JIANHAO JIAO

University College London, Department of Computer Science, United Kingdom

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EMPLOYMENT

University College London (UCL), United Kingdom

Senior Research Fellow — Jan. 2024 - Present

The Hong Kong University of Science and Technology (HKUST), China

Research Associate (PostDoc) — Jan. 2022 - Dec. 2023

EDUCATION

The Hong Kong University of Science and Technology (HKUST) — Hong Kong SAR, CHINA

Ph.D. in Electronic & Computer Engineering — Sep. 2017 - Jan. 2022

Advisor: Ming Liu

Committee: Xiaofang Zhou (Chair), Ming Liu, Michael Yu Wang, Qiong Luo, Zhiyong Fan, Hesheng Wang

Zhejiang University — Hangzhou, CHINA

B.Eng. in Electronic Engineering — Sep. 2013 - Jun. 2017

Advisor: Xiang Tian

AWARDS & HONORS

IEEE IROS′2025 Open World Navigation Workshop Best Paper Award 2025

IEEE ROBIO′2019 Best Paper Finalist 2019

HKUST Postgraduate Student Scholarship 2017-2021

The 3rd Runner-up in DJI RoboMaster Summer Camp (Top 12.5%) 2017

Zhejiang Province Student Scholarship 2017

ZhongKong Robotics Competition Best Team Award, Zhejiang University 2016

RESEARCH GRANTS

- **China NSFC Young Scientist Fund (62303388)** ..... Jan. 2024 - Dec. 2024
  Research on Localization and Mapping in Large-Scale and Unstructured Environments for Mobile Robots
  (Chinese Version: 面向大规模非结构化场景的移动机器人定位和建图方法研究)
  Principal Investigator (PI) — ¥300,000
- **UKRI Future Leaders Fellowship** ..... Jan. 2024 - Present
  RoboHike: Autonomous Quadrupedal Robot Navigation and Hiking in Challenging Rough Terrains
  Main Member: 30% work package contributor — £1430K
- **HKUST-KAISA Joint Fund** ..... Apr. 2020 - Mar. 2022
  Development of Highly Integrated Multi-Sensor System
  Main Member: 45% work package contributor — HK$3766K
- **HKUST Bridge Gap Fund** ..... Jul. 2020 - Jun. 2021
  Development of Multi-Sensor Vehicle System for Autonomous Logistic Transportation
  Main Member: 10% work package contributor — HK$600K

- **Hong Kong Innovation and Technology Fund** ..... Jan. 2017 - Dec. 2019
  Deep Learning-Based Defect Inspection of Smartphone Glass
  Main Member: 25% work package contributor HK$617.6K

SELECTED PUBLICATIONS (FIRST/CO-FIRST/CORRESPONDING AUTHOR)

BOOK CHAPTER

[1] **Jianhao Jiao**, Xiangcheng Hu, Xupeng Xie, Jin Wu, Hexiang Wei, Lu Fan, Ming Liu, Enabling Robust SLAM for Mobile Robots with Sensor Fusion, Autonomous Driving Perception: Fundamentals and Applications, 2023, **Springer**.

JOURNAL

[1] Peng Yin*, **Jianhao Jiao***(Co-first Author), Shiqi Zhao, Lingyun Xu, Guoquan Huang, Howie Choset, Sebastian Scherer, Jianda Han, General Place Recognition Survey for Modern Robotic Systems: Towards the Real-World Autonomy Age, IEEE Transactions on Robotics (**T-RO**), 2025.

[2] Hexiang Wei, **Jianhao Jiao***(Co-first and Corresponding Author), Xiangcheng Hu, Jingwen Yu, Xupeng Xie, Jin Wu, Yilong Zhu, Lujia Wang, Ming Liu, FusionPortableV2: Challenging Mult-Sensor Perception Dataset Beyond Campus, The International Journal of Robotics Research (**IJRR**), 2024.

[3] **Jianhao Jiao***(Corresponding Author), Ruoyu Geng, Yuanhang Li, Ren Xin, Bowen Yang, Jin Wu, Lujia Wang, Ming Liu, Rui Fan, Dimitrios Kanoulas, Real-Time Metric-Semantic Mapping for Autonomous Navigation in Outdoor Unstructured Environments, IEEE Transactions on Automation Science and Engineering (**T-ASE**), 2024.

