

# ALLEN ZIFENG AN

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## EDUCATION

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### McMaster University

*September 2017 - May 2022*

Mechatronics Engineering (Software Department), Biomedical Engineering

GPA: 3.9

Bachelor of Engineering, Currently in Fourth Year out of Five Year

Relevant Courses: Human Anatomy and Physiology (HTHSCI 2F03), Health Solution Design (IBEHS 3P04), Data Structures and Algorithm (SFWRENG 2MD3), Operating Systems (SFWRENG 3SH3), Databases (SFWRENG 3DB3)

## PROJECTS

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### Ultrasound 3D Reconstruction

*2020*

Collected scans of carpal tunnel on human subjects using a portable ultrasound probe mounted on a self-designed linear motorized stage. The median nerve model was created for visualization using Python Open3D. The model increases inter-rater and intra-rater stability and potentially serve as a novel diagnostic standard for carpal tunnel syndrome. Python OpenCV was used to highlight bone surfaces, ligaments, tendons and muscle fascia. Processed accelerometer raw data in MATLAB using different digital filters to simulate the freehand motion of the ultrasound probe in 3D space.

### Personal Website

*2020*

<https://zifengallen.tk/>

Website UI Design. Flex Layout Design. Mobile First Principle. Bootstrap. Vanilla Javascript Games. Canvas Animations. Python Django Forum.

### Recommenki

*2019*

The idea of this project comes from recommending tailored Wikipedia articles to readers. The back end provides Restful API for recommended articles and user behaviour data. The front end used ReactJS for responsive layout and CytoscapeJS for graphical data visualization. This is a single page application that gets data from the back end through AJAX. Hibernation was used as an object relational mapping tool to access the Java Spring sqlite database. We invented a few recommendation algorithms to provide users with similar articles with high quality index. Users can provide active feedbacks – likes and saves, and negative feedbacks – the viewing time of the article, and scrolling behaviour.

### CP Patient Monitoring Insole

*2019*

Designed an insole embedded with force sensors to visualize the force distribution of the patient's weight on the feet. The purpose of the device is to monitor the recovery process of Cerebral Palsy patients after surgery. All data were collected from the Arduino and sent to the python Flask server. The real-time force map can be accessed online for both the patient and the clinician.

### Gyro Spoon, Course Work

*2017*

Prototype Picture

Designed an auto adjusting spoon that counters Parkinson patients shaking hand to prevent food spill. Developed Python scripts to process real time data from gyroscopes and control servo motors on Raspberry Pi. Customized mechanical casing in CAD and 3D printed.

## WORK EXPERIENCE

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### Summer Research Assistant, McMaster University

*May 2019 - August 2019*

Implemented a lane detection algorithm based on hough line transform from Python OpenCV and compiled the software on the Nvidia Jetson TX2 platform. Trained a neural network YOLO model

in MATLAB through ground truth labelling module to recognize car models. Worked closely with graduate students from the department of computing and software.

**Teaching Assistant**, McMaster University *September 2018 - now*  
1ZA3 – Calculus, 1ZC3 – Linear Algebra  
Conducted exam and midterm reviews in front of 200+ students. Provided tailored personal tutoring and organized workshops in the university math help center. Demonstrated outstanding presentation and communication skills.

**Software Engineering Intern**, Union Pay, Shanghai *June 2018 August 2018*  
Set up pseudo-distributed hadoop system using virtual machines to implement the word count example. Exposed to the Spark Map-Reduce model and Scala.

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## ACTIVITIES

**Program Ambassador**, McMaster University *October 2017 - now*  
Worked collaboratively with other ambassadors to advertise and promote the integrated biomedical engineering program. Served as the go to person during university open house and interfaced with prospective students and families.

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## SKILLS

### Programming Languages

Proficient: Javascript, Python, HTML, CSS

Intermediate: Java, C/C++, MATLAB, Simulink

Basic: Assembly

### Frameworks

NodeJS, ExpressJS, ReactJS, Django, OpenCV, NumPy, Matplotlib

### Other

Proficient in Ubuntu/Linux systems, GCP, AWS, Aliyun, Raspberry Pi, Arduino, Nvidia Jetson TX2

### Languages

English, Mandarin, Shanghainese

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## AWARDS AND SCHOLARSHIPS

**Google HashCode Coding Challenge** *Feb 2020*  
Worldwide Ranking 1000+.

**Dean's Honour List**, McMaster University *May 2019*  
Given to degree students in the Faculty having a Cumulative Grade Point Average of 3.50 or higher.

**McMaster President's Entrance Scholarship**, McMaster University *September 2017*  
Awarded to high school students with an average higher than 95.

**Biology Graduation Award**, Bronte College *June 2017*  
Awarded by the high school during graduation to one student per subject.

**Certificate of Completion**, Mississauga *May 2017*  
Mississauga Half Marathon Race 2 hour 10 min.

**Certificate of Distinction**, Canadian Computing Competition, University of Waterloo *May 2017*  
Ranked top 20 percent in Canada in the Competitive Programming Competition.

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## HOBBY

Tennis, Cooking, Golf, Chess