

# Frank Zhou

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## Education

**California Institute of Technology**, Major: Electrical Engineering, GPA: 3.9

Expected Graduation: June 2017

## Skills

- *Electrical*: Proficient in schematic and PCB design using Altium and debugging using test equipment
- *Languages*: Proficient in C, C++, Python, x86 assembly, Blackfin assembly, MATLAB, LABVIEW, and Mathematica
- *Communication Protocols*: CAN, RS232, TTL, RS485, SPI, USB
- *Mechanical*: Experienced in design using Solidworks and machine shop tools (mill, lathe, waterjet, laser cutter, 3D printer)

## Relevant Coursework

- Microprocessor systems, circuits, signals, DSP, electromagnetic engineering, biodevices, control systems, analog design, digital design, semiconductor devices, mechatronic design

## Projects

### **CALTECH ROBOTICS TEAM | ELECTRICAL TEAM LEAD | 2013-PRESENT | 12 HRS/WEEK**

- Won 1<sup>st</sup> place at the International AUVSI Underwater Vehicle Competition in 2016
- Designed and implemented modular ARM microprocessor system to sense environment and control actuators
- Established communication across microprocessors using CAN network protocol

### **BLACKFIN MP3 PLAYER | JAN 2015 – AUG 2015 | 15 HRS/WEEK**

- Created a fully functional MP3 player controlled by a Blackfin microprocessor
- Fully designed schematics for microprocessor, display, keypad, audio, IDE, DRAM, SRAM, and ROM sections
- Completed PCB design and layout in Altium
- Wrote firmware for the completed system

### **POWER GRID VISUALIZATION PROJECT | ELECTRICAL LEAD | DEC 2014 – MAR 2015 | 10 HRS/WEEK**

- Visualized research on the optimization of distributed power networks under Professor Steven Low
- Constructed an LED table of 150 individually addressable LEDs that change colors based on the time varying nodal voltages of a real power network
- Presented work at the 2015 ARPA-E Energy Summit

### **CALTECH ME72 DESIGN COMPETITION | SEP 2015 - MAR 2016 | 12 HRS/WEEK**

- Created three teleoperated robots capable of gathering and shooting soccer balls for Caltech design course
- Implemented control system using gamepads, Teensy microprocessors, and XBee radios

### **FIRST TECH CHALLENGE | TEAM CAPTAIN | 2009-2013 | 20 HRS/WEEK**

- Led the design and construction process for four internationally competitive robots
- Won 1<sup>st</sup> place at 6 State Championships and competed at the World Championship 3 times

## Work Experience

### **UNDERGRADUATE RESEARCH FELLOW | CALTECH | 2016-PRESENT**

- Improved wireless feedback for wireless power transfer system under Professor Ali Hajimiri
- Designed receiver controller capable of transmitting data, load switching, and charging USB devices
- Designed generator controller capable of receiving data, communicating over SPI, and optimizing power transfer
- Implemented protocols and algorithms to quickly optimize power transfer regardless of the receiver's location

### **ELECTRICAL ENGINEERING INTERN | HONEYBEE ROBOTICS | 2015**

- Designed and implemented electrical systems on various robotic systems intended for extraterrestrial sample collection
- Worked on electrical schematics, electrical assembly, PCB design and fabrication, and PLC design

### **TEACHING ASSISTANT (EE/CS 51, EE/CS 52) | CALTECH | 2015-PRESENT**

- Taught 15 Caltech students about software and hardware design for embedded systems for 12 hours a week
- Topics included x86 assembly, schematic drawing, PCB design, timing analysis, CPLD programming, and debugging

### **UNDERGRADUATE RESEARCH FELLOW | JET PROPULSION LAB | 2014**

- Wrote Python scripts that analyze the Curiosity Rover's telemetry data and automatically generate photorealistic animations
- Implemented a GUI for application that reduces meshes of 2.5D objects to create models of Martian terrain (C++)