Josh **Booth**

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WORK EXPERIENCE

Technical Marketing Engineer | Microchip Technology — CURRENT, FROM JUN 2022 (FT)

- Designed embedded reference designs for customers in the power systems, lighting, industrial, and automotive spaces
  - Architected and wrote embedded C code for various 8-bit PIC and AVR microcontrollers
  - Created schematics, PCBs, and plastic/metal structural enclosures for product demonstrations
- Planned and executed launches for upcoming products in the 8-bit microcontroller space
- Organized app notes, use cases, and trainings for the new product to fit in a market niche

Electrical Engineer | US Naval Research Lab - Space Technology Division — JUN 2017 - JAN 2022 (FT/PT)

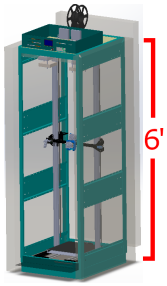
- Created machine learning models for detecting and classifying objects in satellite imagery to increase object identification speed
- Recovered RF communications lost to noise by augmenting message-passing algorithms with machine learning
- Identified promotor sequences in DNA to speed up genome sequence identification using a BRNN w/ LSTM cells (co-authored infographic)

Prototype Engineer - Contract | Booth Oil and Gas LLC. — SEP 2016, JUN 2022 (FT/PT)

- Designed and manufactured prototypes for unique business problems (see 3D PEEK Printer, AI-Driven Security System)
- Offered technical expertise for project planning, cost estimation, and feasibility studies
- Communicated with the client to manage their expectations and incorporate or remove features as their needs changed

SAMPLE PROJECTS

3D PEEK Printer (EMBEDDED C, PYTHON, ANALOG & POWER DESIGN)



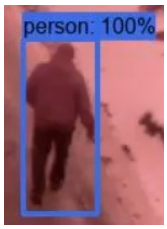
Designed and built a large-scale 3D printer capable of printing PEEK for biofuel refinement.

An STM32 MCU running Klipper and a Raspberry Pi running custom Python controlled the printer. Involved in the development was designing the kinematic system, thermal dynamics, and software to safely control its operation while dealing with hazardous temperatures and voltages.

The Cold Plate (EMBEDDED C, ANALOG & POWER DESIGN)

A thermal pump reference design showing the most efficient way to perform temperature measurement, fan control, current monitoring, and UI control. It has become Microchip's most copied code repository. Development involved SIMPLIS simulation, Altium design, and embedded software architecture.

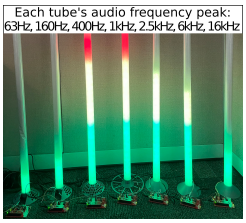
AI-Driven Security System (PYTHON, BASH, MACHINE LEARNING)



A solar-powered security system that gives real-time alerts with a classified video anytime a human, vehicle or large animal is spotted on the property.

Custom python and bash programs handled data transfer throughout the mesh network and into/out of the neural network.

DMX Light Show (EMBEDDED C, ANALOG & POWER DESIGN)



A real-time audio processing light show integrating analog design with the microcontroller's OP-AMP, DMX, DMA, PoE, and a hardware-encoded WS2812 driver; each node using a PIC18Q71 MCU. Utilizing the devices' CIPs, nearly no processing occurs on the CPU. Written C drivers for this project include UART, DMA, DMX, PWM, SPI, CLC, OP-AMP, and ADC configurations.

PUBLICATIONS

2023 App. Note 4889: Using Core Independent Peripherals (CIPs) to Implement a Peltier Cooled Metal Plate
2023 Embedded.com - Reducing BOM cost in embedded systems using advanced MCU peripherals
2018 Machine Learning in Radio Frequency Communications
2017 Prediction of Bacterial Promoter Sequences using Machine Learning

EDUCATION

B.S. in Computer Engineering; Mathematics minor
SUMMA CUM LAUDE; 3.98 GPA; CMPE 322/120 SI; CLASS OF 2022
Shippensburg University of Pennsylvania

CORE COMPETANCIES

- **Technical:** C, Python, Linux, Marlin, Bash, Robotics, Embedded C Development, Digital Circuit Design, CAD Design
- **Software:** Git, Fusion 360, KiCAD, Eagle, MPLAB X, XC8