[4] Shuyang Zhang, Jinhao He, Bowen Yang, Yilong Zhu, Jin Wu, **Jianhao Jiao***(Corresponding Author), Jie Yuan, VirCap: Virtual Camera Exposure Control Based on Image Photometric Synthesis for Visual SLAM Application, IEEE/ASME Transactions on Mechatronics (**T-Mech**), 2024.

[5] Bowen Yang, Jie Cheng, **Jianhao Jiao***(Corresponding Author), Ming Liu, Efficient Global Navigational Planning in 3D Structures based on Point Cloud Tomography, IEEE/ASME Transactions on Mechatronics (**T-Mech**), 2024.

[6] Yingbing Chen, Jie Cheng, Sheng Wang, Hongji Liu, Xiaodong Mei, Xiaoyang Yan, Mingkai Tang, Ge Sun, Ya Wen, Junwei Cai, Xupeng Xie, Lu Gan, Mandan Chao, Ren Xin, Lujia Wang, Ming Liu, and **Jianhao Jiao***(Corresponding Author), Enhancing Campus Mobility: Achievements and Challenges of the Snow Lion Autonomous Shuttle, IEEE Robotics and Automation Magazine (**RAM**), 2024.

[7] **Jianhao Jiao**, Feiyi Chen, Hexiang Wei, Jin Wu, Ming Liu, LCE-Calib: Automatic LiDAR-Frame/Event Camera Extrinsic Calibration With a Globally Optimal Solution, IEEE/ASME Transactions on Mechatronics (**T-Mech**), 2023.

[8] Xiangcheng Hu, Linwei Zheng, Ruoyu Geng, Jin Wu, Hexiang Wei, Yang Yu, Xiaoyu Tang, Lujia Wang, **Jianhao Jiao***(Corresponding Author), Ming Liu, PA-SLAM: Robust Prior-Assisted Ground Truth Trajectory Generation for Benchmarking, IEEE/ASME Transactions on Mechatronics (**T-Mech**), 2023.

[9] **Jianhao Jiao***(Corresponding Author), Haoyang Ye, Yilong Zhu, Ming Liu, Robust Odometry and Mapping for Multi-LiDAR Systems with Online Extrinsic Calibration, IEEE Transactions on Robotics

(**TRO**), 2021.

CONFERENCE

[1] Boyi Liu, Qianyi Zhang, Qiang Yang, **Jianhao Jiao**, Chauhan Jagmohan, Dimitrios Kanoulas, The Starlink Robot: A Platform and Dataset for Mobile Satellite Communication, The International Conference on Embedded Artificial Intelligence and Sensing Systems (**SenSys**), 2026.

[2] Zhiqiang Yan, **Jianhao Jiao**, Zhengxue Wang, Gim Hee Lee, Event-Driven Dynamic Scene Depth Completion, Neural Information Processing Systems (**NeurIPS**), 2025.

[3] Yilong Zhu, **Jianhao Jiao***(Corresponding Author), Hexiang Wei, Jin Wu, Bohuan Xue, Shuyang Zhang, Shaojie Shen, From Satellite to Street: Semantic and Depth Information for Enhanced Geo-Localization, IEEE/RSJ International Conference on Intelligent Robots and Systems (**IROS**), 2025.

[4] **Jianhao Jiao**, Jinhao He, Changkun Liu, Sebastian Aegidius, Xiangcheng Hu, Tristan Braud, Dimitrios Kanoulas, LiteVLoc: Map-Lite Visual Localization for Image Goal Navigation, International Conference on Robotics and Automation (**ICRA**), 2025.

[5] Yuzhou Cheng, **Jianhao Jiao***(Corresponding Author), Yue Wang, Kanoulas Dimitrios LoGS: Visual Localization via Gaussian Splatting with Fewer Training Images, International Conference on Robotics and Automation (**ICRA**), 2025.

[6] Aegidius Sebastian, Hadjivelichkov Dennis, **Jianhao Jiao***(Corresponding Author), Embly-Riches Jonathan, Kanoulas Dimitrios Watch your STEPP: Semantic Traversibility Estimation using Pose Projected Features, International Conference on Robotics and Automation (**ICRA**), 2025.

[7] Jinhao He, Huaiyang Huang, Shuyang Zhang, **Jianhao Jiao***(Corresponding Author), Ming Liu, APMP: Accurate Prior-centric Monocular Positioning with Offline LiDAR Fusion, IEEE International Conference on Robotics and Automation (**ICRA**), 2024.

