

# Jonathan E. Zarger

Embedded Systems Engineer

## Contact Information

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[jzarger.me](http://jzarger.me)

**Summary** I'm an Embedded Systems Engineer with experience in avionics, embedded hardware, controls, real-time embedded software, signal processing, hardware test, and test automation.

**Work Experience** **Blue Origin [Kent, WA]** **June 2018 – Present**  
*Avionics Engineer – “New Glenn” Orbital Rocket Stage 1 Embedded Controllers* *June 2018 – Present*

**Center for Socially Engaged Design [Ann Arbor, MI] – Lab Assistant** **September 2017 - May 2018**

- Maintained prototyping lab, ran trainings, organized and maintained spreadsheets and macros
- Taught students prototyping skills for software, electrical hardware and mechanical hardware
- Designed and implemented software infrastructure for lab access control

**Education** **Master’s of Science in Engineering, Electrical and Computer Engineering** **May 2018**  
*University of Michigan [Ann Arbor], Graduated 3.709/4.000*  
*Degree in Embedded Systems, focus on Control Systems*

- Digital Control Design, Linear Feedback Control, Advanced Embedded Systems, Space Instrumentation, Matrix Methods for DSP and Machine Learning, Self-Driving Vehicles: Perception and Control

**Bachelor’s of Science in Engineering, Electrical Engineering** **May 2017**  
*University of Michigan [Ann Arbor] - Graduated Magna Cum Laude, 3.621/4.000*

- Embedded Control Systems, Microprocessor Based System Design, Flight Software Systems, Linear System Theory, Navigation and Guidance for Aerospace Vehicles, Computer Organization

**Internship Experience** **Northrop Grumman [Rolling Meadows, IL] – Software Engineering Intern** **May - August 2017**  
*Mission Systems – Software Development*

- Worked on Agile team to develop standard internal test automation software in Python and Robot Framework for remotely controlling test equipment like signal generators, spectrum analyzers, etc.

**Delphi Electronics and Safety [Kokomo, IN] – Electrical Engineering Intern** **May - August 2016**  
*Diesel Powertrain – Electrical Engineering*

- Designed, fabricated and tested equipment for frequency-based signals in radiated immunity validation testing, including analog circuit design and design for RF immunity
- Assessed functionality of prototypes and assisted with failure analysis

**BeijingWest Industries [Brighton, MI] – Brake Systems Engineering Intern** **May - August 2015**  
*Brake Systems – Systems Engineering*

- Performed benchmarking and failure analysis, created test plan, created systems documentation
- Assisted with system level design for a new project, including creating an upper level architecture diagram, designing a vehicle mechanization diagram, and assisting with component selection

**Honda R&D Americas [Southfield, MI] – Prototyping Engineering Intern** **May - August 2014**

## Technical Skills

### Controls and Signal Processing Proficiencies

- Modern and classical control for linear systems, MIMO and SISO systems, continuous and digital
- Linear feedback control for MIMO and SISO systems
- LQR/LQE/LQG design
- Machine learning through logistic regression, subspace learning, and basic neural nets approaches
- Experience with various gradient descent implementations

### Embedded Systems Proficiencies

- Digital and analog electronics design
- FreeRTOS and real time scheduling
- SPI, UART, I<sup>2</sup>C

### Electrical Hardware Proficiencies

- Printed circuit board and schematic design with Altium CircuitMaker, EAGLE, and KiCAD
- Reading electrical schematics and component datasheets
- Using and automating standard EE tools: oscilloscopes, bench power supplies, waveform generators, logic analyzers

### Software Proficiencies

- C, MATLAB, Python, Arduino, Verilog, ARM, C++, Simulink, Stateflow, Julia
- Proficient with NI Multisim (SPICE), and Synopsys Saber for circuit modeling
- High frequency signal integrity analysis with MentorGraphics HyperLynx

**College  
Team and  
Project  
Experience**

- Michigan Aeronautical Science Association – Avionics Team** **September 2014 – April 2018**
- Avionics Team Lead (2015-2016)
  - Led team of ten students to design, implement, and test flight and ground electrical systems
  - Co-led project to prototype active roll control hardware and algorithms for a rocket
  - Managed instrumentation, data acquisition, and actuation systems during hybrid engine testing
  - Led project to design, fabricate, and program an engine control, recovery control and telemetry device
- MHacks Coordinator – Hardware Team** **November 2015 - October 2016**
- Designed microcontroller development boards to distribute to event participants
  - Planned and ran Introduction to Hardware and Arduino Workshops
  - Provided mentoring and assistance at event to participants working on hardware-based projects
- Digital Signal Processing Lab Senior Capstone Project – DOGBOT** **Fall 2016**
- Designed printed circuit board for robot chassis, containing motor drivers and ARM microcontroller
  - Designed and implemented observer and closed-loop controller embedded software for laser following
  - Wrote framework for vision processing and data handling in Python
- Advanced Embedded Systems Final Project – Multisensory Helmet Controller** **Fall 2017**
- Designed printed circuit board for muscle sensing, inertial sensing, and ARM microcontroller
  - Designed analog circuits required to collect muscle motion information
  - Wrote logistic regression-based machine learning algorithm to identify muscle motion events, trained algorithm on sample data, and implemented detection with trained weights in embedded software
- Space Instrumentation Final Project – High-Altitude Balloon** **Winter 2018**
- Designed electrical systems for sensing on a high-altitude balloon
  - Wrote real-time software for data acquisition and logging (including testing with FreeRTOS)
  - Tested and interfaced off-the-shelf tracking and telemetry equipment
- Microprocessor Based System Design Final Project – Motion Based Game Controller** **Winter 2017**
- Designed printed circuit board with microcontroller, FPGA, Bluetooth module, and inertial sensor
  - Implemented data interpretation and communication algorithms in C and Verilog
- Flight Software Systems Final Projects – Satellite Simulator and Quadcopter Control** **Winter 2016**
- Wrote outer-loop control and navigation software to fly a quadcopter autonomously through a 3D path
  - Developed real-time embedded software to control rotation of tabletop satellite simulator
  - Implemented coarse sun sensor and rate gyro sensor fusion for a position controller
- Other Control Systems and Embedded Systems Projects** **2015 - 2017**
- Implemented simulated adaptive cruise control and lane-keep system with Simulink and Stateflow
  - Designed, implemented, and tested a feedback controller to magnetically levitate a ball