LEWIS FORREST BATES

Cookeville, TN | lewisforrestbates@hotmail.com | 901-605-9136 | lewisforrestbates.com | github.com/LFB1937 | KQ4SNV (Amateur Radio)

PROFESSIONAL SUMMARY

Results-driven Electrical & Computer Engineering graduate (B.S., Tennessee Tech, May 2026) specializing in embedded systems, hardware security, and real-time Hardware-in-the-Loop (HIL) simulation. Led an international MITRE eCTF competition team (19th of 114 teams in 2026) and founded HCIG (Hardware Cyber Interest Group). Extensive experience integrating RTAC-like control logic and ML models on industrial Raspberry Pi for microgrid applications using Typhoon HIL. Recognized with Highest Technical Rigor Award for capstone power subsystem work. Seeking entry-level Embedded Systems / Hardware Security Engineer roles.

EDUCATION

Tennessee Technological University — Cookeville, TN | B.S. Electrical and Computer Engineering, May 2026 | Combined GPA: 3.06
Relevant Coursework: Embedded Systems, Digital Design (VHDL/FPGA), Power Systems, Computer Architecture, DSP, Cybersecurity, Real-time Control

Brighton High School — Brighton, TN | Honors Diploma, May 2021, GPA 3.76

PROFESSIONAL EXPERIENCE

Joint R&D Staff Engineer (CESR & CEROC) | Tennessee Tech — June 2026 – Present

- Lead integration of CESR RTAC-like functionality and ML-enabled control on industrial Raspberry Pi: on-device structured text for deterministic sequencing, Modbus gateways, time synchronization, alarms/events, local historian, and secure remote engineering access.
- Implement and validate neural network models for islanding detection and energy forecasting; test in standalone and RTAC-coupled Typhoon HIL environments; scale to multi-microgrid systems. Findings disseminated via technical reports and publications.
- Develop hands-on instructional materials for hardware security and OT security; mentor eCTF teams and hardware interest groups; coordinate training and outreach to students, educators, and industry partners.

Undergraduate Assistant Engineer (Part-Time) | Center for Energy Systems Research (CESR), TN Tech — Oct 2024 – May 2026

- Supported MS/PhD teams on power/microgrid solutions; coordinated with Typhoon engineers on HIL enhancements and lab IT; engineered 4G Raspberry Pi data interfaces.

LEADERSHIP & HARDWARE SECURITY COMPETITIONS

MITRE Embedded Capture The Flag (eCTF) — Hardware Engineer / Team Lead | 2024 – 2026 (3 Seasons)

- 2026 Season: Led an international competition team to 19th place out of 114 teams; founded HCIG (Hardware Cyber Interest Group) collaborating across departments with faculty/staff to build sustainable hardware security talent pipeline and team development.
- 2025 Season: 33rd place (113 teams); implemented satellite TV stream encoding/decoding with access-control security on embedded platforms.
- 2024 Season: 13th place (76 teams); security bug fixes for medical-device microcontroller; analyzed I^2C vulnerabilities and offensive/defensive hardware techniques on Analog Devices MAX7800FTHR.

SENIOR CAPSTONE DESIGN

Automated Chessboard ("Chess 2 Impress", F25_Team2) | TN Tech ECE — Highest Technical Rigor Award, Industrial Advisory Board

- Goal & Description: Developed low-cost (<$660), voice-controlled automated chessboard with CoreXY gantry, under-board electromagnet, Stockfish AI, and LCD feedback for accessibility (mobility/visual impairment). Achieved 97% first-try voice accuracy and 3 µs electromagnet switching (3,300× faster than spec).
- Power Subsystem Lead: Designed and validated complete power architecture using DFRobot UPS HAT + 4×18650 cells, including MT3608 boost converters, fuse protection, and seamless wall-to-battery switchover. Conducted experiments on UPS switchover, sleep-mode current draw, battery runtime (>2 hours), voltage regulation, and safety compliance.
- Led data analysis and reporting for all power-related experiments (Experiments 11, 13, 16, 17); ensured reliable power delivery for CoreXY motion, electromagnet actuation, and embedded control systems across the full project.

TECHNICAL SKILLS

Languages & Embedded: C/C++, Python, VHDL, ARM Assembly, Structured Text (IEC 61131-3), Real-time Deterministic Control

Hardware & Platforms: Raspberry Pi (industrial), Typhoon HIL + RTAC + PYTAC, Modbus, DE10-Lite FPGA, STM32, MAX7800FTHR, ChipWhisperer

Tools & Domains: Quartus Prime, ModelSim, Git/GitHub/LFS, Docker, Power Systems & Microgrids, Hardware Security (eCTF), DSP, Real-time HIL Simulation, Neural Net Edge Deployment

VOLUNTEER EXPERIENCE

Sycamore Church of Christ, Cookeville, TN — Aug 2022 – Present | Audio/Visual & Livestream Assistant, Volunteer

- Rotated A/V/livestream duties via iPads/OBS; tuned speakers/inputs; managed projectors and PowerPoints for services and recordings.

LICENSES & CERTIFICATIONS

Amateur Radio License, Technician Class (KQ4SNV) — Operate and maintain radio equipment; apply EE principles to real-world communication and problem-solving.