YIXI CAI
Curriculum Vitae

Division of Robotics, Perception and Learning
KTH Royal Institute of Technology
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Work Experience

KTH Royal Institute of Technology **Stockholm, Sweden**
Postdoctoral Fellow, Digital Future *Jan, 2025 – Present*
Supervisor: Prof. Patric Jensfelt and Dr. Olov Andersson

Education

University of Hong Kong **Hong Kong SAR, China**
Ph.D., Robotics *Sept, 2020 – Sept, 2024*
Supervisor: Prof. Fu Zhang and Prof. James Lam

Beihang University **Beijing, China**
B.Eng, Automation *Sept, 2016 – July, 2020*

Publications

First/Co-first Authored & Leading

[RSS'2025] Yuhan Xie, **Yixi Cai**†, Yinqiang Zhang, Lei Yang, and Jia Pan. GauSS-MI: Gaussian splatting shannon mutual information for active 3d reconstruction. In ***Robotics: Science and Systems***, 2025. (†: Project Leader) [Preprint].

[TRO'2023] **Yixi Cai**, Fanze Kong, Yunfan Ren, Fangcheng Zhu, Jiarong Lin, and Fu Zhang. Occupancy grid mapping without ray-casting for high-resolution lidar sensors. ***IEEE Transactions on Robotics***, volume 40, pages 172–192, 2024. [Paper].

[TRO'2022] Wei Xu*, **Yixi Cai***, Dongjiao He, Jiarong Lin, and Fu Zhang. FAST-LIO2: Fast direct lidar-inertial odometry. ***IEEE Transactions on Robotics***, volume 38, pages 2053–2073. IEEE, 2022. (∗: Equal Contribution) [Paper].

Featured

[SR'2025] Yunfan Ren, Fangcheng Zhu, Guozheng Lu, **Yixi Cai**, Longji Yin, Fanze Kong, Jiarong Lin, Nan Chen, and Fu Zhang. Safety-assured high-speed navigation for mavs. ***Science Robotics***, volume 10, page eado6187, 2025. [Paper].

[IJRR'2023] Guozheng Lu, **Yixi Cai**, Nan Chen, Fanze Kong, Yunfan Ren, and Fu Zhang. Trajectory generation and tracking control for aggressive tail-sitter flights. ***The International Journal of Robotics Research***, volume 43. SAGE Publications Sage UK: London, England, 2023. [Paper].

[TRO'2023] Jiarong Lin, Chongjian Yuan, **Yixi Cai**, Haotian Li, Yunfan Ren, Yuying Zou, Xiaoping Hong, and Fu Zhang. Immesh: An immediate lidar localization and meshing framework. ***IEEE Transactions on Robotics***, volume 39, pages 4312–4331, 2023. [Paper].

[SR'2023] Nan Chen, Fanze Kong, Wei Xu, **Yixi Cai**, Haotian Li, Dongjiao He, Youming Qin, and Fu Zhang. A self-rotating, single-actuated uav with extended sensor field of view for autonomous navigation. ***Science Robotics***, volume 8, page eade4538. American Association for the Advancement of Science, 2023. [Paper].

[TMECH'2022] Youming Qin, Nan Chen, **Yixi Cai**, Wei Xu, and Fu Zhang. Gemini ii: Design, modeling, and control of a compact yet efficient servoless bi-copter. *IEEE/ASME Transactions on Mechatronics*, volume 27, pages 4304–4315. IEEE, 2022. ***Best Paper Award Finalist*** [Paper].

Others

[RAL'2025] Bingyang Zhou, Chunran Zheng, Ziming Wang, Fangcheng Zhu, **Yixi Cai**, and Fu Zhang. Fast-livo2 on resource-constrained platforms: Lidar-inertial-visual odometry with efficient memory and computation. *IEEE Robotics and Automation Letters*, volume 10, pages 7931–7938, 2025. [Paper].

[RAL'2025] Hairuo Wei, Rundong Li, **Yixi Cai**, Chongjian Yuan, Yunfan Ren, Zuhao Zou, Huajie Wu, Chunran Zheng, Shunbo Zhou, Kaiwen Xue, and Fu Zhang. Large-scale multi-session point-cloud map merging. *IEEE Robotics and Automation Letters*, volume 10, pages 88–95, 2025. [Paper].

[ICCV'2025] Ziliang Miao, Runjian Chen, **Yixi Cai**, Buwei He, Wenquan Zhao, Wenqi Shao, Bo Zhang, and Fu Zhang. Temporal overlapping prediction: A self-supervised pre-training method for lidar moving object segmentation. In *Proceedings of the IEEE/CVF International Conference on Computer Vision (ICCV)*, October 2025. [Preprint].

