

EDUCATION

- **Duke University** 08/2024 - 05/2029 (Expected) Durham, NC, United States
Ph.D. Student in Robotics and AI (Department of Electrical and Computer Engineering) GPA: 3.85/4.0 (Up to date)
- **Southern University of Science and Technology (SUSTech)** 08/2020 - 06/2024 Shenzhen, China
B.E. in Computer Science and Technology, Academic Advisor: **Prof. Xin Yao (Fellow, IEEE)** 🌐 GPA: 3.62/4.0
- **Tsinghua University (Tsinghua Univ. - UC Berkeley Research Institute)** 05/2023 - 06/2024 Shenzhen, China
Visiting Student in **Prof. Xinlei Chen's** 🌐 Research Group
- **University of California, Berkeley (UCB)** 08/2022 - 01/2023 Berkeley, United States
Exchange Student (Got a Letter of Recommendation from **Prof. Igor Mordatch** 🌐) GPA: 4.0/4.0
- **National University of Singapore (NUS)** 05/2022 - 08/2022 Singapore
School of Computing, Summer Workshop 2022 2D Game Development

RESEARCH INTEREST

Robotics & AI, Robotic Manipulation, Humanoid Robot, Planning, Reinforcement Learning, Collaborative Robots, UAV & UGV Swarm, Large-Scale Combinatorial Optimization, Problem Reduction by ML, Meta-Heuristic Algorithms

PUBLICATIONS

- *Yuhan Cheng[†], *Xuecheng Chen[†], **Yixuan Yang[‡]**, Haoyang Wang[†], Jingao Xu[†], Chaopeng Hong[†], Susu Xu[§], Xiaoping Zhang[†], Yunhao Liu[†], Xinlei Chen[†]. "**SniffySquad: Patchiness-Aware Gas Source Localization with Multi-Robot Collaboration**", *Under peer review: Transactions on Sensor Networks*. (arXiv:2411.06121).
[†]Tsinghua University [‡]Southern University of Science and Technology [§]Johns Hopkins University
- *Yuhan Cheng[†], *Xuecheng Chen[†], **Yixuan Yang[‡]**, Haoyang Wang[†], Yuxuan Liu[†], Xinlei Chen[†]. "**Poster: Olfactory Sensing in Turbulent Airflow via Collaborative Robots**", *HOTMOBILE '24: Proceedings of the 25th International Workshop on Mobile Computing Systems and Applications - Accepted and Presented*.
[†]Tsinghua University [‡]Southern University of Science and Technology [§]University of Washington
- Shuaixiang Zhang[†], **Yixuan Yang[‡]**, Hao Tong[‡], Xin Yao[†]. "**Learning-based Problem Reduction for Large-scale Uncapacitated Facility Location Problems**", *2024 IEEE Congress on Evolutionary Computation (CEC) - Accepted*.
[†]Southern University of Science and Technology [‡]University of Birmingham

RESEARCH EXPERIENCE

- **Automated Lab: Scientific Lab Manipulation driven by Humanoid Robot** 08/2024 - Present
Duke University - General Robotics Lab *Advised by Prof. Boyuan Chen* 🌐
 - Using traditional heuristics-based methods and Deep Reinforcement Learning to enable the Unitree G1 humanoid robot to perform contact-rich manipulation tasks.
 - **THIS PROJECT/PAPER IS NOT PUBLISHED YET (CAN NOT DISCLOSE MORE DETAILS DUE TO FUNDING AGENCY RESTRICTIONS)**
- **GasHunter: Empowering Efficient Gas Source Localization by Collaborative Robots** 05/2023 - 06/2024
Tsinghua University (Tsinghua Univ. - UC Berkeley Research Institute) *Advised by Prof. Xinlei Chen* 🌐
Accepted and Presented: Hotmobile 24'; Under Peer Review Process: ToSN
 - Proposed *GasHunter*, a collaborative multi-robot scheduling system for gas source localization, specifically designed to handle the patchy characteristic in realistic gas plume environments.
 - Devised a patchy plume-resilient movement strategy borrowing ideas from Langevin Diffusion approach in non-convex learning area to conquer the complex patchy characteristic of gas plumes.
 - Developed a collaborative strategy for multiple robots by assigning and adapting their planning preferences dynamically to balance the search efficiency and localization effectiveness of gas sources. (Between *Exploration* and *Exploitation*)
 - Conducted extensive experiments for validation and evaluation in both a physical-feature-based gas dispersion simulator and a real-world testbed (Constructed a robot system in a LAN indoor environment, centered around a host-based server communication system, utilizing Ultra-Wide Bandwidth Localizer for real-time robot positioning).
 - Results show *GasHunter* achieves a 20%+ success rate and 30%+ path efficiency improvement, respectively, outperforming state-of-the-art gas source localization solutions.
- * Please refer to a selection from my personal research diary, which provides detailed records of my research activities and deep insights. Click on the [English Version](#) 🌐 or the [Chinese Version](#) 🌐.
- **Experience-Assisted Optimization for Uncapacitated Facility Location Problem** 01/2023 - 06/2024
Southern University of Science and Technology *Advised by Prof. Xin Yao (Fellow, IEEE)* 🌐
Accepted: IEEE CEC 2024

- Proposed an innovative framework to enhance speed in evolutionary algorithms by capturing knowledge from smaller-scale instances and applying these learnings to optimize performances in larger, more complex situations.
- Proposed *LAV: Local Adjacent Vector*, a strategy that integrates the inherent characteristics of a facility with its dynamic surrounding conditions (real-time data among the evolutionary process) as features, to determine the probability of establishing a particular facility.
- Designed a specialized operator embedded with *LAV*, which, by tracking the relationship among facility opening costs, logistics expenses, and the number of facilities currently operational within an individual, dynamically refines individuals, accelerates the optimization speed of the entire population, and escapes local optima.
- Devised a strategy that removes nodes (costly facilities) in the graph of the UFLP problem. Employed Machine Learning to extract relevant attributes of the facilities to facilitate problem reduction, transforming large-scale UFLP problems into smaller, more manageable ones that are easier to solve.
- Reproduced four contemporary state-of-the-art algorithms and embedded the framework into these models to demonstrate its efficiency, which confirmed that large-scale instances were effectively reduced to a smaller scale, significantly accelerated the convergence of the UFLP problem and increased the likelihood of reaching optimal solutions in large-scale scenarios.

