

# Wang Xinyi

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## Education

- **Postdoctoral Fellow**, Robotics Department, University of Michigan 09/2024-Now
- **Postdoctoral Fellow**, Department of Mechanical & Automation Engineering, The Chinese University of Hong Kong 10/2023-09/2024
- **Ph.D. Degree**, Department of Mechanical & Automation Engineering, The Chinese University of Hong Kong 08/2019-09/2023
- Supervisor & Co-supervisor:**  
Prof. Ben M. Chen (IEEE Fellow & Academy of Engineering Fellow, Singapore)  
& Prof. Jie Huang (IFAC Fellow & IEEE Fellow)
- **B.Eng. Degree**, Flight Vehicle Design and Engineering, Xiamen University 09/2015-06/2019

## Research Interests

Optimization and Control Theory, Multi-Agent System, Safe Reinforcement Learning, Motion Planning.

## Publications

(# = equal contribution, \* = corresponding author)

### ● Journals

- [1] J. Chen, Y. Luo, J. Li, **X. Wang**, M. Guo. AMBUSH: Collaborative Capture in Complex Environments with Neural Acceleration. IEEE Transactions on Robotics (T-RO), 2025 (Under review).
- [2] V. S. Chipade, **X. Wang**, D. Panagou. IDCAIS: Inter-Defender Collision-Aware Interception Strategy against Multiple Attackers. IEEE Transactions on Control of Network Systems (TCNS), 2024. (Second round under review)
- [3] **X. Wang**, L. Xi, Y. Ding, B. M. Chen. Distributed Encirclement and Capture of Multiple Pursuers with Collision Avoidance. IEEE Transactions on Industrial Electronics (TIE), 2023.
- [4] C. Gao, **X. Wang\***, X. Chen, B. M. Chen. A Hierarchical Multi-UAV Cooperative Framework for Infrastructure Inspection and Reconstruction. Control Theory and Technology (CTT), 2023.
- [5] **X. Wang**, L. Xi, Y. Chen, S. Lai, F. Lin, B. M. Chen. Decentralized MPC-based Trajectory Generation for Multiple Quadrotors in Cluttered Environments. Guidance, Navigation and Control (GNC), 2021.
- [6] C. Gao, **X. Wang**, R. Wang, Z. Zhao, Y. Zhai, X. Chen, B. M. Chen. A UAV-based Explore-then-exploit System for Autonomous Indoor Facility Inspection and Scene Reconstruction. Automation in Construction (AIC), 2022.
- [7] L. Xi, **X. Wang**, L. Jiao, S. Lai, Z. Peng, B. M. Chen. GTO-MPC-Based Target Chasing Using a Quadrotor in Cluttered Environments. IEEE Transactions on Industrial Electronics (TIE), 2021.

### ● Conference papers

- [1] **X. Wang**, T. Kim, B. Hoxha, G. Fainekos, D. Panagou, Safe Navigation in Uncertain Crowded Environments Using Risk Adaptive CVaR Barrier Functions. IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2025.
- [2] C. Wang, **X. Wang**, Y. Dong, L. Song, X. Guan. Multi-Constraint Safe Reinforcement Learning via Closed form Solution for Log-Sum-Exp Approximation of Control Barrier Functions. Learning for Dynamics & Control Conference (L4DC), 2025.
- [3] **X. Wang**, J. Xu, C. Gao, Y. Chen, J. Zhang, C. Wang and B. M. Chen, Sensor-based Multi-robot Search and Coverage with Spatial Separation in Unstructured Environments. IEEE International Conference on Robotics and

Automation (ICRA), 2024.

[4] **X. Wang**, Y. Ding, Y. Chen, R. Han, L. Xi, B. M. Chen. OA-ECBVC: A Cooperative Collision-free Encirclement and Capture Approach in Cluttered Environments. IEEE Conference on Decision and Control (CDC), 2023.

[5] Y. Chen, R. Wang, **X. Wang\***, B. M. Chen. Sampling-based Path Planning under Temporal Logic Constraints with Real-time Adaptation. IEEE International Conference on Robotics and Automation (ICRA), 2023.

[6] **X. Wang\***, C. Gao, X. Chen, B. M. Chen. Fast and Secure Distributed Multi-agent Coverage Control with an Application to Infrastructure Inspection and Reconstruction. Chinese Control Conference (CCC), 2023, Guan Zhao-Zhi Award Finalist.

[7] C. Gao, **X. Wang\***, X. Chen, B. M. Chen. An Active Search Strategy with Multiple Unmanned Aerial Systems for Multiple Targets. International Conference on Unmanned Aircraft Systems (ICUAS), 2024.

[8] L. Xi#, **X. Wang#**, Ding Y, Y. Wei, Z. Peng, B. M. Chen. Quadrotor Trajectory Planning for Visibility-aware Target Following. IEEE International Conference on Robotics and Biomimetics (ROBIO), 2021.

