

# Ruihua Han

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## EDUCATION

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### Master's Degree of Engineering

09/2014-06/2017

Xiamen University

Major: Microelectronics and Solid State Electronics

### Bachelor's Degree of Engineering

09/2010-06/2014

Wuhan University of Technology

Major: Industrial Equipment and Control Engineering

## RESEARCH EXPERIENCE

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### Navigation of Self-driving Campus Bus on Road

08/2017-present

- This research aims to develop a self-driving system for the campus bus with exteroceptive sensors including LIDARs and cameras to perform autonomous navigation on the road.
- *Responsibilities:* Developing the algorithm for localization of the bus with binocular camera based on ORB-SLAM and filter algorithm such as EKF, PF.

### Multi-Robot Localization in Featureless Environment

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.
- *Responsibilities:* Developing the decentralized algorithm based on EKF which fuses the odometry and relative observation derived from the camera to perform the cooperative localization.

### Design of Micro Piezoelectric Ultrasound Pump

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.
- *Responsibilities:* Designed and optimized the detailed size of the pump model to obtain a higher performance by the fluid analysis using ANSYS simulation.

### Design of Micro Piezoelectric Accelerator

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.
- *Responsibilities:* Designed and optimized the detailed size of the accelerator model to obtain a higher performance by kinetic 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 the course *Intelligent Robot* about the *ROS* navigation.
- Wrote proposals to apply projects including *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 place and perform the task of fetching target automatically.

## CONTEST EXPERIENCE

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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*

- This competition requires students to design a robot with the theme of *Intelligent Robot*
- *Responsibilities:* Designed and simulated a dental robot based on virtual force feedback technology using 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.

## GRADES AND SKILLS

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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