

# Yuchen Zhang

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## Research Interests

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**Multi-sensor fusion estimation, set-membership estimation, privacy-protecting distributed estimation, set programming**

## Education

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### Zhejiang University of Technology

Sep. 2017 – Jan. 2024

- Major: Ph.D., Control Science and Engineering
- Supervisor: Prof. Li Yu and Prof. Bo Chen
- ETCS: 69 GPA: 3.71/4.0 Ranking: 4/98

### Zhejiang University of Technology

Sep. 2013 – Jun. 2017

- Major: Bachelor of Engineering, Electrical Engineering and Automation
- Supervisor: Prof. Li Yu
- ETCS: 210 GPA: 3.27/4.0 Ranking: 32/121

## Visiting Experience

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### Research Assistant at University of Macau

Jul. 2023 – Oct. 2023

- Project: Distributed Control of Interconnected Positive Systems with Constraints
- Supervisor: Prof. Jason J. R. Liu, Faculty of Science and Technology

### Visiting PhD Student at City University of Hong Kong

Jul. 2018 – Oct. 2018

- Project: Secure Estimation and Control of Networked Systems under Cyber-Attacks
- Supervisor: Prof. Daniel W. C. HO, Department of Mathematics

## Projects

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### Distributed Secure State Estimation for Large Scale Interconnected Cyber-Physical Systems under Cyber Attacks, National Natural Science Foundation of China

Jan. 2020 – Dec. 2023

- PI: Li Yu
- Modeled large-scale interconnected systems and analyzed their observability
- Designed distributed estimators for large-scale interconnected systems
- Designed distributed fusion estimators to address the redundant information caused by overlapping states in interconnected systems

**Cyber-Attack Detection and Secure State Estimation in Cyber-Physical Systems: From Perspective of Distributed Fusion, National Natural Science Foundation of China**

Jan. 2020 – Dec. 2023

- PI: Bo Chen
- Analyzed the privacy issues in distributed estimators
- Designed a noise contamination mechanism to achieve private multiplication
- Designed a private weighted sum aggregation scheme
- Designed privacy-protecting distributed estimators for cyber-physical systems

**Attack Detection and Secure State Estimation for Networked Fusion Systems, Zhejiang Provincial Natural Science Foundation of China**

Jan. 2020 – Dec. 2023

- PI: Bo Chen
- Conducted surveys for cyber attacks, privacy security, and secure state estimation algorithms

## Publications

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### Papers under Review

4. **Y. Zhang**, B. Chen\*, Jason J. R. Liu, Z. Wang, and L. Yu, “Distributed zonotopic fusion estimation for multi-sensor systems,” **IEEE Transactions on Automatic Control** (Under Review).
3. **Y. Zhang**, B. Chen\*, and L. Yu, “Privacy-aware distributed estimation for interconnected systems,” **Automatica** (Reject provisionally - may be resubmitted as Regular Paper).
2. **Y. Zhang**, B. Chen\*, L. Yu, and D. W. C. Ho, “Distributed estimation for time-varying interconnected dynamic systems with arbitrary coupling structures,” **IEEE Transactions on Network Science and Engineering** (Minor Revision).
1. A. Mao, **Y. Zhang**, Z. Wang, and B. Chen\*, “Minimal Sensor Activation for Detectable Networked Discrete Event Systems,” **IEEE Control Systems Letters** (Under Review).