[9] **X. Wang\***, L. Xi, Y. Chen, S. Lai, F. Lin, B. M. Chen. Decentralized Trajectory Generation Technique for Multiple Unmanned Multi-copter Systems in Cluttered Environments. The 12th International Micro Air Vehicle Conference (IMAV), 2021.

[10] Y. Chen, **X. Wang**, R. Wang, Z. Guo, S. Lai, B. M. Chen. An Interactive System for Multiple-task Linear Temporal Logic Path Planning. IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2023.

[11] R. Wang, Z. Guo, Y. Chen, **X. Wang** and B. M. Chen, Air bumper: A collision detection and reaction framework for autonomous MAV navigation. IEEE International Conference on Robotics and Automation (ICRA), 2024.

#### ● Patents

[1] B. M. Chen, Y. Chen, R. Wang, **X. Wang**, Xi Chen. A Human-in-the-Loop System for Mobile Robot Task Planning. Patent of the United States, No. 63/450,314, Mar. 6, 2023.

### **Research Grants**

- **Collaborative Research: CPS: Medium: Enabling Autonomous, Persistent, and Adaptive Mobile Observational Networks Through Energy-Aware Dynamic Coverage.** National Science Foundation (NSF), 2022-2025. **Core Member.**
- **Socially Aware Safe Navigation for Heterogeneous Multi-Agent Systems.** Toyota Research North America, 2023-2025. **Core Member.**
- **Aerial-Marine Collaborative Heterogeneous Multi-Agent Systems with Digital Twin Technology for Smart Oceans.** General Research Fund, Hong Kong, 2025–2027. **Write proposal & Co-I.**
- **Collaborative Task Assignment of Multi-Agent Unmanned Systems for Infrastructure Inspection.** General Research Fund, Hong Kong, 2024–2026. **Write proposal & Core Member.**
- **Collaborative Search and Pursuit-evasion for Unmanned Systems in Cluttered Environments.** General Research Fund, Hong Kong, 2023-2025. **Write proposal & Core Member.**
- **Advanced Motion Planning Techniques for the Cooperation of Multi-agent Systems.** General Research Fund, Hong Kong, 2022–2024. **Core Member.**
- **Development of an Integrated Autonomous Building Inspection and Information Management.** InnoHK Center for Logistics Robotics, Hong Kong, 2020–2025. **Core Member.**

## Technical Skills

- Experienced in Python, MATLAB, Julia, C++, Pytorch, Robot Operating System (ROS), Gazebo

## Courses & Teaching Experience

- IERG 5350 Reinforcement Learning, instructed by Professor Bolei Zhou.
- ENGG 5501 Foundations of Optimization, instructed by Professor Anthony Man-Cho So.
- ELEG 5491 Introduction to Deep Learning, instructed by Professor Hongsheng Li.

Teaching Experience:

- EECS 560 Linear Systems Theory, **Co-instructor** with Professor Necmiye Ozay
- MAEG 3080 Fundamentals of Machine Intelligence, **Teaching Assistant**, instructed by Professor Juan Luis.
- ENGG 5402 - Advanced Robotics, **Teaching Assistant**, instructed by Professor Fei Chen.

## Awards & Honors

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|--------------------------------------------------------------------------------------|-------------------|
| Postdoctoral Scholarship, the Innovation and Technology Fund of Hong Kong            | 10/2023-09/2024   |
| Professor Charles K. Ko Student Creativity Award, CUHK                               | 06/2023           |
| Research Postgraduate Studentship, CUHK                                              | 2019-2023         |
| Outstanding Graduates, XMU (Top 2%)                                                  | 06/2019           |
| Merit Student, XMU (Twice, Top 8%)                                                   | 12/2016 & 12/2017 |
| Third Prize in RoboMaster 2017 (The 16th National College Students Robotics Contest) | 08/2017           |
| Xiamen International Bank Scholarship, XMU (Top 4%)                                  | 04/2017           |

## Academic Services

### ● Reviewer of Journals

- IEEE Transactions on Robotics (TRO)
- IEEE Transactions on Automatic Control (TAC)
- IEEE Transactions on Cybernetics
- IEEE Robotics and Automation Letters (RA-L)
- IEEE Transactions on Intelligent Transportation Systems (T-ITS)
- International Journal of Robust and Nonlinear Control

### ● Reviewer of Conferences

- Associate Editor of IEEE International Conference on Control and Automation (ICCA)
- Robotics: Science and Systems (RSS)
- IEEE International Conference on Robotics and Automation (ICRA)
- IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)
- IEEE Conference on Decision and Control (CDC)
- IEEE International Conference on Unmanned Aircraft Systems (ICUAS)