[ICRA'2025] Jianheng Liu, Chunran Zheng, Yunfei Wan, Bowen Wang, **Yixi Cai**, and Fu Zhang. Neural surface reconstruction and rendering for lidar-visual systems. *International Conference on Robotics and Automation (ICRA)*. IEEE, 2025. [Preprint].

[IROS'2025] Yisheng Li, Longji Yin, **Yixi Cai**, Jianheng Liu, Haotian Li, and Fu Zhang. Efficient swept volume-based trajectory generation for arbitrary-shaped ground robot navigation. In *2025 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*. IEEE, 2025. [Preprint].

[ICRA'2025] Rundong Li, Xiyuan Liu, Haotian Li, Zheng Liu, Jiarong Lin, **Yixi Cai**, and Fu Zhang. Lvba: Lidar-visual bundle adjustment for rgb point cloud mapping. *International Conference on Robotics and Automation (ICRA)*. IEEE, 2025. [Preprint].

[TRO'2024] Fangcheng Zhu, Yunfan Ren, Longji Yin, Fanze Kong, Qingbo Liu, Ruize Xue, Wenyi Liu, **Yixi Cai**, Guozheng Lu, Haotian Li, et al. Swarm-lio2: Decentralized, efficient lidar-inertial odometry for uav swarms. *IEEE Transactions on Robotics*. IEEE, 2024. [Paper].

[IROS'2024] Yunfan Ren, **Yixi Cai**, Fangcheng Zhu, Siqi Liang, and Fu Zhang. Rog-map: An efficient robocentric occupancy grid map for large-scene and high-resolution lidar-based motion planning. In *2024 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 8119–8125. IEEE, 2024. [Paper].

[TRO'2024] Guozheng Lu, Yunfan Ren, Fangcheng Zhu, Haotian Li, Ruize Xue, **Yixi Cai**, Ximin Lyu, and Fu Zhang. Autonomous tail-sitter flights in unknown environments. *IEEE Transactions on Robotics*. IEEE, 2024. [Paper].

[IJRR'2024] Haotian Li, Yuying Zou, Nan Chen, Jiarong Lin, Xiyuan Liu, Wei Xu, Chunran Zheng, Rundong Li, Dongjiao He, Fanze Kong, **Yixi Cai**, et al. Mars-lvig dataset: A multi-sensor aerial robots slam dataset for lidar-visual-inertial-gnss fusion. *The International Journal of Robotics Research*. SAGE Publications Sage UK: London, England, 2024. [Paper].

[CASE'2023] Yuying Zou, Haotian Li, Yunfan Ren, Wei Xu, Yihang Li, **Yixi Cai**, Shenji Zhou, and Fu Zhang. Perch a quadrotor on planes by the ceiling effect. In *2023 IEEE 19th International Conference on Automation Science and Engineering (CASE)*, pages 1–7. IEEE, 2023. [Paper].

[RAL'2023] Fanze Kong, Xiyuan Liu, Benxu Tang, Jiarong Lin, Yunfan Ren, **Yixi Cai**, Fangcheng Zhu, Nan Chen, and Fu Zhang. Marsim: A light-weight point-realistic simulator for lidar-based uavs. *IEEE Robotics and Automation Letters*, volume 8, pages 2954–2961. IEEE, 2023. [Paper].

[TCST'2022] Wei Xu, Dongjiao He, **Yixi Cai**, and Fu Zhang. Robots' state estimation and observability analysis based on statistical motion models. ***IEEE Transactions on Control Systems Technology***, volume 30, pages 2030–2045. IEEE, 2022. [Paper].

[RAL'2021] Fanze Kong, Wei Xu, **Yixi Cai**, and Fu Zhang. Avoiding dynamic small obstacles with onboard sensing and computation on aerial robots. ***IEEE Robotics and Automation Letters***, volume 6, pages 7869–7876. IEEE, 2021. [Paper].

Fellowships & Awards

Digital Future Postdoctoral Fellowship, 2025-2026

RSS Pioneer in Robotics: Science and Systems 2024 (15% Acceptance Rate)

Best Paper Award Finalist in IEEE/ASME Transactions on Mechatronics, 2023

Y S and Christabel Lung Postgraduate Scholarship for Engineering Students 2020-2021.

University Postgraduate Fellowships for the academic year 2020-21.

Postgraduate Scholarships, as a Ph.D. research scholar at the University of Hong Kong.

Academic Service

Committees

RSS Pioneer Program Committee 2025

Journal Review

Transactions on Robotics

Journal of Field Robotics

Transactions on Mechatronics

Robotics and Automation Letters

Transactions on Intelligent Vehicles

Transactions on Aerospace and Electronic Systems

Transactions on Pattern Analysis and Machine Intelligence

Conference Review

International Conference on Robotics and Automation (ICRA) 2024-2025

International Conference on Intelligent Robots and System (IROS) 2022-2025

Teaching Assistantship

MECH3433 Robotics, drones and autonomous ground vehicles   **Spring Semester**
2020-2024