

# Baoshan Song

## Curriculum Vitae

The Hong Kong Polytechnic University PQ502  
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### Education

- 2023–present **PhD Degree - The Hong Kong Polytechnic University, Hong Kong.**  
**Thesis Title:** Safety-certifiable GNSS PPPRTK/INS/Visual in urban environment  
(Supervised by **Dr. Li-Ta Hsu** and **Dr. Weisong Wen**)  
Status: In the writing phase
- 2020–2023 **M.Sc. Engineering, Wuhan University, China.**  
**Thesis Title:** Multi-Robot Decentralized Mapping Based on Manifold Optimization  
(Supervised by **Dr. Xingxing Li** and **Dr. Yun Wu**)  
Graduation grade: very-good
- 2016–2020 **B.C.s Engineering, Wuhan University, China.**  
**Graduation project:** Real-time GNSS/INS loosely-coupled localization system  
(Supervised by **Dr. Xingxing Li**)  
Graduation grade: Distinguished

### Professional Interests

Working in the research fields of convex optimization and its application on simultaneous localization and mapping (SLAM)

### Publications

#### Journals

- **Baoshan Song**, Weisong Wen and Li-Ta Hsu. Online IMU-Odometer Calibration using GNSS Measurements for Unmanned Ground Vehicle Localization. (Submitted).
- Xingxing Li, **Baoshan Song**, et.al. Consistent Localization for Autonomous Robots with Inter-vehicle GNSS Information Fusion. *IEEE communications letters* 2022.

#### Conferences

- **Baoshan Song**, Weisong Wen, Li-Ta Hsu. Certifiably Optimal Satellite Orbit Determination Based on Doppler Measurements for Low-Earth-Orbit Satellite. *IEEE/ION PLANS 2025* (Abstract Accepted).
- **Baoshan Song**, Weisong Wen, Li-Ta Hsu. Tightly coupled Low-cost GNSS-RTK/INS/Odometer Integration Via Factor Graph Optimization Aided by GNSS Outlier Mitigation in Urban Canyons. *European Navigation Conference (ENC) 2024*.

#### Patents

- **Baoshan Song**, et.al. An integrated positioning method based on ArduRover unmanned vehicle. *Chinese Patent ZL202110539154.8, 2021*.

## Work Experience

- 2023–2024 **Teaching Assistant**, *Undergraduate Course: Dynamic systems and control.*  
**Task:** Design teaching materials and teach the PID control experiments using robot operation system (ROS)
- 2020–2021 **Part-time Engineer**, *Hangzhou Shenhao Technology Co..*  
**Task:** Develop a simulated rail track irregularity measuring system using tactical IMU.

## Supervision

- B.C.s **Yuxuan Tan**, *PPP/INS/Vision tightly coupled integration navigation in complex environments.*
- Competition **First Prize in Wuhan university surveying competition (2019)**, *An autonomous navigation system using GNSS/INS/Vision fusion for UGV.*

## Skills and Activities

- Programming C/C++, MATLAB, Python, Android
- Third-party ROS, Qt, OpenCV, Latex, SOLIDWORKs  
Library
- Operating Windows, Mac, Linux  
System

## Languages

- Cantonese Native Speaker
- Mandarin Mandarin (Secondary level-A)
- English English (IELTS)(PhD in English, PhD dissertations written in English, publications and presentations are in English)

## Honors and Awards

- 2020 Wuhan University Outstanding undergraduate graduate
- 2019 Wuhan University Research Postgraduate Recommendation (*the only one*)
- 2018–2019 Wuhan University Outstanding Student
- 2017–2018 National Encouragement Scholarship
- 2017 Wuhan University Merit Student