

# SHUAI ZHOU

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## RESEARCH INTERESTS

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Multi-Agent/Robot Systems, Heuristic Search, Motion Planning

## EDUCATION

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### SOUTH CHINA UNIVERSITY OF TECHNOLOGY

*Bachelor of Engineering in Robotics, Guangzhou, China*

Sep 2022 — Jun 2026 (Expected)

*Cumulative GPA: 3.86/4.00, Rank: 4/56*

Core curriculum: Artificial Intelligences and technologies, Robotics theory and technology, Design and Manufacture.

### UNIVERSITY OF CALIFORNIA, BERKELEY

*Exchange Student, Berkeley, United States*

Aug 2023 — Dec 2023

*Cumulative GPA: 4.00/4.00*

Core curriculum: Data Structures, Designing information devices and Systems I, Introduction to Solid Mechanics.

## ACADEMIC EXPERIENCE

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### CARNEGIE MELLON UNIVERSITY, ARCS Lab

*Research Intern, Pittsburgh, United States*

Apr 2025 — Present

*Supervised by Prof Jiaoyang Li*

- Co-lead research on an anytime planner for Multi-Agent Path Finding (MAPF) with deadlines and kinematic constraints.
- Combine deadline-aware heuristics with learning-based execution models to adapt MAPF to real-world scenarios.
- Design, implement (C++), and evaluate planning algorithms in both simulation and on physical mobile robots.

### UNIVERSITY OF CALIFORNIA, IRVINE, IDM Lab

*Collaboration via RAP Lab, Irvine, United States*

Mar 2025 — Present

*Supervised by Prof Sven Koenig*

- Lead research on an anytime planner for Multi-Agent Path Finding with Asynchronous Actions (MAPF-AA).
- Enhance large neighborhood search with congestion-aware heuristics to improve solution refinement.
- Design, implement (C++), and evaluate algorithms in grid-based simulation; lead the writing of the research paper.

### SHANGHAI JIAO TONG UNIVERSITY, RAP Lab

*Research Intern, Shanghai, China*

Apr 2024 — Present

*Supervised by Prof Zhongqiang Ren*

- Led research on a scalable planner for Multi-Agent Path Finding with Asynchronous Actions (MAPF-AA).
- Planned for 1,000 robots using rule-based strategies and extended to a general search framework with provable optimality.
- Designed, implemented (C++), and evaluated algorithms in grid-based simulation; analyzed theoretical properties such as completeness; led the writing of the research paper.
- One first-author paper accepted by **AAAI 2025** and one extended abstract accepted by **SoCS 2025**.

## PUBLICATIONS

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### LSRP\*: Scalable and Anytime Planning for Multi-Agent Path Finding with Asynchronous Actions

[Shuai Zhou](#), Shizhe Zhao, Zhongqiang Ren

— Submitted to Artificial Intelligence (AIJ)

Extended Abstract: <https://doi.org/10.1609/socs.v18i1.36016>

— In SoCS 2025

- Main Contributions: This paper extends the previously proposed LSRP algorithm to an anytime version and is the first method capable of finding optimal solutions for Multi-Agent Path Finding with Asynchronous Actions (MAPF-AA). Given a reasonable amount of computation time, the proposed approach can efficiently handle instances with up to 1,000 agents, achieve near-optimal solutions, and eventually converge to the optimal one. This approach serves as a search framework that can easily incorporate other planners as shortcuts while retaining guarantees of eventual optimality.

### Loosely Synchronized Rule-Based Planning for Multi-Agent Path Finding with Asynchronous Actions

[Shuai Zhou](#), Shizhe Zhao, Zhongqiang Ren

— In AAAI 2025

Paper: <https://doi.org/10.1609/aaai.v39i14.33618> | Code: [https://github.com/rap-lab-org/public\\_LSRP](https://github.com/rap-lab-org/public_LSRP)

- Main Contributions: This paper proposes a novel approach to Multi-Agent Path Finding with Asynchronous Actions, focusing on scalability over optimality. By integrating search-based (LSS) and rule-based (PIBT) planning, the proposed approach efficiently computes unbounded sub-optimal solutions for large-scale problems. Experiments demonstrate its ability to handle 10× more agents than baselines with only 25% longer makespan.

## SERVICE

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Reviewer: IROS 2025

## SKILLS

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- **OS:** Windows, Linux(Ubuntu)
- **Programming Languages:** Python, C/C++, Java, HTML, MATLAB
- **Languages:** Chinese (native), English (fluent)
- **Additional Courses**
  - CMU: 10301/601 Introduction to Machine Learning
  - CMU: 16-782 Planning and Decision-making in Robotics
  - Coursera: Robotics: Computational Motion Planning
  - Coursera: Robotics: Aerial Robotics

## AWARDS

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| <b>Outstanding Visiting Student Scholarship from USIEA</b><br>Awarded to the top student in the UC Berkeley Global program; received 6,000 CNY               | Guangzhou, China<br>Mar 2024 |
| <b>Merit Student of South China University of Technology</b><br>Top student in the Robotics Engineering major, Class of 2022                                 | Guangzhou, China<br>Feb 2024 |
| <b>The Third Prize Scholarship by South China University of Technology</b><br>Top 10% of students, receiving 10,000 CNY                                      | Guangzhou, China<br>Dec 2023 |
| <b>Exchange Student Scholarship from South China University of Technology</b><br>Awarded to outstanding students for overseas exchange, receiving 40,000 CNY | Guangzhou, China<br>Jul 2023 |

## REFERENCES

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### Prof. Jiaoyang Li

*Assistant Professor, Carnegie Mellon University*

E-mail: jiaoyanl@andrew.cmu.edu

Department: Robotics Institute

### Prof. Sven Koenig

*Chancellor's Professor and Bren Chair, University of California, Irvine*

E-mail: sven.koenig@uci.edu

Department: Donald Bren School of Information and Computer Science

### Prof. Zhongqiang Ren

*Assistant Professor, Shanghai Jiao Tong University*

E-mail: zhongqiang.ren@sjtu.edu.cn

Department: University of Michigan - Shanghai Jiao Tong University Joint Institute, Automation

### Dr. Shizhe Zhao

*Postdoctoral, Shanghai Jiao Tong University*

E-mail: shizhe.zhao@sjtu.edu.cn

Department: University of Michigan - Shanghai Jiao Tong University Joint Institute

### Jingtian Yan

*Phd student, Carnegie Mellon University*

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