[8] Shuyang Zhang, Jinhao He, Bohuan Xue, Jin Wu, **Jianhao Jiao***(Corresponding Author), Ming Liu, An Image Acquisition Scheme for Visual Odometry based on Image Bracketing and Online Attribute Control, IEEE International Conference on Robotics and Automation (**ICRA**), 2024.

[9] **Jianhao Jiao**, Hexiang Wei, Tianshuai Hu, Xiangcheng Hu, Yilong Zhu, Zhijian He, Jin Wu, Jingwen Yu, Xupeng Xie, Lujia Wang, Ming Liu, FusionPortable: A Multi-Sensor Campus-Scene Dataset for Evaluation of Localization and Mapping Accuracy on Diverse Platforms, IEEE/RSJ International Conference on Intelligent Robots and Systems (**IROS**), 2022.

[10] **Jianhao Jiao**, Yilong Zhu, Haoyang Ye, etc, Ming Liu, Greedy-Based Feature Selection for Efficient LiDAR SLAM, IEEE International Conference on Robotics and Automation (**ICRA**), 2021.

[11] **Jianhao Jiao**, Peng Yun, Lei Tai, Ming Liu, MLOD: Awareness of Extrinsic Perturbation in Multi-LiDAR 3D Object Detection for Autonomous Driving, IEEE/RSJ International Conference on Intelligent Robots and Systems (**IROS**), 2020.

[12] **Jianhao Jiao**, Automatic Calibration of Multiple 3D LiDARs in Urban Environments, IEEE/RSJ International Conference on Intelligent Robots and Systems (**IROS**), 2019. **This work was cited and integrated into MATLAB**[1].

[1] https://uk.mathworks.com/help/lidar/ug/multi-lidar-calibration-workflow.html

[13] **Jianhao Jiao**, Qinghai Liao, Yilong Zhu, Tianyu Liu, Yang Yu, Rui Fan, Lujia Wang, Ming Liu, A Novel Dual-Lidar Calibration Algorithm Using Planar Surfaces, IEEE Intelligent Vehicles Symposium (**IV**), 2019.

[14] **Jianhao Jiao**, Rui Fan, Han Ma, Ming Liu, Using DP Towards A Shortest Path Problem-Related Application, IEEE International Conference on Robotics and Automation (**ICRA**), 2019.

[15] Yilong Zhu, Dong Han, **Jianhao Jiao**, etc, Ming Liu, Rui Fan, Road Curb Detection Using A Novel Tensor Voting Algorithm, IEEE International Conference on Robotics and Biomimetics (**ROBIO**), 2019. **Best Paper Finalist (**1.19%**)**.

PATENTS

[1] Chinese Patent (4228721): A Localization Method, System, and Medium ..... Jan. 2021
Jianhao Jiao, Peng Yun, Ming Liu

[2] Chinese Patent: Transition Platform and Joint Data Collection Assembly .....Jun. 2023
Xie Xupeng, Wei Hexiang, **Jianhao Jiao**, Hongji Liu, Ming Liu

TEACHING EXPERIENCE

- UCL COMP0244: Legged Robotics Systems.
  Spring 2025 (52 students)
  Instructor: Prof.Dimitrios Kanoulas, Prof.Chengxu Zhou, Prof.Amir Patel.
  Responsibility: Coordinated the design and development of core module content, including lecture materials and supporting notes, focused on SLAM and navigation for legged platforms. Co-designed and implemented the majority of hands-on laboratory experiments on a real-world quadruped robot (Unitree GO2), covering perception, planning pipelines, and benchmarking tasks. Established a comprehensive ROS-based navigation framework, documentation, and grading rubrics to support reliable simulation-to-hardware workflows.

- UCL COMP0132: Msc Robotics and Computation Dissertation.
  Spring 2024 (1 student), Spring 2025 (1 student)
  Instructor: Prof.Dimitrios Kanoulas (UKRI Future Leaders Fellow)
  Responsibility: Provided comprehensive research supervision and mentorship to two Master of Science students for their dissertations in Robotics and Computation. Guided projects from initial proposal development to final submission; one supervised thesis achieved a distinction grade.

- HKUST ELEC1030: The Rise of Autonomous Robots.
  Spring 2018 (10 students), Fall 2018 (30 students)
  Instructor: Prof.WANG, Michael Yu (IEEE/ASME Fellow)
  Responsibility: Managed the integration and development of course materials related to mobile robots and autonomy. Designed, implemented, and managed the full-semester hands-on course project and corresponding tutorials, overseeing a total of 40 students across two offerings. Developed and applied detailed evaluation rubrics to ensure fair assessment of laboratory and project outcomes.