• **Invited as Reviewer: IEEE Journal of Selected Topics in Signal Processing** 11/2023 - 12/2023
Special Issue on Intelligent Robotics: Sensing, Signal Processing and Interaction **IEEE J-STSP-IRSSPI**

TEACHING

• **Fuqua School of Business, Duke University** 08/2024 - 10/2024
DECISION 520Q/618: Data Science for Business (Teaching Assistant)

OTHER PROJECTS

• **Bug Identified in Open-Source SDN Framework - Ryu** 03/2023 - 06/2023
Software-Defined Network (SDN) Construction *Advised by Prof. Zhuozhao Li*

- Identified a bug individually in the open-source framework Ryu, where the identification codes for ARP Request and ARP Response (0 or 1) were mixed up, not aligning with the actual situation.
- Constructed a high-quality SDN using Mininet and Ryu, implementing DHCP and Shortest Path Switching with various routing algorithms: Distance Vector (Bellman-Ford), Dijkstra, etc.

• **2D Multiplayer Online Battle Arena Game Development** 05/2022 - 08/2022
School of Computing, NUS, Summer Workshop 2022 - 2D Game Development Track

- The only game project in the summer camp capable of implementing networked PVP.
- Developed a small PVP MOBA game with C# and the Unity engine.

• **Dormitory Selection System** 09/2023 - 11/2023
Object Oriented Analysis and Design, Final Project - Web App Construction

- Built a Web Application with multiple interactive features using Spring Boot and Vue.js, specifically designed for SUSTech graduate students.
- Implemented multiple functionalities: live broadcast, form upload and automatic parsing, forum discussion, etc.

TECHNICAL SKILLS

Python, Pytorch, Isaac Gym/Genesis, CAD, CNC cutting, 3D printing, Linux, Git, C/C++, Java, L^AT_EX, Raspberry Pi Development, UGV System Construction, Ultra-Wide Bandwidth (UWB) Localization System, Vue.js, SQL, MATLAB, Spring Boot, Computer Network, etc.

LANGUAGES

English (**TOEFL iBT: Total 102**), Chinese (native), Cantonese (native)

HONORS

- *SUSTech - Outstanding Undergraduate Graduate, Class of 2024* 6/2024
- *Guo Xie Bi Rong Fellowship (¥10000), Class of 2024 (only 4%)* 5/2024
- *Distinguished Graduate, Computer Science and Engineering, Class of 2024 (only 2 out of 245 students)* 5/2024
- *Zhicheng College Outstanding Student Scholarship [2023, 2021]* 10/2023
- *SUSTech Intercollegiate Athletics Meet, Men's 4×100 Meter Relay Bronze Medal* 11/2021
- *2021, 2022, 2023 SUSTech Alma Mater Visit Event - Best Individual Award* 2021 - 2023

LEADERSHIP AND MISCELLANEOUS

- **Campus Ambassador of Southern University of Science and Technology** 10/2020 - present
Represented the school as a campus ambassador in various university-level events
 - Represented Southern University of Science and Technology at *CCTV Studio No.1* in Beijing (Chinese Spring Festival Gala Hall) for the recording of the National College Students' Youth Art Evening. 04/2021
 - During the series of events celebrating the 10th anniversary of SUSTech — specifically at the "Lang Lang's Melodies Stir SUSTech" concert dedicated to the university's decade milestone — I served as the head of the working group on-site and had the honor of presenting flowers on stage to the world-renowned pianist *Lang Lang* as a representative. 11/2020
- **Director of the Social Practice Department at the Zhi Cheng College Student Union** 03/2021 - 05/2022
Organized student visits to high-tech companies in Shenzhen and hosted community recreational activities
 - Coordinated and organized educational exchange activities with renowned global high-tech companies in Shenzhen, such as *Tencent* and *DJI*. The visit to *DJI* achieved **record-breaking** popularity within the college's history, with all available slots being filled within 30 seconds of the ticket release. 04/2021
 - Planned and organized the **largest** mentor tea event in the college's history, which was attended by over **200** students and **30** academic and extracurricular mentors. 11/2021
- **Director of the Project Department of the College Student Association, Nanhai District** 02/2022 - 02/2023
Organized various social charity and welfare events
 - Planned the charity sale event at Qiandeng Lake during the Spring Festival, with all proceeds going towards charitable causes. 02/2022
 - Organized a presentation competition for college students in Nanhai District to promote their hometown culture, contributing to the celebration of Lingnan regional culture. 08/2021
- **Deputy Head of the delegation for the SUSTech Alma Mater Visit Event** 09/2020 - present
Organized SUSTech students to return to their alma maters for university promotional activities
 - Leveraged personal influence to organize the **most attended** and **effective** student-led promotional event in the **school's history**, with over **300** Shimen Middle School students participating in-person and **200** parents engaging online. 02/2022