

# Minghui (Scott) Zhao

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## Education

### Columbia University

**MS in Computer Engineering**, GPA N/A (Just started)

*Courses: Operating System, IoT and Cloud Computing, Networking, Robotics*

*New York, NY*

Expected May 2022

### University of California San Diego

**BS in Electrical Engineering, Minor in Mathematics**, GPA 3.72 / 4.0

*Courses: C, C++, Python for Data Analysis, Data Networks, Computer Architecture, Embedded Systems, Rapid Prototyping, Analog Design, Digital Design, Linear System Fundamentals*

*La Jolla, CA*

Aug 2016 – Dec 2020

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## Academic Experience

### Bharadia Lab UCSD

#### Research Assistant

- Developed an accurate indoor tracking system employing an array of ultra-wideband (UWB) radio frequency (RF) transceivers to make virtual reality system tracking feasible in non-line-of-sight situations
- Worked on an embedded system that controls the UWB transceivers and the PCB for a transceiver array
- Processed the RF signal data and analyzed the performance and limits of the system
- Compared and optimized various methods and algorithms in angle of arrival estimation and location solving to reduce the median localization error to 5 cm

*La Jolla, CA*

Apr 2019 – Present

### Talke Lab UCSD

#### Research Assistant

- Developed an embedded, wireless, hand and ergonomic motion tracking system to improve the surgical operation training and ergonomic health monitoring of medical students and doctors
- Designed and fabricated a PCB for the system and fitted it into a 3D-printed soft watch case
- Compared and analyzed performance and data fidelity on TCP/UDP transmitting protocols and implemented buffering and data recovery algorithms to transmit data at tripled rate while eliminating data loss

*La Jolla, CA*

Apr 2017 – Jun 2019

### UCSD Electrical and Computer Engineering Department

#### Undergraduate Teaching Assistant

- Worked as a teaching assistant for ECE 5 (Introduction to ECE) and ECE 16 (Rapid Software & Hardware Design) beginning in my freshman year, acquired a 99.5% student recommendation rate in a total of 14 quarters worked
- Led lab section meetings and announcements in addition to other duties, including coordinating tutors on the preparation of material, organizing class project competitions, and developing lab instructions and assignments
- Trained students in hands-on skills, including 3D CAD and printing, PCB design, laser cutting, and soldering
- Interacted with students by answering technical questions, debugging circuits and programs, and inspiring and assisting them in developing their own projects; fostered essential skill sets in more than 1,000 students to facilitate innovative projects and to inspire a practical interest in ECE

*La Jolla, CA*

Sep 2016 – Dec 2020

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## Projects (see many more at [scottz.net/projects](https://scottz.net/projects))

### AutoPark ([github.com/zhaomh1998/AutoPark](https://github.com/zhaomh1998/AutoPark))

- Developed a multi-level parking structure model with automatic car parking
- Designed and assembled seven distinct PCB prototypes with DC and stepper motor drivers and wireless microcontrollers
- Built a 3D model for the system, manufacturing and assembling it with laser cutting and 3D printing
- Programmed “node” microcontrollers to interface with sensors and drive stepper motors, enabling wireless communication with one another and with the host

Jan 2019 – Mar 2019

### Tubular Robot ([scottz.net/tr](https://scottz.net/tr))

- Developed an autonomous terrain exploration and mapping robot with wireless controls and a streaming camera
- Assembled the robot from scratch with a laser-cut tubular chassis and wheels and 3D-printed sensor holders

Apr 2018 – Jun 2018

- Programmed the microcontroller to read sensors, transmit data, and react wirelessly to commands from the PC
- Developed algorithms for obstacle avoidance, autonomous driving, and terrain mapping

**Real-Time Traffic Monitoring and Analysis** ([scottz.net/traffic](http://scottz.net/traffic))

Dec 2017 – Present

- Programmed a script to collect and plot traffic congestion information from AMap API in real time
- Optimized the scraping server script for years of stability
- Enabled comparison of traffic data with precipitation data and analyzed weather's contribution to traffic jams

**Smart Home Remote Watering** ([scottz.net/water](http://scottz.net/water))

Jan 2015 – Present

- Built an embedded wireless system to monitor soil humidity and to water plants autonomously or remotely using mobile phones over Wi-Fi
- Enabled GSM connectivity to maintain an internet connection in the absence of Wi-Fi
- Developed a cross-platform mobile app using Flutter to control the system remotely

**Publications**

- Morris, K., **Zhao, M.**, Lam, J., Jacobsen, G., Horgan, S., & Talke, F. E. (2019, June). A Wearable Neck Measurement Device and Monitoring System to Improve Ergonomic Performance of Surgeons. In *Information Storage and Processing Systems* (vol. 59124, p. V001T09A002). American Society of Mechanical Engineers.
- **Zhao, M.**, Ayyalasomayajula, R., Zhang, C., & Bharadia, D. (Under review). ULoc: Robust, Scalable and cm-Accurate UWB Tag Localization. *Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies*.

**Extracurricular Activities**

- **EnVision Arts and Engineer Maker Studio Volunteer** Jan 2019 – Mar 2020  
Inspired students in their personal and class projects and provided hands-on training on maker tools, including laser cutting, 3D modeling and printing, PCB design, and soldering
- **YonderDeep Student Organization** Sep 2018 – Aug 2019  
Designed the PCB for an autonomous underwater vehicle (AUV) and improved the AUV's software by proposing and developing a more robust code logic using finite state machines; wrote programs in Python for communication between the AUV and the base station and developed PID control algorithms to control and balance the AUV during autonomous navigation and when diving to a specified depth

**Honors and Awards**

- Honorable Mention. LA Hacks 2019: Site 101 Big Data Award
- First Award. SD Hacks 2019: Best Use of AWS AI/ML Services
- 2020 ECE Best Tutor Award

**Professional Skills and Languages**

- **Languages:** Python, MATLAB, C, C++, LabVIEW, Flutter, Java
- **Software:** Autodesk EAGLE, Solidworks, SystemVerilog
- **Manufacturing:** Soldering, 3D Printing, Laser Cutting
- **Other:** Internet of things, embedded systems, Unix, Git
- **Certification:** Certified LabVIEW Associate Developer (CLAD)