PROFESSIONAL ACTIVITIES

Associate Editor

- IEEE International Conference on Robotics and Automation (ICRA), 2026
- IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2024-2025
- Robot Learning, ELSP, 2025-2026

Journal/Conference Reviewer

- **Journal:** IEEE TRO, IEEE RAM, IEEE RAL, AuRO, IEEE/ASME TMECH, IEEE TASE, IEEE TITS, IEEE TIM, etc.
- **Conference:** RSS, ICRA, IROS, CoRL, IV, ITSC, CVPR-Workshop, ECCV-Workshop, etc.

INVITED TALKS

[1] **Conference Talk:**

- **SLAM for Robotics: Lifelong Spatial Memory and Navigation in Unstructured Worlds** .2025
  Host: Dr.Jieqi Shi. Nanjing University, China.
  Distributed AI (DAI) Conference Workshop on AI Agent and Embodied Intelligence in UK.
- **OpenNavMap: Multi-Session Structure-Free Mapping for Visual Navigation** 2025
  Host: Meta, US.
  2nd Research Summit for Egocentric Perception with Project Aria.
- **Towards Cognitive-based Real-World Teleoperation** 2025
  Host: Prof.Ziwei Wang. Lancaster University, UK.
  IEEE ICRA 3rd Workshop on Human-Centric Multilateral Teleoperation in US.
- **Autonomous Navigation System of Mobile Robots for Large-scale Unstructured Environments** 2023
  Host: Prof.Weisong Wen, PolyU, Hong Kong.
  ITSC Workshop on Intelligent Vehicle Meets Urban: Safe And Certifiable Navigation And Control For Intelligent Vehicles In Complex Urban Scenarios.

[2] **University Talk:**

- **SLAM for Robotics: Lifelong Spatial Memory and Navigation in Unstructured Worlds** .2025
  Host: Prof.Martin Magnusson. Örebro University, Sweden.
- **SLAM for Robotics: Lifelong Spatial Memory and Navigation in Unstructured Worlds** .2025
  Host: Dr.Yu Ge. Chalmers University of Technology, Sweden.
- **Cognitive Mapping for Robotics: Lifelong Spatial Memory and Navigation in Unstructured Worlds** 2025
  Host: Dr.Chao Chen. University of Manchester, UK.
- **Cognitive Mapping for Robotics: Lifelong Spatial Memory and Navigation in Unstructured Worlds** 2025
  Host: Dr.Xingxing Zuo. MBZUAI, Abu Dhabi.
- **OpenNavMap: Multi-Session Structure-Free Mapping for Visual Navigation** 2025
  Host: Prof.Maruice Fallon. Oxford University, UK.

- **General Mobile Robot Navigation System for Unstructured Environments** 2024
  Host: Prof.Baoding Zhou. Shenzhen University, China.
- **General Mobile Robot Navigation System for Unstructured Environments** 2024
  Host: Prof.Shilei Li. Beijing Institute of Technology, China.
- **General Mobile Robot Navigation System for Unstructured Environments** 2024
  Host: Prof.Jianlin Chen. Shanghai University, China.
- **General Mobile Robot Navigation System for Unstructured Environments** 2024
  Host: Prof.Yi Zhou. Hunan University, China.
- **Enabling Robust Perception System for Autonomous Navigation** 2022
  Host: Prof.Lei Zhu. Robotics and Autonomous Systems Thrust, The Hong Kong University of Science and Technology (Guangzhou), China.
- **LiDAR Perception System for Autonomous Robots: from Calibration to Localization, Mapping, and Recognition** 2021
  Host: Prof.Hong Zhang. Southern University of Science and Technology, China.
- **LiDAR Perception System for Autonomous Robots: from Calibration to Localization, Mapping, and Recognition** 2021
  College of Control Science and Engineering. Zhejiang University, China.
- **Extending Multi-LiDAR Fusion to LiDAR-Inertial-Event Fusion** 2021
  Host: Dr.Ming Liu. Robotics and Autonomous Systems Thrust, The Hong Kong University of Science and Technology (Guangzhou), China.

[3] **Public Lecture:**

- **Cognitive Robots for Good** 2024
  65th London International Youth Science Forum, UK.
  Audience: 420 high-scholar students from 82 countries and territories.