

Jack Rademacher

jradema@umich.edu • 603-918-3110 • Hampton, NH • jackrademacher.me

EDUCATION

University of Michigan — Ann Arbor, MI

B.S. Electrical Engineering

May 2021

- **GPA:** 3.97 / 4.0 - Dean's List: Fall 2017, Winter 2018, Fall 2019, Winter 2020
- **Coursework:** Analog ICs (EECS 311), Digital ICs (EECS 312), Statistics (EECS 301)
Antennas & Wireless Systems (EECS 330), Device Physics (EECS 320), Signals (EECS 216)

WORK EXPERIENCE

Analog Devices — Colorado Springs, CO

May 2020 — August 2020

Microwave Product Engineering Intern, Aerospace & Defense (ADEP) Business Unit

- Created a test setup for characterizing IP₃ of beam forming ICs from 2-33GHz through PCBs or an RF probe
- Created a calibration procedure to remove signal losses along cables & components to determine exact silicon input and output power
- Designed an NI LabWindows/CVI application to automate calibration and testing through SCPI commands over GPIB
- Collected data on worst/average case input and output IP₃ to within ± 0.35 dBm of actual value across frequency & power to compare with designers' simulations

Apple — Sunnyvale, CA

Electrical Engineering Intern, Special Projects Group (SPG)

January 2019 — August 2019

- Designed the schematic and layout for a "wireless oscilloscope" PCB to measure and log voltage, current and temperature
- Wrote embedded C to live-stream ADC samples to an SD card in SPI mode and wirelessly to a python application using the MQTT protocol
- Designed a concurrent embedded application using FreeRTOS to manage ADC sampling, WIFI connectivity, wireless streaming & device control, SD card reading/writing, and RTC initialization using network time
- Tested power supplies under various load conditions along with other parameters such as UVLO, ripple, OCP, and thermals

PROJECT EXPERIENCE

University of Michigan Hyperloop — Ann Arbor, MI

Power sub-team lead

September 2018 — December 2019

- Manage a team of 8 members to design the electric vehicle systems for propelling a hyperloop pod to high speeds
- Work with cross-functional teams to ensure reliable mechanical and electrical integration of wire harnesses, PCBs, power conversion units, battery compartments and battery management systems
- Designed a custom low voltage battery management system to monitor a 2S-8S high power battery pack
- Facilitated the design of a custom power conversion board with 3 independent buck, boost, and buck-boost blocks

Controls sub-team: Batteries and Power Electronics

September 2017 — September 2018

- Designed and integrated the systems needed to manage and maintain the safety of high power battery packs, including battery management systems and pre-charge and isolation detection modules
- Developed power distribution electronics requiring custom PCBs to manage thermals and high current busses for regulating a low power battery pack to stable 24V, 12V, 5V, and 3.3V supplies

"Light-Deck" RGB LED Audio Visualizer

Independent project — See website for more information

Summer 2020

- Designed and built a 297 WS2812 LED matrix—controlled from an STM32F4—to react to a 3.5mm jack and microphone audio input
- Designed and simulated analog front-end using op-amps for audio inputs prior to on-chip ADC processing
- Used Altium Designer to integrate microcontroller, level shifters, power management, analog front-end, primary battery, and programming ports into a single custom PCB
- Wrote software using DMA & CMSIS-DSP library to take 2048-sample FFT and display a real-time spectrum of audio signal across matrix

ADDITIONAL SKILLS

Programming Languages: C/C++, Python, Java, HTML/CSS, JavaScript (React, ReactNative, NodeJS), Elm

Software Packages: Altium Designer, Cadence Allegro, KiCAD, NI Labwindows/CVI, NI Max, Cadence Virtuoso, Ansys HFSS, LTSpice, Siemens NX, Microsoft Office