

# ZHANG, Dingzhong

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## EDUCATION

### Shanghai University (SHU)

09/2014-Present

*B.Eng. in Mechanical Engineering, expected in Jun 2019*

- **Overall GPA:** 3.7/4.0 **RANK:** 1/277
- **Test Scores:** IELTS 7.0 (R8.0 /L8.0 /S5.5 /W6.5) | GRE 317 (V147/Q170) + W3.5 | French B1.1 (CEFR)
- **Academic Scholarship** of SHU from 2015-2018
- **Relevant Coursework: Distinction** in Mechanical Design, Micro-computer Concept and Application, 3D Design and Analysis of Mechanical System, The Innovation Practice of Mechatronics System

## RESEARCH EXPERIENCE

### Analysis, Wear Test of Knee-Joint Prosthesis

09/2018-present

*Final Year Project, Lab Orthotek, Supervisor: Dr. Zikai Hua*

- Reproduced the motion of the knee-joint by ABB IRB6700 robotic arm, including anterior-posterior translation, medial-lateral rotation, flexion-extension rotation and axial loading.
- Simulated and planned routes in MATLAB with robotic toolbox and implemented in RobotStudio.
- Designed new fixtures including a flange, an intermediate flange, trapezoidal grooves, and two solidification pharmaceutical (PMMA) barrels, to connect the knee-joint with robotic and determine the coordinate points.
- Gave precise and rapid judgment on the knee-joint axis and center through a previously validated model-based tracking algorithm to determine 3D joint motion by several markers, supported by Argus, GOM.

### Optimization of Baxter – A Cobot made by rethink

06/2018-08/2018

*Research Assistant in The Visual Interactivity Group, Supervisor: Dr. Guiqin Li*

- Improved the response speed of Baxter when imitating human's action by motion replanning in Moveit!, based on ROS system.
- Redesigned the mechanical structure of the gripper to grab objects of various shapes and surface texture.
- Successfully guided the robot to pick up a delicate wineglass and finish the water-pouring movement.
- Empirically adjusted the gripping pressure to objects in different shapes, weight, and surface texture.

### Design of A Medical Rehabilitation Robotic Arm

01/2018-06/2018

*Third Year Project, First Prize in Chinese Service Robot Competition (Innovative design of rehabilitation robot) 2018, Supervisor: Dr. Bin He*

- A four degrees of freedom robotic arm which can follow the movement of patient's hand and arm depended on a multiple sensor – Leap Motion.
- Messages detected and exchanged through the serial communication ports between upper and lower computers, which were a windows forms application programed in c# and servos' control system in Arduino.
- Deduced empirical formula which linked four servos with detected coordinate points after many attempts.
- Set a special parameter to regulate the sensitivity of the robotic arm for various rehabilitation process.
- Simulated the movement and force analysis in Ansys under different and complex situations.

### Construction and Test of FPV - A Racing Drone

05/2018-06/2018

*One of Two Team members, First Prize in Aerial Robotics Competition 2018, Supervisor: Dr. Ze Cui*

- Built an FPV by 4 brushless motors (4800kv) with 3-leaf propellers on each, the carbon fiber frame, 4 in 1 ESCs and F3 flight controller, connecting to the altimeter, barometer, video transmitter, etc.
- Tuned the PID algorithm to ensure the steady of the plane while having a quick respond.
- 3D-printed a knife rest for a ceramic blade to penetrate several balloons on the game day.

### Programming and Design of PCB Boards on AGV

11/2017-03/2018

*Team leader, Third Prize in China Robot Match (Travel and Security) 2018, Supervisor: Dr. Ze Cui*

- Oriented the vehicle in the right direction when moving on different kinds of path and make actions (drove by four servos) after scanning QR codes.
- Drew and soldered an expanded PCB to be set on the STM32 for improving the reliability instead of connecting various sensors with Dupont Cables.
- Automatic steering system – result of 16 gray-scale sensors, 4 ultrasonic sensors and optimized algorithm to quicken the responsiveness.

## COURSEWORK PROJECTS

### Flywheel Design based on the Load Condition of the Crankshaft

Summer 2018

*Coursework: Mechanical Design*

- Designed a flywheel connected to the crankshaft of the gasoline engine according to the load condition.
- Calculated the working condition of the operating gasoline engine and analyzed the cylinder pressure and the movement of piston by their respective fitting curves.
- Calculated the size of the flywheel using the concept of moment of inertia of flywheel according to the load condition of the crankshaft.

### Mechanical Analysis of a Supported Beam with Complex Loads

Summer 2017

*Coursework: Engineering Mechanics*

- Programmed with Ansys APDL to build the model of the supported beam, divide the beam into several elements and apply the load on the supported beam.
- Calculated the shear force and bending moment at the joint of each element, obtained the images of shear force and bending moment and checked the strength of the supported beam by using the strength checking formula.

### Design of a Lathe Reducer

Summer 2016

*Coursework: Mechanical Design*

- Designed a reducer which reduced rotating speed from the electric motor driving the lathe and drew the layouts of the reduce.
- Calculated the parameters of two gears and the gear box size to make sure the gear box size would not interfere with the gears according to the requirement of the reducer performance.
- Figured out the tolerance of the shaft and decided where to use clearance fit or interference fit.

### Metal Shaft Making with CNC Machine

Summer 2015

*Coursework: Metalworking Practice*

- Operated lathe & CNC machine to turn a metal shaft and wrote CNC machine code.
- Finished the metal shaft making with almost no deviation from the design drawings.

## OTHER SKILLS

- IT Skills: C#, C, AutoCAD, Solid works, Catia, UG NX, MATLAB, Ubuntu, ROS
- SCM: STM32, C51, Arduino, Keil, Altium Designer
- OpenMV, OpenCV
- PLC: Siemens PLC, Mitsubishi PLC
- Ansyes Space claim, Ansys APDL, Ansys Workbench, Ansys Fluent
- Hobby: Foreign literature and poems, language learning, FPV and Racing Drones

## PHOTOS

