
SUMMARY

Inventor, pending patent. Interdisciplinary in: software/firmware development, hardware engineering, IoT architecture, edge AI deployment, and agentic workflow building. Interest lies heavily in understanding all sub-components of systems, the inter-relation of abstraction layers, and problem-solving at the boundaries. Experience spans enterprise HPC to bespoke ultra-low power remote applications.

TECHNOLOGIES

- **Languages:** C/C++, Python, TypeScript, Java, Kotlin, Dart, VHDL, SystemVerilog
- **Embedded Platforms:** STM32, ESP32, PowerPC, ARM, iCE40UP5k, Artix 7
- **ML & AI:** TFLM, PyTorch, LiteRT, ExecuTorch, ONNX, OpenCV, RAG, VecDB, LangGraph, CrewAI
- **Protocols:** I²C, SPI, UART, MQTT, BLE, WiFi, LoRa, MCP, A2A
- **EDA Tools:** KiCAD, Cadence, Modus, Quartus
- **PCB Design:** Mixed-Signal, RF

CAREER

R&D Engineer	Freelance	Jan 2025 - Present
• Working on clients' projects that are subsets of the following: firmware development, architecting IoT systems, deploying on-device ML, FPGA/PCB design, and agentic workflows.		
R&D Engineering Lead	Trops	April 2024 - Present
• Invented an indoor localization system with SoTA estimation accuracy in GPS-denied environments; sensing, compute, and inference all local. • Extending an existing outdoor experience to indoor spaces, where communities engage with public art installations in the physical world.		
Hardware Developer, Design For Test	IBM	January 2022 - March 2024
• Developed chip-op firmware for the embedded self-boot engine of the processor and memory controller. • Built latch traces into functional patterns for microcontroller-assisted testing. Implemented auto pattern emulation to enable 5nm processor and memory controller VLSI for Power server and Z mainframe. • Conducted comprehensive AWAN simulations for the Z17 RIT-A using the checkRings chip-op I developed. This improved confidence in other ring scan methods in the months leading up to bring-up. • Implemented test points in logic design to pass random resistant fault analysis (RRFA) thresholds.		
Memory Software Development Engineer	IBM	January 2021 – January 2022
• Developed hardware procedure code for Power10 and Power9 system initiation sequences, enhancing system start-up efficiency and reliability through the removal of edge case system IPL bugs. • Engineered firmware for the embedded DDIMM controller subsystem, contributing to improved memory management and performance. • Implemented a system characterization/qualification software toolkit, streamlining system testing and validation processes.		

Full Stack Software Engineer	Smart Retail Systems	June 2019 – February 2020
- Extended and re-architected the image processing, REST API, database, and frontend to support second-generation shelf sensor hardware, laying the groundwork for easier modification and scalability. - Deployed advanced machine learning models (Single Shot Detector, Siamese Networks) for real-time object detection and classification, addressing the challenge of maintaining low latency amidst increased data rates of the second version of shelf hardware. - Supported live in-store testing at flagship CVS Manhattan location (57th & 7th), collaborating with retail management teams to gather operational insights and translate feedback into product improvements.		

Mobile Development Engineer	Touchcode	June 2019 – February 2020
- Developed a mobile app for reading T+INK conductive ink technology via phone touchscreen only. - Developed client-tailored demo websites from scratch.		

Full Stack IoT Developer	Palira LLC	August 2017 – September 2018
- Prototyped an IoT sensor suite and programmed the embedded system to monitor local environmental conditions (temperature, humidity, PM2.5/10, flame) in a large warehouse. The system provides the granularity to allow for lifespan extension of semi-perishables as well as confined flame suppression to minimize loss. - Developed the REST API. Designed and implemented a mobile app to display live data and analytics.		

EDUCATION

Online	Coursera	April 2020 – June 2026
- Building AI Agents and Agentic Workflows Specialization (<i>IBM</i>) - Neural Networks and Deep Learning (<i>DeepLearning.AI</i>) - Machine Learning [original course] (<i>Stanford Online</i>) - System Validation: Automata and Behavioral Equivalences (<i>EIT Digital</i>)		

Mahwah, NJ	Ramapo College of New Jersey	September 2012 – December 2017
Bachelor of Science - B.S., Computer Science		

HOBBIES/PROJECTS

- Modular Synthesizer:** I make in multiple paradigms - software (MCU DSP firmware), FPGA (real-time audio gateway), and analog (circuit design/assembly). Focus on custom audio processing and human machine interfaces to explore voltage as a hardware lingua franca. My current project, Movement Voltage, tracks a hand with a stereo camera and relays control voltage such that the body becomes the instrument.
- Demoscene Sizecoding:** I also used to code golf visual demos using JavaScript which encouraged me to learn new syntactic and mathematical tricks to generate more complex output from fewer characters.