### Journal Papers

10. **Y. Zhang**, B. Chen\*, and L. Yu, “Overlapping fusion estimation for discrete time-varying interconnected systems,” **IEEE Control Systems Letters**, vol. 7, pp. 2125-2130, 2023.
9. **Y. Zhang**, B. Chen\*, and L. Yu, “Distributed zonotopic estimation for interconnected systems: A fusing overlapping states strategy,” **Automatica**, vol. 155, 2023, Art. no. 111144.
8. X. Yan, B. Chen\*, **Y. Zhang**, and L. Yu, “Distributed encryption fusion estimation against full eavesdropping,” **Automatica**, vol. 153, 2023, Art. no. 111025.
7. X. Yan, B. Chen\*, **Y. Zhang**, Li Yu, “Guaranteeing differential privacy in distributed fusion estimation,” **IEEE Transactions on Aerospace and Electronic Systems**, vol. 59, no. 3, pp. 3416-3423, 2023.
6. D. Xu, B. Chen\*, **Y. Zhang**, and L. Yu, “Distributed anti-eavesdropping fusion estimation under energy constraints,” **IEEE Transactions on Automatic Control**, vol. 68, no. 12, pp. 7795-7802, 2023.
5. Z. Hu, B. Chen\*, **Y. Zhang**, and L. Yu, “Kalman-Like filter under binary sensors,” **IEEE Transactions on Instrumentation and Measurement**, vol. 71, 2022, Art. no. 9503111.
4. X. Yan, **Y. Zhang**, D. Xu, and B. Chen\*, “Distributed confidentiality fusion estimation against eavesdroppers,” **IEEE Transactions on Aerospace and Electronic Systems**, vol. 58, no. 4, pp. 3633-3642, 2022.
3. **Y. Zhang**, B. Chen\*, L. Yu, and D. W. C. Ho, “Distributed Kalman filtering for interconnected dynamic systems,” **IEEE Transactions on Cybernetics**, vol. 52, no. 11, pp. 11571-11580, 2021.
2. **Y. Zhang**, B. Chen\*, and L. Yu, “Distributed fusion Kalman filtering under binary sensors,” **Int J Robust Nonlinear Control**, vol. 30, no. 6, pp. 2570-2578, 2020.

1. **Y. Zhang**, B. Chen\*, and L. Yu, “Fusion estimation under binary sensors,” **Automatica**, vol. 115, 2020, Art. no. 108861.

## Conference Papers

1. **Y. Zhang**, B. Chen\*, L. Yu, and H. Song, “Bounded recursive optimization approach for pose estimation in robotic visual servoing,” in *Intelligent Robotics and Applications*, vol. 11740. Cham: Springer International Publishing, 2019, pp. 488–497.

## Patents

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3. Bo Chen, **Yuchen Zhang**, Li Yu, Wenan Zhang, Zhen Hong. (2019). Bounded Recursive Optimization Based Robotic Pose Estimation Approach. CN 201910896428.1 (**Authorized**).
2. Bo Chen, **Yuchen Zhang**, Li Yu, Wenan Zhang, Zhen Hong. (2019). Binary Sensor Based Bounded Recursive Optimization Fusion Filtering for Blood Oxygen Content Estimation. CN 201910896450.6 (**Authorized**).
1. Bo Chen, **Yuchen Zhang**, Li Yu, Zhen Hong, Wenan Zhang. (2019). Binary Sensor Based Fusion Kalman Filtering for Blood Oxygen Content Estimation. CN 201910896449.3 (**Authorized**).

## Talks

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2. Oral Presentation in International Conference on Intelligent Robotics and Applications. Shenyang, China, 2019.
1. Oral Presentation in Hong Kong and Macao Doctoral Academic Exchange Conference. Harbin, China, 2023.

## Academic Services

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2. Reviewer of Systems & Control Letters
1. Reviewer of Automatica

## Honors and Awards

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1. Chinese National Scholarship for Doctoral Students (2020)

## Referees

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4. Zheming Wang, Professor, Department of Automation, Zhejiang University of Technology, [wangzheming@zjut.edu.cn](mailto:wangzheming@zjut.edu.cn)
3. Bo Chen, Professor, Department of Automation, Zhejiang University of Technology, [bchen@aliyun.com](mailto:bchen@aliyun.com)
2. Li Yu, Professor, Department of Automation, Zhejiang University of Technology, [lyu@zjut.edu.cn](mailto:lyu@zjut.edu.cn)
1. Daniel W. C. HO, Professor, Department of Mathematics, City University of Hong Kong, [madaniel@cityu.edu.hk](mailto:madaniel@cityu.edu.hk)