Guofei CHEN

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EDUCATION

Carnegie Mellon University, Robotics Institute   *Aug 2023 - May 2025 (expected)*
GPA: 4.0/4.0 — M.S. in Robotics
Advisor: Ji Zhang, Wenshan Wang
Research: Planning, Localization, Interactive Navigation

Zhejiang University, Chukochen Honors College   *Sep 2019 - Jul 2023*
GPA: 3.94/4.0 — B.E. in Automation
Advisor: Fei Gao, Rong Xiong
Research: Multi-robot Localization, Optimization

PUBLICATIONS

1. **G. Chen**, B. He, S. Zhao, C. Fermuller, Y. Aloimonos, G. Shi, W. Wang, J. Zhang. AIM-Nav: A Full-Stack Platform for Data-Driven Navigation Research. *Robotics and Automation Letters (Submitted).* [website][code1][code2]

2. B. He*, **G. Chen***, W. Wang, J. Zhang, C. Fermuller, Y. Aloimonos.(*: equal contribution) Interactive-FAR: Interactive, Fast and Adaptable Routing for Navigation Among Movable Obstacles in Complex Unknown Environments. *2024 IEEE/RSJ International Conference on Intelligent Robots and Systems* [paper][video][website]

3. B. He, **G. Chen**, C. Fermuller, Y. Aloimonos, J. Zhang. Air-FAR: Fast and Adaptable Routing for Aerial Navigation in Large-scale Complex Unknown Environments. *2025 International Conference on Robotics and Automation (Submitted)*[paper][website]

4. Z. Ren, B. Suvonov, **G. Chen**, B. He, Y. Liao, C. Fermuller, J. Zhang. Search-Based Path Planning among Movable Obstacles. *2025 International Conference on Robotics and Automation (Submitted)*[paper]

5. Z. Chen, H. Wang, **G. Chen**, Y. Ma, L. Yao, Z. Ge, Z. Song. Analyzing and Improving Supervised Nonlinear Dynamical Probabilistic Latent Variable Model for Inferential Sensors. *2023 IEEE Transaction on Industrial Informatics.* [paper]

RESEARCH EXPERIENCE

Carnegie Mellon University   Aug 2023 - Present
Advised by Ji Zhang, Wenshan Wang, Guanya Shi, and Yiannis Aloimonos (UMD)

Planning for Interactive Navigation (IROS 2024) [paper] [website]
· Developed a real-time planning algorithm for interactive navigation, which enables robots to manipulate movable obstacles, adapt to their properties online, and navigate previously inaccessible task spaces.
· Accelerated global path search 100 times by modeling the environment as a sparse graph with the interaction policy encoded. Derived the dynamically feasible and safe guarantee for interaction policy.

Mapping for Interactive Navigation (To Submit to RSS 2025)[video]
· Developed real-time indoor open-vocabulary semantic mapping using sparse LiDAR scan and image.
· Designed the filtering technique for stabilizing object inference and removing outliers. Enabled the system to build consistent open-vocabulary instance-level semantic maps for kilometer-scale environments.

Full-Stack Platform for Data-Driven Navigation (Submitted to RA-L) [Unitree Go2 Deployment] [Diablo Deployment][website]
· Spearheaded the adaptation, deployment, and calibration of SLAM and planning with custom sensor setup.

· Single-handled a navigation simulation platform using Unity for wheeled robots and quadrupeds with a narrow sim-to-real gap of robot sensing and locomotion.

Planning with Sparse Visibility Graph in 3D Enviornments (Submitted to ICRA 2025)[paper][website]
· Proposed a real-time global planning algorithm based on 3D sparse dynamic visibility graph for large-scale or complex environments, which is **1000x** faster than SOTA grid-map-based path search methods.

Zhejiang University   June 2020 - June 2023

Advisor: Fei Gao, Rong Xiong, Zhiqiang Ge

Relative Localization in Quadrotor Swarm using Range Measurements [thesis]
· Developed a robust and certifiable relative pose solver for quadrotor swarm with range measurements, using convex relaxation and Riemannian Staircase Optimization (RSO).
· Made the localization module robust to severe measurement noise (up to 50% scale of GT) and random initialization, making it deployable in the field.

RoboCup Robot Soccer Small Size League Team - ZJUNlict
· **1st place** in *2020* and *2021 RoboCup China Open.*[video] [news]
· Developed a planning module using a visibility graph, reducing its time consumption from more than 60% to 10% per execution cycle. [post]

Soft Sensor based on Bayesian Inference (TII) [code][paper]
· Proposed Optimal-Control Nonlinear Dynamic Latent Variable Model (OC-NDPLVM), which improves the accuracy of NDPLVMs with deep learning backend.
· Derived rigorous proof that optimizing the proposed loss function is equivalent to optimizing the evidence lower bound (ELBO) constrained by the Ito state transition process. Work accepted by *IEEE TII*.

HONORS AND AWARDS

- 2023 Chiang Chen Overseas Graduate Scholarship (**1 in Zhejiang University, 9 in China**) [Website]

- 2020, 2021 RoboCup (ChinaOpen) Champion of Small Size League [highlights]

- Excellence Award in Academics (x3 times), Zhejiang University

SKILLS

Programming: C/C++, Python, Lua, MATLAB
Robotics and ML Platforms: ROS, Unity, Isaac Sim, Jax
Language: English (TOEFL: 111, S: 25), Mandarin Chinese