

Yi Wang

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RESEARCH INTERESTS

State-of-the-art robotics optimal motion planning, bidirectional heuristic search, real-time autonomous systems, optimal controller, and graph-based optimization techniques. Focused on solving open questions in motion planning and heuristic search to push the boundaries of efficiency, scalability, and robustness in robotic autonomy.

RESEARCH EXPERIENCE

Phd Candidate (Research Assistant) at University of New Hampshire 2022-present

- Introduced the **first algorithm** that develops lazy any incremental bidirectional heuristic search within batch-wise sampling motion planning, setting a new benchmark in efficiency & robustness in high-dimensional continuous state space (**Open question**).
- Developed the **first algorithm** for premature termination in bidirectional heuristic search while ensuring optimality and maintaining the *meet-in-the-middle* property (**Open question**).
- Established a **lower bound** for informed sampling to **address the curse of dimensionality** in high-dimensional continuous state spaces for kinodynamic robotic systems (**Open question**).
- Collaborating with Professor **Oren Salzman (Technion)** on sampling-based motion planning and bidirectional heuristic search.

SELECTED PUBLICATIONS

Peer-reviewed Conferences and Journals

- **Yi Wang**, Bingxian Mu, Oren Salzman. “Asymptotically Optimal Sampling-Based Motion Planning Through Anytime Incremental Lazy Bidirectional Heuristic Search” **Proceedings of IEEE International Conference on Robotics & Automation (ICRA)**, 2025.
- **Yi Wang**, Eyal Weiss, Bingxian Mu, Oren Salzman. “Bidirectional Search while Ensuring Meet-In-The-Middle via Effective and Efficient-to-Compute Termination Conditions”. **Proceedings of International Joint Conference on Artificial Intelligence (IJCAI)**, 2025.
- Xiangyu Zhang, **Yi Wang**, Bingxian Mu, Se Young Yoon. EMPC-Based Flight Control and Collision-Free Path Planning for A Quadrotor with Unbalanced Payload. **Proceedings of IEEE/ASME Transactions on Mechatronics (TMECH)**, 2025.

Under Review & Work in Progress

- “Asymptotically Optimal Sampling-Based Motion Planning by Anytime Incremental Lazy Bidirectional Heuristic Search”. **International Journal of Robotics Research (IJRR)** (Submitting in late 2025).
- “Tighter Termination for Bidirectional Heuristic Search: Preserving Meet-in-the-Middle and Optimality”. **Artificial Intelligence Journal (AIJ)** (Submitting in late 2025).

HONORS & AWARDS

Special IJCAI 2025 DC Travel Award June, 2025
Awarded by the National Science Foundation (NSF) to selected U.S.-based Ph.D. students with accepted proceedings paper at IJCAI 2025.

ICRA 2025 Travel Grant Feb, 2025
Awarded by the IEEE Robotics & Automation Society (RAS) Member Support Program.

TALKS & INVITED ORAL

Lightning talk, Doctoral Consortium, IJCAI 2025 Aug, 2025
Selected as one of six lightning talks of selected papers from main conference track of IJCAI.

OPEN SOURCE CONTRIBUTION

Open Motion Planning Library Contributor Oct, 2025-present
BLIT* has been merged into Open Motion Planning Library (OMPL).

EDUCATION

University of New Hampshire
Ph.D. in System Design. 2022–Present

M.Sc. in Computer Science. 2017–2022
 Project: Batch Informed Trees (BIT*) for a Dubins vehicle amid dynamic obstacles.
Xi’An Technological University
 M.Sc. in Control Theory and Control Engineering. 2011–2014
 Thesis: 3D Path Planning based on Ant Colony algorithm and Elevation Model, Research
 Mentor: Prof. Qinkun Xiao.
College of JinCheng of NUAA
 B.Sc. in Electrical Engineering and Automation. 2006-2010
 Thesis: Path Planning of Artificial Fields, Research Advisor: Prof. Congqing Wang.

PROFESSIONAL EXPERIENCE Teaching Assistant 2017 - 2022, 2025-Present
 Involved in creating assignments, exams and conducting recitation sessions for Intro to Computer Science (Java), Data Structure and Algorithms(C++), From problems to algorithms to programs(Python), An introduction to Artificial Intelligence, Systems modeling, simulations and control.

COMMUNITY SERVICE Journal Reviewer

- IEEE Transactions on Industrial Informatics (TII)
- IEEE/ASME Transactions on Mechatronics (TMECH)
- International Journal of Robotics and Automation (IJRA)
- IEEE Canadian Journal of Electrical and Computer Engineering (ICJECE)
- Control Theory and Technology (CTT)
- IEEE Journal of Emerging and Selected Topics in Industrial Electronics (JESTIE).
- Transactions of the Canadian Society for Mechanical Engineering (TCSME)

 Conference Reviewer

RESEARCH PROJECTS **Motion Retrieval Using Graph Modeling** 07/2013-06/2014

- National Natural Science Foundation of China NO:61271362
- Research on the data of motion retrieval involved in military training, sports, teaching, film, and game production. Based on the Graph model, we establish movement data descriptor, look for suitable motion data comparison method and then form motion data retrieval demonstration system.

Path Planning Algorithm of outdoor Environment For UGV 12/2012-06/2013

- Research Projects of Shaanxi Province Education Office NO:12J0510
- This project consists of three parts: research for the path planning algorithm for an unmanned ground vehicle in uneven outdoor spatial environments, research on outdoor environment perception and reconstruction based on multi-sensor fusion as well as research on real-time locating and tracing.

Retrieval of Multi-Motion System In A Multi-perspective Environment 12/2012-12/2012

- National Natural Science Foundation of Shaanxi Province NO:2012JM8028
- Research on Multi-angle moving objects and velocity measure mechanism using dynamic Bayesian Network. Measure dynamic network multi-angle moving objects and velocity mechanism.

Retrieval of Multi-View Moving Objects Under A complex Environment 01/2012-06/2012

- Special Funds of Shaanxi Province Education Office NO:12JK0727
- Multi-view video streaming based on Content Based Retrieval System, Which can be used in airport security, major intersection security and intelligent information management.

Road Detection Based on Machine Vision 12/2012-06/2013

- Special Funds of Xi’an Technological University NO:XG001
- Design the road recognition system of unmanned ground vehicles based on machine vision, including its hardware system, data analysis as well as real-time image processing. Transfer the video into sequential images through an image capture card, and design a set of fast and accurate video processing algorithm for identify vehicle on the road.

TECHNICAL SKILLS Languages: C++, C, R, Python, Matlab, Java.

Robotics Tools: OMPL, MoveIt!.
Dev Tools: Linux, Github.