

## Education

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Bachelor of Science in Computer Science, The University of Texas at Dallas

Junior, Expected Graduation in May 2019

## Experience

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### **NASA Johnson Space Center; Houston, TX**

*Integrated Guidance, Navigation, and Control Analysis Branch (EG4) Intern (August 2017 — December 2017)*

- Used the Trick Simulation Framework to analyze ascent abort procedures and created math models of the propellant slosh in the SpaceX Crew Dragon landing and orbit tanks.
- Created a Python modeling and animation tool to visualize propellant slosh movement (similar to CFD) within various tank geometries. The software is currently used by the Aeroscience and Flight Mechanics Division at JSC.

### **Massachusetts Institute of Technology; Cambridge, MA**

*Research Affiliate — Haystack Observatory (June 2017 — August 2017)*

- Conducted a feasibility study of and developed a prototype avionics system for an air-dropped, data collecting, penetrator system to be used for autonomous antarctic research applications.
- The system I developed employed a master-slave configuration of an embedded system running Linux, and a priority-driven, data processing and recording subsystem using the real-time operating system, FreeRTOS.
- My completed prototype included C / C++ programs for remote communication and command via the Iridium satellite network, autonomous system health monitoring and process management, high-speed data collection, and power reduction optimizations.

### **NASA Johnson Space Center; Houston, TX**

*International Space Station On-Orbit Engineering (OB2) Intern (January 2017 — May 2017)*

- Developed a multi-platform (Android and iOS) mobile application in C# (using Xamarin) to have a read/write interface with the International Space Station Mission Evaluation Room (MER) Web System and various NASA / ISS resources.
- Created a user login and verification system, a SQLite database, and developed a tailored search functionality for the console log.

### **William B. Hanson Center for Space Sciences; Richardson, TX**

*Undergraduate Researcher (May 2016 — December 2016)*

- Developed a beacon satellite receiver to calculate total electron content (TEC) in the ionosphere. Investigated different methods of signal acquisition and built a nested Quadrifilar Helicoidal (QFH) antenna system.
- Wrote a signal recording and satellite tracking software in Python to automate the data acquisition process.

## Projects

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### **Blade Runner Voight-Kampff (Visual Polygraph) Machine in Python**

- Using the OpenCV Python library, I developed a rudimentary program to calculate heart rate visually (via a webcam). The project also utilized an Arduino to measure body temperature, perspiration, and speech patterns to calculate a user's stress.
- The user's heart rate is calculated using changes in skin pigment as a subject's heart beats.

### **Enigma Machine in Verilog**

- Developed a digitally encoded processing unit in Verilog to simulate a WWII Enigma Machine with 4 states - On, Reset, Encrypt/Decrypt, and Calibrate.

### **iOS Road Conditions Detection and Reporting Application in Swift**

- Created a mobile application to autonomously detect, verify, and report roads with rough pavement or potholes.
- The application utilizes the iPhone's GPS, gyroscope, and accelerometer to distinguish normal road conditions from those unsafe.
- The city of Richardson received a \$25,000 grant from State Farm for continued development on the project.

## Programming Languages / Platforms

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C, C++, Python, MATLAB, FreeRTOS, Arduino, Verilog, SQLite, C#, OpenCV, GNU Radio, and the UNIX Command Line

## Relevant Coursework

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Algorithm Analysis & Data Structures, Discrete Mathematics I & II, Linear Algebra, Computer Architecture, Digital Logic & Computer Design, Digital Systems Laboratory, Operating Systems Concepts, and Computer Vision

## Awards

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- 1st Place at HackNAU 2017
- 1st Place at Richardson Community Hack Week 2016
- 1st Place for Best Microsoft Hack + Best Drone Hack (State Farm) at TAMUHack 2015