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# JOSHUA DAVID BUTLER

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## SUMMARY

Highly Experienced and driven automation and embedded systems engineer with 20+ years in hardware-software integration, specializing in embedded firmware, PCB design, and electro-mechanical systems debugging. Passionate advocate and instructor of AI-driven engineering methodologies, consistently improving software production throughput by 10-20x, more in automation and edge computing environments. Lifelong learner with deep cross-disciplinary engineering expertise, further accelerated by recent advancements in large language models and continuous AI workflow integrations.

## PROFESSIONAL EXPERIENCE

### STERIS, Richmond, CA

**Embedded Systems Specialist – Operating Room Integration** | 3/2022 – Present

* Resolved critical video and fiber optic system issues in medical equipment deployed in operating rooms nationwide.
* Engineered firmware and hardware solutions for PIC microcontrollers and embedded Linux systems, enhancing reliability and performance.
* Developed custom testing frameworks for validating hardware-software integration and legacy product improvements.
* Strategically managed component obsolescence, qualifying alternative parts amidst global supply chain disruptions.
* Diagnosed and optimized firmware to enhance system reliability, significantly improving healthcare outcomes.
* Introduced advanced AI-driven code generation methodologies, increasing development throughput by 10-20x for many tasks.

### VACTRONIX SCIENTIFIC, Fremont, CA

**Technical Development Manager / Electrical and Software Development Engineer** | 5/2021 – 9/2022

* Directed the development and integration of sophisticated physical vapor deposition equipment from prototype to production.
* Automated precision gantry systems for improved manufacturing process control and less manual effort.
* Enhanced HMI and PLC interfaces, delivering improved user experience and extended operational capabilities with ultra-low latency and real-time operation.
* Redesigned hardware, firmware, and software toolchains to address supply-chain constraints, reduce maintenance demands and costs, and extend equipment lifetime.
* Developed advanced embedded system platforms supporting remote diagnostics and control.

### INTEVAC, Santa Clara, CA

**Hardware and Firmware Development Engineer – Military Night Vision** | 7/2020 – 6/2021

* Executed comprehensive PCB bring-up procedures with Altium Designer, validating and tuning high-voltage power supplies by adding automated parameter sweeps and self-calibrating feedback loops.
* Developed robust firmware in C++, Python, and MATLAB for STM32 and ESP32 controller to address precise military design requirements and complex manufacturing workflows.
* Optimized sophisticated low-light camera component design and manufacturing technologies supporting DoD applications.
* Ensured compliance with stringent AS9100, ISO9001, and NIST documentation and security standards.

### FESTO, Livermore, CA

**Research Engineer / Applications Engineer – Medical Devices** | 6/2015 – 2/2020

* Engineered embedded, PLC-based closed-loop control systems for automated medical diagnostic platforms.
* Deployed and validated machine learning algorithms for industrial automation, including image processing and OCR technologies.
* Integrated piezoelectric pneumatic, electrical, and hydraulic components into complex electro-mechanical systems for precise process control.
* Developed embedded logic and signal processing algorithms using C++, Python, and MATLAB.
* Prototyped advanced market-ready medical devices and developed production-support quality testing systems.

## EDUCATION

* **PhD (ABD)—Electrical Engineering** | University of Cincinnati
  + Concentration: Advanced Algorithms and Systems Integration for Point-of-Care Medical Devices
* **Extensive Graduate-level Study** | University of Louisville
  + Biomedical Engineering, Embedded Systems, and Advanced Programming
* **Bachelor of Science—Electrical Engineering; Physics Minor** | Rose-Hulman Institute of Technology

## TECHNICAL SKILLS

**Embedded Systems & Firmware:**

* Expertise with PIC, STM32, ESP32, Arduino microcontrollers, some experience in FPGAs
* Proficient in RTOS, state machines, real-time systems, distributed real-time automation
* Skilled in I2C, SPI, UART, CAN bus communication protocols

**Hardware Integration:**

* PCB design and troubleshooting using Altium and OrCAD, among other software and testing packages
* Comprehensive component selection, validation, system and process optimization, and EOL-related redesigns
* Electro-mechanical systems integration and debugging with extensive SolidWorks modeling for FEA

**Programming & AI/ML:**

* Extensive experience in C/C++, Python, MATLAB
* Expert in machine learning frameworks: TensorFlow, PyTorch, scikit-learn
* Edge deployment of optimized AI/ML models for real-time control and automation
* Experience as AI systems architect, training teams to leverage AI-driven code generation for 10-20x productivity gains

**Standards Compliance:**

* ISO 9001/13485 Quality Management Systems
* AS9100 Aerospace Standards
* NIST SP 800-53/800-171 Security Frameworks
* IEC Safety Standards (60601, 61010, 61131-3)

**Design & Simulation Tools:**

* SolidWorks, AutoCAD, COMSOL Multiphysics
* MATLAB/Python-based finite element modeling, derivative analysis, least-squares optimization, and advanced mathematical processing and analysis methods

## PATENTS

* Awarded multiple patents in microorganismal growth control and biological processing technologies
* Developed modified-air dehydration methods enhancing nutritional quality in personalized nutrition applications