

# Ruihua Han

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## EDUCATION

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<b>Master's Degree of Engineering</b> <i>Xiamen University</i> Major: Microelectronics and Solid State Electronics	09/2014-06/2017
<b>Bachelor's Degree of Engineering</b> <i>Wuhan University of Technology</i> Major: Industrial Equipment and Control Engineering	09/2010-06/2014

## RESEARCH EXPERIENCE

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<b>Navigation of Self-driving Campus Bus on Road</b>	08/2017-present
● This research aims to develop the self-driving system for the campus bus with exteroceptive sensors including LIDARs and cameras to perform autonomous navigation on the road.	
● <i>Responsibilities:</i> Developing the algorithm for the localization of the bus with binocular camera based on ORB-SLAM and filter algorithm such as EKF, PF.	
<b>Multi-Robot Localization in Featureless Environment</b>	04/2018-present
● This research aims to localize a group of robots by the relative observation between two robots in a featureless environment where has no fixed landmark.	
● <i>Responsibilities:</i> Developing the decentralized algorithm based on EKF which fuses the odometry and relative observation that derived from the camera to perform the cooperative localization.	
<b>Design of Micro Piezoelectric Ultrasound Pump</b>	09/2015-06/2017
● This research aims to design an ultrasound pump model based on piezoelectric material which can generate a traveling wave to drive fluid when AC voltage applied.	
● <i>Responsibilities:</i> Designed and optimized the detailed size of the pump model to obtain a higher performance by the fluid analysis using ANSYS simulation.	
<b>Design of Micro Piezoelectric Accelerator</b>	09/2014-09/2015
● This research aims to design an accelerator which can detect the charge generated from the piezoelectric material by the vibration of the mass to calculate the corresponding acceleration.	
● <i>Responsibilities:</i> Designed and optimized the detailed size of the accelerator model to obtain a higher performance by theoretical analysis and simulation with ANSYS.	

## PUBLICATIONS

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- **Ruihua Han**, Shengduo Chen, Yasheng Bu, Zhijun Lyu, and Qi Hao, “Decentralized Cooperative Multi-Robot Localization with EKF” ICRA 2019. Submitted.
- Shuai Zhang, **Ruihua Han**, Wankuan Huang, Shuaijun Wang, and Qi Hao, “Linear Bayesian Filter based Low-cost UWB Systems for Indoor Mobile Robot Localization” SENSORS, 2018 IEEE. Accepted.
- **Ruihua Han**, Jianyan Wang, Mahui Xu, and Hang Guo. “Design of a tri-axial micro piezoelectric accelerometer” Symposium on Piezoelectricity, Acoustic Waves, and Device Applications (SPAWDA), 2016. pp. 66-70. IEEE, 2016.

- Hui Zhou, **Ruihua Han**, Mahui Xu, and Hang Guo. “Study of a piezoelectric accelerometer based on d33 mode” Symposium on Piezoelectricity, Acoustic Waves, and Device Applications (SPAWDA), 2016. pp. 61-65. IEEE, 2016
- Mahui Xu, Jianyan Wang, **Ruihua Han**, Hui Zhou, and Hang Guo. “Analytical and finite element analysis of a new tri-axial piezoelectric accelerometer.” Symposium on Piezoelectricity, Acoustic Waves, and Device Applications (SPAWDA), 2016. pp. 71-75. IEEE, 2016.

## **WORK EXPERIENCE**

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### **Research Assistant**

**08/2017-present**

*Southern University of Science and Technology*

- Participated in *Self-driving Campus Bus* and *Multi-Robot Localization* projects.
- Served as the *Teaching Assistant* to teach students the experiment of *ROS navigation*.
- Wrote the proposal to apply the projects: *Self-driving Campus Bus(\$1500000)*, *Open Datasets for Autonomous Transportation(\$600000)*

### **Algorithm Engineer Intern**

**07/2016-09/2016**

*DJI-Innovations*

- Developed the flight control algorithm based on ROS to control the aerial vehicle (M100) move to the assigned location and perform the task of fetching target automatically.

## **COMPETITION**

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### **2015 ABU Robocon China**

***national first prize***

- This competition requires students to build a badminton robot which can compete with other robots built by other universities.
- *Responsibilities:* Designed and built the mechanical structure of the robot; programmed the code to control the brushless motor.

### **2016 National Robot Creative Design Contest**

***national first prize***

- Designed and simulated a dental robot based on virtual force feedback technology.
- *Responsibilities:* mechanical design, animated simulation (SolidWorks).

### **2016 RoboMaster Robotics Competition**

***national second prize***

- This competition requires students to form a robotics team, and independently develop and produce a variety of robots to participate in a large-scale competition
- *Responsibilities:* Programmed the code on the STM32 platform to address the problems including CAN/serial port communication and control (PID) of robots.

### **2017 RoboMaster Robotics Competition**

***national third prize***

- This competition requires students to form a robotics team, and independently develop and produce a variety of robots to participate in a large-scale competition
- *Responsibilities:* Developed the flight control algorithm based on ROS and DJI Onboard SDK to perform the task of grabbing ball.

## **Personal**

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- GPA: 3.1
- Language: IELTS 6.0
- Programming Language: C/C++, Python
- Hardware: 3D printer, CNC, Lathe Machine
- Software: Matlab, latex, ANSYS, SolidWorks, AutoCAD
- Development Platform: Linux, ROS, STM32