Weijian Zhang

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EDUCATION

University of Birmingham — Birmingham, United Kingdom
Ph.D. Candidate in Computer Science — *Feb. 2023 – Present*
Advisor: Prof. Masoumeh Mansouri
Thesis: Formation Control and Motion Planning for Multi-Robot System

University of Birmingham — Birmingham, United Kingdom
M.Sc. in Robotics (Degree Class: Distinction) — *Sep. 2021 – Sep. 2022*
Advisor: Prof. Masoumeh Mansouri
Thesis: Multi-robot object delivery in formation based on convex optimization

Southwest Jiaotong University — Chengdu, China
B.Eng. in Automation — *Sep. 2017 – Jue. 2021*

RESEARCH INTERESTS

My research interests lie at the intersection of **planning** and **control** in multi-robot systems. My current research interests focus on **multi-robot formation control**, **multi-robot motion planning**, and **multi-robot cooperative manipulation**.

PUBLICATIONS

[1] Multi-Robot Navigation in Obstacle-cluttered Environments with LOS connectivity
Weijian Zhang, Charlie Street and Masoumeh Mansouri
In Progress

[2] Collaborative Human-Robot Object Transportation Using a Deformable Sheet
Weijian Zhang, Charlie Street and Masoumeh Mansouri
IEEE International Conference on Robotics and Automation (ICRA), 2026.
Under Review

[3] Robots Calling the Shots: Using Multiple Ground Robots for Autonomous Tracking in Cluttered Environments
Weijian Zhang, Charlie Street and Masoumeh Mansouri
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2025. [PDF] [VIDEO] [CODE]

[4] Multi-Nonholonomic Robot Object Transportation with Obstacle Crossing Using a Deformable Sheet
Weijian Zhang, Charlie Street and Masoumeh Mansouri
IEEE International Conference on Robotics and Automation (ICRA), 2025. [PDF] [VIDEO] [CODE]
Selected for Best Conference Paper Award Finalist & Best Paper Award Finalist on Multi-Robot Systems

[5] A Decoupled Solution to Heterogeneous Multi-Formation Planning and Coordination for Object Transportation
Weijian Zhang, Charlie Street and Masoumeh Mansouri
Robotics and Autonomous Systems (RAS), 2024. [PDF] [VIDEO] [CODE]
Selected for Best Poster award at The 7th IEEE UK & Ireland RAS Conference

[6] Multi-Formation Planning and Coordination for Object Transportation
Weijian Zhang, Charlie Street and Masoumeh Mansouri
IEEE European Conference on Mobile Robots (ECMR), 2023. [PDF] [VIDEO] [CODE]

RESEARCH EXPERIENCE

Using Multiple Ground Robots for Autonomous Tracking in Cluttered Environments — Oct. 2024 – Mar. 2025
Research Student, University of Birmingham — *Advisor: Prof. Masoumeh Mansouri and Dr. Charlie Street*

- Introduced a novel hierarchical multi-robot trajectory planning framework which maximizes camera coverage in cluttered environments while avoiding collisions and maintaining visibility of the human.
- Evaluated our approach in simulation, demonstrating how we outperform existing works by explicitly considering the kinodynamic constraints of differential-drive robots and the topology of the environment.

Collaborative Object Transportation Using a Deformable Sheet — Aug. 2024 – Ste. 2025
Research Student, University of Birmingham — *Advisor: Prof. Masoumeh Mansouri and Dr. Charlie Street*

- Designed a multi-modal real-time formation trajectory planning framework where leadership switches between the human and robots to maximize safety and transportation efficiency.
- Developed a method for computing feasible regions that can be visualized to the human to guide them during obstacle crossing.
- Proposed a heuristic path exploration method which efficiently evaluates a set of homotopically distinct solution spaces for the formation.
- Proposed a two-stage iterative motion planning framework for finding locally time-optimal collision-free formation trajectories using a deformable sheet.
- Validated the efficacy of our framework in simulation and through real robot experiments.

Heterogeneous Multi-Formation Planning and Coordination for Object Transportation Feb. 2023 – Jul. 2024

Research Student, University of Birmingham *Advisor: Prof. Masoumeh Mansouri and Dr. Charlie Street*

- Designed a comprehensive H-MFPC framework which integrates formation generation, planning, and coordination techniques for heterogeneous formations.
- Proposed an efficient formation generation approach for heterogeneous multi-robot systems which synthesises collision-free and kinematically feasible trajectories in unstructured environments.
- Proposed a cost-optimal formation planning method that maintains rigidity for heterogeneous formations.
- Proposed a loosely-coupled multi-formation coordination algorithm for ensuring deadlock-free and collision-free navigation among formations.

SELECTED AWARDS

Exceptional Contribution from a Doctoral Researcher (Shortlisted for 2026) - *University of Birmingham* Dec. 2025

ICRA 2025 Best Conference Paper Award Finalist - *IEEE* May 2025

ICRA 2025 Best Paper Award Finalist on Multi-Robot Systems - *IEEE* May 2025

RAS 2024 Best Poster award - *IEEE* Jul. 2024

Computer Science School Prize - *University of Birmingham* Dec. 2022

Comprehensive Scholarship - *Southwest Jiaotong University* Dec. 2020

Comprehensive Scholarship - *Southwest Jiaotong University* Dec. 2019

ACADEMIC SERVICE

Reviewer: ICRA (2024, 2025, 2026), IROS (2024, 2025), AAMAS (2025), MRS (2025), RITA (2025)

Teaching Assistant: LM Robot Vision (*University of Birmingham*, Autumn 2023), LH Computer Vision and Imaging (*University of Birmingham*, Autumn 2023), LC Artificial Intelligence 1 (*University of Birmingham*, Spring 2024/2025), LM Advanced Robotics (*University of Birmingham*, Autumn 2024), LH/LM Intelligent Robotics (*University of Birmingham*, Autumn 2024), LM Robot Motion Planning and Control (*University of Birmingham*, Spring 2025/2026)

SKILLS

Languages: English (Fluent), Chinese (Native)

Programming Tools: Python, C++, MATLAB, LaTeX

Frameworks: Git, ROS, Gazebo, Pybullet, Linux

Platforms: TurtleBot3/4, MiR, HUNTER SE