# Dingzhong Zhang

Mechanical Engineer

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## Profile

Mechanical Engineer with expertise in robotics and image processing. Specializing in the design, implementation, and testing of robotic systems and biomechanical devices. Respected for enhancing software through implementing deep learning and algorithm optimization.

## Work Experience

**Robotics Engineer Intern** June 2020 – Aug 2020

Shanghai Genius Education & Technology Co. Ltd (UBTECH Robotics): Shanghai, China

- Designed and assembled first-person-view drones and applied control theory to improve flight stability.
- Developed a line-following-vehicle project for students to gain hands-on experience with MircroBit and Python.
- Taught classes of up to 15 students in flight regulation, python programming, and using Arduino hardware.

**Research Assistant** Dec 2018 – July 2019

Orthotek Laboratory: Shanghai, China

- Established a universal test platform for replicating different movement/load scenarios for prosthetic knee joints.
- Simulated and analysed loading conditions with kinematics tests using an ABB IRB6700 robotic arm.
- Improved-prosthesis control methods by analysing load conditions using a multidimensional force sensor, Beckhoff embedded PC, and secondary developed software based on TwinCat.
- Developed a dynamic optical measuring system to observe knee-joint kinematics in gait by sticking markers on the surface of prosthesis.

## Academic Research

**Spine Surgical Navigation System based on AR using HoloLens** Sept 2020 – Present

McGill University

- Developed an AR based surgical navigation system for high-quality visualization during spine surgery.
- Optimized the 3D reconstructed data from DICOM by using deep learning for automatic image segmentation.

**Orbital Rim Registration Software** Jan 2020 – June 2020

Shanghai Jiao Tong University

- Developed a software in QT using C++ that allows doctors to register points along the orbital rim for ocular surgery procedures.
- Improved the iterative-closest-point algorithm for surface registration in drafted 3D models from CT-scan data.

**Medical Image Segmentation via Deep Learning** Sept 2019 – Nov 2019

Shanghai Jiao Tong University

- Reduced calculation time by 80% for medical image computation software by integrating deep learning.
- Compiled the Tensorflow C++ library and converted Python image segmentation programs to C++.
- Developed semi-automatic labeling algorithms to segment a bone graft from maxillary sinus for training models.

**Design of A Medical Rehabilitation Robotic Arm** Jan 2018 – Jun 2018

Shanghai University

- Earned First Prize in the Chinese Service Robot Competition.
- Prototyped a robotic arm with four degrees of freedom which can predict patient arm movement to aid in rehabilitation exercises and adjust its sensitivity for different patients.
- Developed a robotic arm system equipped with multiple sensors, a windows forms application, and servo controls.
- Conducted force analysis in ANSYS to increase stiffness and strength as needed for various situations.

**Design of A Novel First-Person-View Racing Drone** May 2018 – June 2018

Shanghai University

- Developed and competed a first-person-view drone to win First Prize in China's Aerial Robotics Competition.
- Built a drone with 4x 4800kv brushless motors, carbon fibre frame, 4 in 1 electronic speed controller, F3 flight controller, altimeter, barometer, video transmitter, etc.
- Actively calibrated the drone's PID to adjust for various match requirements and conditions.

**Programming and Design of a PCB Layout of an Automated Guided Vehicle** Nov 2017 – Mar 2018
Shanghai University

- Won Third Prize in China's Robot Match for Travel and Security.
- Programmed a vehicle to pass different terrains and execute corresponding actions after scanning QR codes.
- Improved system reliability by designing an expansion PCB to replace multiple parts connected with Dupont cables.
- Optimized vehicle response by installing an automatic steering system featuring 16 gray-scale sensors, 4 ultrasonic sensors and a control algorithm.

## Education

McGill University Sept 2020 – Present
- Master of Science – Mechanical Engineering (GPA: 4.00 / 4.00)

Shanghai Jiao Tong University Aug 2019 – June 2020
- Master of Science – Mechanical Engineering (GPA: 3.64 / 4.00)

Shanghai University Sept 2014 – June 2019
- Bachelors of Engineering – Mechanical Engineering (GPA: 3.72 / 4.00 RANK: 1/277)

## Awards & Honors

- Academic Excellence Scholarship - Shanghai Jiao Tong University 2019
- Graduated with Honors of Shanghai 2019
- Academic Scholarship - Shanghai University 2015 - 2018
- First Prize - Chinese Service Robot Competition (Innovative Design of Rehabilitation Robot) 2018
- First Prize - China Aerial Robotics Competition 2018
- Third Prize - China Robot Match (Travel and Security) 2018

## Core Competencies

### Specialization
- AR/VR Navigation
- Medical Image Processing
- Robotics
- Programming

### Technical Skills
- ANSYS
- Altium
- AutoCAD
- C++
- MATLAB
- OpenCV
- PLC
- Python
- Pytorch
- Qt
- ROS
- Solidworks
- Tensorflow
- Visual Studio
- VTK, ITK

### Soft Skills
- Adaptable
- Analytical
- Communication
- Optimization Oriented

## Languages

- English (Fluent)
- French (B1)
- Chinese (Fluent)

REFERENCES AVAILABLE UPON REQUEST