

# Zida Wu

<https://milkytip.github.io/>

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## EDUCATION

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### Shanghai Jiao Tong University

*September 2017 - Present*

Master of Electronics and Communication Engineering  
Department of Electronic and Electrical Engineering

### Xidian University

*September 2013 - July 2017*

Bachelor of Telecommunication Engineering  
Department of Telecommunication Engineering

## AWARDS

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Third prize of the 15th China Graduate Mathematical Modelling Contest	<i>December 2018</i>
Chinese National Graduate Scholarship (top 3%)	<i>November 2018</i>
Merit Student Prize of Shanghai Jiao Tong University (top 5%)	<i>October 2018</i>
First Prize Scholarship of Shanghai Jiao Tong University (top 20%)	<i>September 2017</i>
Outstanding Graduates of Xidian University (top 5%)	<i>July 2017</i>
Pacesetter of Outstanding Volunteer (top 1‰)	<i>September 2016</i>
Second Prize Scholarship of Xidian University	<i>September 2015</i>
First Prize Scholarship of Xidian University	<i>September 2014</i>

## PUBLICATIONS

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Z. Wu, and P. Liu. “Pseudorange Double Difference and PDR Fusion Algorithm Using Smartphone GNSS Raw Measurements”, in *2019 China Satellite Navigation Conference (CSNC) (Oral)*.

A. Rehman, Q. Liu, Z. Wu, H. Zhu, J. Qian, et al. “PDR/GNSS Fusion Algorithm Based on Joint Heading Estimation”, in *2019 China Satellite Navigation Conference (CSNC)*.

Z. Wu, P. Liu, Q. Liu, et al. “MEMS-based IMU Assisted Real Time Difference Using Raw Measurements from Smartphone”, in *2018 International Technical Meeting of The Satellite Division of the Institute of Navigation (ION GNSS+)*.

Q. Liu, J. Qian, P. Liu, R. Ying, Y. Wang, Z. Wu, and A. Rehman. “Theoretical Analysis and Reconstruction Algorithm for Intermittent Carrier Observations on Low-Power Mobile Devices”, in *2018 International Technical Meeting of The Satellite Division of the Institute of Navigation (ION GNSS+)*.

A Positioning System under GNSS Double Difference for Portable Intelligent Devices [P]. *Chinese National Invention Patent. (Patent No. CN201810091248.1)*.

## RESEARCH

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### Intelligent Robotic Navigation and Manipulation System

*Agency for Science, Technology and Research (A\*STAR) of Singapore July 2019 - September 2019*

- Developed a docking SLAM method that tracks moving objects with cm-grade docking accuracy for autonomous vehicles.
- Constructed two images handler threads to fuse the masks of object and depth images, and used omnidirectional wheels to avoid large rotation under close range.

- Utilized the low-frequency masks (based on Mask\_RCNN) as predictive areas for feature detection, and utilized depth geometry discontinuity and convexity as real-time auxiliary segmentation.
- Such a system was deployed in autonomous factories, to dynamically follow mobile target and then implement docking and mechanical grab.

### **Multi-sensor Fusion for Inspection Robot**

*Shanghai Jiao Tong University*

*December 2018 - Present*

- Introduced a loose-coupled framework that fuses IMU, SLAM, GNSS and other sensors separately, which tolerates single sensor failure during operation.
- Applied an error-state Kalman Filter to optimize the independent poses from SLAM and IMU, and fed back into the nominal states to acquire the genuine pose.
- Loosed the rigid constrain between the world frame and vision frame, and utilized gravity as implicit observation to align SLAM-IMU vision frame to GNSS world frame.
- A second error-state filter was utilized to fuse the GNSS measurements to prevent state estimation drift in long-term operation.
- This algorithm achieved seamless and continuous positioning at large-distance scale (km-grade) when robots move across the indoor and outdoor environments.

### **Bluetooth Indoor Positioning System**

*Shanghai Jiao Tong University*

*August 2018 - October 2018*

- Aimed to realize an accurate Bluetooth signal arrival-of-angle (AOA) estimation, using single channel 6-antenna array.
- Performed the Multiple Signal Classification algorithm (MUSIC) with phase and frequency to estimate angles.
- Solved the phase drift problem caused by antenna switch and multipath, by dynamic signal polarization switch and intermittent sampling with frequency compensation.
- The algorithm achieved 5-degree accuracy in estimating the AOA of Bluetooth signal, which means cm-grade localization accuracy could be achieved with this system.

### **High-accuracy GNSS Positioning on Portable Smartphone**

*Shanghai Jiao Tong University*

*July 2017 - August 2018*

- Developed an algorithm which achieved high-accuracy and reliable positioning of smartphones under complex environment using GNSS-IMU fusion.
- Utilized the pseudorange double-difference model (PDD) to linearized the positioning process, and eliminate the atmosphere, satellite, and phone clock error, as well as decoupled the pseudorange and velocity measurements based on the short-baseline hypothesis.
- Joint heading estimation using Pedestrian Dead Reckoning (PDR) and GNSS Doppler.
- This algorithm calibrated the PDR gait length loss and heading drift in the long-term, and maintained high smooth and accuracy in the short-term.

## **TEACHING EXPERIENCE**

**Teaching assistant of Digital Signal Processing**

*Autumn 2018*

Instructor: Prof. Xiangming Geng

## **TECHNICAL STRENGTHS**

**Programming Languages**

C/C++, Python, MATLAB, Java, LaTeX, Markdown

**Software Platforms**

ROS, Linux, Android, Windows

**Hardware Platforms**

Jetson, Arduino, NUC, eZdsp 5535