

# Mahmubul Hoque

Mechatronics Engineer

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## Skill Summary

- *Languages:* C, C++, Python
- *Technology:* Linux, IAR Compiler, TensorFlow, Matlab/Simulink, LabView, Git, CANalyzer
- *Communication Protocols:* SPI, I2C, UART, USB, CAN, LIN
- *Bench Equipment:* Oscilloscope, DMM, PSU, Logic Analyzer, Soldering Iron, JTAG Debugger
- *CAD:* Spice, Cadence, Altium, Eagle, OrCAD, Catia, Solidworks

## Work Experience

### **RMF Design | Hardware/Firmware Engineer** May 2018 - Present

- Rapid prototyping, design, and validation testing of medical, automotive, and commercial products
- Mixed Signal, multi-layer, high density board design for high transient, high speed systems
- Firmware development in C on 8/16/32-bit  $\mu$ C and SoCs; bare metal, RTOS, custom drivers
- Update  $\mu$ C and SoC power management logic and GPIO power rail controls
- Circuit analysis/simulation, sensor implementation, and DSP/Signal integrity

### **Tesla | Prototype Engineer** August 2016 - January 2017

- Rapid prototype development of test harnesses for EV systems within Model 3 and Tesla Truck
- Design boards to interface with high voltage actuators, VFDs, and various sensors/transducers
- LabView programming, interfacing with DAQ systems, and implementing DSP
- 3D CAD in Catia for mechanical design and analysis
- Script data collection with Matlab and design state-space/PID control systems in Simulink

## Projects

### **Vehicle Compression System**

- Develop external temperature management system for automotive vehicles
- Implement CAN/LIN networks to communicate with vehicle ECU and private peripherals
- Design automotive rated board; isolated from chassis, ESD/load-dump protected
- Interface with sensors, implement circuits to filter conductive/EMI noise and anti-aliasing
- Design 48V, 55A BLDC driver; 3x bridge driver, low Rds FETs, current feedback, UVLO, deadtime
- Develop lean, bare metal firmware on STM  $\mu$ C; build custom drivers due to constrained code space
- Validate design through comprehensive tests to ensure field compatible with multiple vehicles

### **Smart Lock System**

- Develop Raspberry Pi based automated door lock to eliminate need for peripherals
- Render enclosure in Solidworks and optimised via mech analysis; FEA, thermal, impulse
- Develop firmware for ATmega chip to interface with stepper motor and various sensor inputs
- Write automation scripts in Python for facial and voice recognition

### **Virtual Fitting** [<https://youtu.be/Z5dfei719XU>]

- Develop prototype to eliminate fitting issues and facilitate online clothes shopping
- Hardware lead; implemented Xbox Kinect system and designed the PDU with CSA approval

## Education

**University of Waterloo:** Bachelor of Applied Science, 2018  
Honours Mechatronics Engineering (GPA: 3.5)

## Interests

- Badminton
- Travelling