

Jonathan E. Zarger

Embedded Systems Engineer

Contact Information

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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
	<i>Avionics Engineer – “New Glenn” Orbital Rocket Stage 1 Embedded Controllers</i>	<i>June 2018 – Present</i>
	Center for Socially Engaged Design [Ann Arbor, MI] – Lab Assistant	September 2017 - May 2018
	<ul style="list-style-type: none">• 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
	<i>University of Michigan [Ann Arbor], Graduated 3.709/4.000</i> <i>Degree in Embedded Systems, focus on Control Systems</i> <ul style="list-style-type: none">• 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
	<i>University of Michigan [Ann Arbor] - Graduated Magna Cum Laude, 3.621/4.000</i> <ul style="list-style-type: none">• 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
	<i>Mission Systems – Software Development</i> <ul style="list-style-type: none">• 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
	<i>Diesel Powertrain – Electrical Engineering</i> <ul style="list-style-type: none">• 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
	<i>Brake Systems – Systems Engineering</i> <ul style="list-style-type: none">• 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 <ul style="list-style-type: none">• 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 <ul style="list-style-type: none">• Digital and analog electronics design• FreeRTOS and real time scheduling• SPI, UART, I²C	
	Electrical Hardware Proficiencies <ul style="list-style-type: none">• 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 <ul style="list-style-type: none">• 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