# Zhenjun Zhao

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## Education

**2019.8 – 2023.10**  **The Chinese University of Hong Kong**                                **Hong Kong SAR**

*PhD at Department of Mechanical and Automation Engineering*

- Research interests include robust pose estimation, feature detection/description/matching and visual localization in challenging environments for drones and vehicles.

**2012.9 – 2015.4**  **Nanjing University of Aeronautics and Astronautics**                        **Nanjing, China**

*Master at College of Automation Engineering*

- Master of Science: Navigation, Guidance and Control granted in April 2015.
- GPA: 3.76/4.00; Rank: 2/38.

**2008.9 – 2012.6**  **Nanjing University of Aeronautics and Astronautics**                        **Nanjing, China**

- Bachelor of Engineering: Automation Engineering granted in June 2012.
- GPA: 3.70/4.00; Rank: 6/155.

## Internship Experience

**2020.6 – 2020.11**  **Orbbec Co., Ltd**                                                    **Shenzhen, China**

*SLAM Algorithm Intern, Research Institute*

- Research on visual-inertial odometry initialization.
- Develop light-weight visual-inertial odometry initialization and optimization in mobile devices.

**2021.3 – 2022.12**  **Peng Cheng Laboratory**                                            **Shenzhen, China**

*Research Intern, Mathematics and Theory Department*

- Research on pose estimation and visual localization in underwater environments.
- Research on local feature extraction in underwater environments.

## Professional Experience

**2018.11 – 2019.7**  **The Chinese University of Hong Kong**                                **Hong Kong SAR**

*Research Assistant, Department of Mechanical and Automation Engineering*
- Research on visual-inertial odometry for unmanned aerial vehicle.
- Integrate PX4 and MSF to build a loosely-coupled visual-inertial odometry for unmanned aerial vehicle.

2015.4 – 2016.6 **Huawei Technologies Co., Ltd** **Hangzhou, China**
*Software Engineer, the Security Gateway Development Division*
- Develop and maintain virtual system, intelligent routing, mail filtering and north direction in Huawei's first visualized software firewall (VFW).
- Develop and maintain virtual machine migration and policy optimization in Huawei's visualized network security product (NGFW).
- Lead the project of Huawei's first firewall simulation tool targeting at corporate users, trainees and examinees.

## Selected Projects

**Local Feature in Challenging Environment** **USR Group, CUHK & CVGL, Westlake University**
- Local feature detection algorithm is investigated to enhance visual localization in low-lighting environment which exists motion blur effect.
- Our BALF achieves superior detection performance over prior works on motion blurred images, while keeping comparable performance for sharp images.
- Local feature extraction and matching are investigated to implement the front-end in underwater environment.
- Our UAD2Net achieves the state-of-the-art matching performance in underwater environment.
- Integrate our UAD2Net to build sparse and dense underwater reconstruction.

**Visual Localization – Pose Graph Registration** **USR Group, CUHK**
- We propose a new paradigm for outdoor visual localization task leveraging multiple pose graph.
- Our algorithm achieves the state-of-the-art robustness performance in the outdoor visual localization task.

**Visual-Inertial Odometry/SLAM Evaluation System** **USR Group, CUHK**
- We built the full verification and validation system for visual-inertial odometry/SLAM from scratch.
- Our system contains full testing procedure, diverse challenging data, specified metrics.
- The overall protocol is open-sourced for the community.

**Multi-Sensor Fusion for Indoor Localization Using Camera, IMU, and UWB** **USR Group, CUHK**
- We built an advanced indoor localization system leveraging multiple sensors, including cameras, Inertial Measurement Units (IMUs), and Ultra-Wideband (UWB).
- Our multi-sensor fusion approach enables precise tracking and localization to enhance indoor navigation, tracking, and augmented reality applications.

## Honors & Awards

PhD Scholarship, CUHK, 2019-2023

Huawei Annual Research Director Award (top 2 at Hangzhou Branch), Huawei, 2016

Graduate Prize Fellowship, NUAA, 2012-2015

Undergraduate Academic Scholarship, NUAA, 2008-2012

## Teaching

Co-supervisor, Undergraduate Final Year Project, 2019-2020

Co-supervisor, MSc Project, 2019-2020

Teaching Assistant, Multivariable Calculus for Engineers, Spring 2021

Teaching Assistant, Complex Variables for Engineers, Fall 2020

Teaching Assistant, Probability and Statistics for Engineers, Spring 2020

Teaching Assistant (Lead), Introduction to Control Systems, Fall 2019

## Academic Services

Reviewer: ICRA, 3DV

## Publications

**Zhenjun Zhao** and Ben M. Chen, Benchmark for Initialization of VIO, *Chinese Control Conference (CCC)*, 2023.

**Zhenjun Zhao**, Yu Zhai, Ben M. Chen, Peidong Liu, BALF: Simple and Efficient Blur Aware Local Feature Detector, *arXiv preprint arXiv:2211.14731,* 2022 (Under review).

**Zhenjun Zhao**, Pose Graph Registration for Visual Localization, *International Conference on Robotics and Automation (ICRA)*, 2024 (Under review).

Junjie Wen, Jinqiang Cui, **Zhenjun Zhao**, Ruixin Yan, Zhi Gao, Lihua Dou, Ben M. Chen, SyreaNet: A Physically Guided Underwater Image Enhancement Framework Integrating Synthetic and Real Images, *International Conference on Robotics and Automation (ICRA)*, 2023.

Haoang Li, Ji Zhao, Jean-Charles Bazin, Pyojin Kim, Kyungdon Joo, **Zhenjun Zhao**, Yun-Hui, Liu, Hong Kong World: Leveraging Structural Regularity for Line-based SLAM, *Transactions on Pattern Analysis and Machine Intelligence (TPAMI)*, 2023.