

# Wenhan (Winston) Cao

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## RESEARCH INTERESTS

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My research interests are optimal control and estimation using Bayesian machine learning, with applications to autonomous vehicles and robots.

## EDUCATION

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### **The University of Manchester, Manchester, UK**

*Visiting Ph.D. Student, Department of Computer Science, January 2023-now*

Supervisor: Dr. Wei Pan, Senior Lecturer of Computer Science

### **Technical University of Munich, Munich, Germany**

*Visiting Ph.D. Student, School of Computation, Information and Technology, September 2023-December 2023*

Supervisor: Dr. Sandra Hirche, Professor of Control and Optimization

### **Tsinghua University, Beijing, China**

*Ph.D. Student, School of Vehicle and Mobility, September 2019-now*

Supervisor: Dr. Shengbo Eben Li, Professor of Mechanical Engineering

### **Beijing Jiaotong University, Beijing, China**

*Bachelor of Engineering, School of Electrical Engineering, September 2015-June 2019*

GPA ranking: 1/305

## SELECTED PAPERS

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**Wenhan Cao**, Shiqi Liu, Chang Liu, Zeyu He, Stephen S.-T. Yau & Shengbo Eben Li. *Convolutional Bayesian Filtering*. Submitted to IEEE TAC (Available at <https://arxiv.org/abs/2404.00481>).

**Wenhan Cao**, Chang Liu, Zhiqian Lan, Shengbo Eben Li, Wei Pan & Angelo Alessandri. *Robust Bayesian Inference for Moving Horizon Estimation*. Provisionally Accepted by Automatica as Brief Paper (Available at <https://arxiv.org/abs/2210.02166>).

Shiqi Liu, **Wenhan Cao**, Chang Liu, Tianyi Zhang & Shengbo Eben Li. *Convolutional Unscented Kalman Filter for Multi-Object Tracking with Outliers*. Accepted by IEEE Transactions on Intelligent Vehicles (Available at <https://arxiv.org/abs/2406.01380>).

**Wenhan Cao** & Wei Pan (2024). *Impact of Computation in Integral Reinforcement Learning for Continuous-Time Control*. In 2024 International Conference on Learning Representations (ICLR). (Spotlight)

**Wenhan Cao**, Alexandre Capone, Rishabh Yadav, Sandra Hirche & Wei Pan. *Computation-Aware Learning for Stable Control with Gaussian Process*. Accepted by Robotics: Science and Systems (RSS) 2024.

**Wenhan Cao**, Chang Liu, Zhiqian Lan, Yingxi Piao & Shengbo Eben Li (2023, May). *Generalized Moving Horizon Estimation for Nonlinear Systems with Robustness to Measurement Outliers*. In 2023 American Control Conference (ACC) (pp. 1614-1621). IEEE.

Jingliang Duan, **Wenhan Cao**, Yang Zheng & Lin Zhao (2023). *On the Optimization Landscape of Dynamic Output Feedback Linear Quadratic Control*. IEEE Transactions on Automatic Control. (Regular Paper)

**Wenhan Cao**, Jingliang Duan, Shengbo Eben Li, Chen Chen, Chang Liu, & Yu Wang. (2022, December). *Primal-Dual Estimator Learning Method with Feasibility and Near-Optimality Guarantees*. In 2022 IEEE 61st Conference on Decision and Control (CDC) (pp. 4104-4111). IEEE.

**Wenhan Cao**, Jianyu Chen, Jingliang Duan, Shengbo Eben Li & Yao Lyu. (2021). *Reinforced Optimal Estimator*. IFAC-PapersOnLine, 54(20), 366-373.

## HONORS & AWARDS

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*Student Best Paper Finalist of 2021 IFAC Modeling, Estimation and Control Conference*, Texas, USA, 2021

*National Scholarship*, Beijing, China, 2016

*The First Prize Scholarship*, Beijing, China, 2016 – 2018

## INVITED TALKS & CONFERENCES PRESENTATIONS

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*Convolutional Bayesian Filtering* at the Department of Mathematical Sciences, Tsinghua University, Beijing, China, hosted by Prof. [Stephen Shing-Toung Yau](#), February 2024.

*Generalized Moving Horizon Estimation for Nonlinear Systems with Robustness to Measurement Outliers* in 2023 American Control Conference, San Diego, CA, USA (Oral Presentation), May 2023.

*Learning-based state estimation methods* at the Technical University of Munich, Munich, Germany (Online Presentation), hosted by Prof. [Sandra Hirche](#), February 2023.

*Primal-Dual Estimator Learning Method with Feasibility and Near-Optimality Guarantees* in 2022 IEEE 61st Conference on Decision and Control, Cancún, Mexico (Oral Presentation), December 2022.

*Reinforced Optimal Estimator* in 2021 IFAC Modeling, Estimation and Control Conference, Texas, USA (Oral Presentation), October 2021.

*Accelerated Inverse Reinforcement Learning with Randomly Pre-sampled Policies for Autonomous Driving Reward Design* in 2019 IEEE Intelligent Transportation Systems Conference, Auckland, New Zealand (Oral Presentation), October 2019.

## PROFESSIONAL SERVICES

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I serve as an active reviewer for CDC, ACC, L4DC, RA-L, AAMAS, TASE and TITS.