

# Yuchen Zhang

Email: [YuchenZhang95@163.com](mailto:YuchenZhang95@163.com) · Phone: (+86)151-5809-8966 · [Homepage](#)

Address: ZJUT, 288, Liuhe Road, Hangzhou, P.R. China, 310023

## Research Interests

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**Multi-sensor fusion estimation, set-membership estimation, privacy-preserving 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

11. **Y. Zhang**, B. Chen\*, and L. Yu. "Overlapping fusion estimation for discrete time-varying interconnected systems." **IEEE Control Systems Letters**, 7: 2125-2130, 2023. [\[PDF\]](#).
10. **Y. Zhang**, B. Chen\*, and L. Yu. "Distributed zonotopic estimation for interconnected systems: A fusing overlapping states strategy." **Automatica**, 155: 111144, 2023. [\[PDF\]](#).
9. X. Yan, B. Chen\*, **Y. Zhang**, and L. Yu. "Distributed encryption fusion estimation against full eavesdropping." **Automatica**, 153: 111025, 2023. [\[PDF\]](#).
8. X. Yan, B. Chen\*, **Y. Zhang**, Li Yu. "Guaranteeing differential privacy in distributed fusion estimation." **IEEE Transactions on Aerospace and Electronic Systems**, 59(3): 3416-3423, 2023. [\[PDF\]](#).
7. D. Xu, B. Chen\*, **Y. Zhang**, and L. Yu. "Distributed anti-eavesdropping fusion estimation under energy constraints." **IEEE Transactions on Automatic Control**, 68(12): 7795-7802, 2023. [\[PDF\]](#).
6. Z. Hu, B. Chen\*, **Y. Zhang**, and L. Yu. "Kalman-Like filter under binary sensors." **IEEE Transactions on Instrumentation and Measurement**, 71: 9503111, 2022. [\[PDF\]](#).
5. X. Yan, **Y. Zhang**, D. Xu, and B. Chen\*. "Distributed confidentiality fusion estimation against eavesdroppers." **IEEE Transactions on Aerospace and Electronic Systems**, 58(4): 3633-3642, 2022. [\[PDF\]](#).
4. **Y. Zhang**, B. Chen\*, L. Yu, and D. W. C. Ho. "Distributed Kalman filtering for interconnected dynamic systems." **IEEE Transactions on Cybernetics**, 52(11): 11571-11580, 2021. [\[PDF\]](#).
3. M. Xu, **Y. Zhang**, D. Zhang, B. Chen\*. "Distributed robust dimensionality reduction fusion estimation under DoS attacks and uncertain covariances." **IEEE Access**, 9: 10328-10337, 2021. [\[PDF\]](#).

2. **Y. Zhang**, B. Chen\*, and L. Yu. “Distributed fusion Kalman filtering under binary sensors.” **International Journal of Robust and Nonlinear Control**, 30(6): 2570–2578, 2020. [\[PDF\]](#).
1. **Y. Zhang**, B. Chen\*, and L. Yu. “Fusion estimation under binary sensors.” **Automatica**, 115: 108861, 2020. [\[PDF\]](#).

## 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: 12th International Conference (ICIRA)**, Springer International Publishing, 11740: 488–497, 2019. [\[PDF\]](#).

## 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)