

Kalan Brunell

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Education

Tufts University – B.S. in Computer Engineering

Expected May 2027

Dean's List

Inter-Lakes Middle High School – High School Diploma

May 2023

Xerox Award for Innovation and Information Technology

Experience

Manufacturing Engineering Intern, Gentex Corporation – Manchester, NH

May 2025 - August 2025

- Increased manufacturing inspection accuracy by developing a machine vision system using Python and OpenCV to replace a manual inspection process.
- Enabled real-time object locating and defect detection on production-line Fanuc robotic arms by integrating low-cost vision solutions with existing PLC systems.
- Designed prototype fixtures for in-development products optimized for use with the new vision systems.
- Boosted packaging throughput by developing automated barcode scanner scripts.

Projects

FSAE Electric Racecar EV Accumulator, Tufts Electric Racing

May 2025 - Present

- Optimized lithium-ion cell configuration for motor specifications, thermal management, and serviceability.
- Designing cell contact PCBs, integrated fusing, and interlocks while prioritizing high-voltage insulation and safety.
- Developing CAN-enabled PCBs for battery management and thermistor monitoring using Altium Designer.
- Assembled and tested battery packs, ensuring compliance with FSAE regulations.

FSAE Electric Racecar Safety System PCBs, Tufts Electric Racing

November 2024 - May 2025

- Engineered PCBs for the vehicle's safety system, including a BMS/Motor Controller fault latch and emergency shutdown circuits.
- Designed power distribution PCB with integrated fusing and visual indicators.

Digital Tachometer and Shift Indicator

September 2025

- Developed a digital tachometer and shift indicator for a modern car using an STM32 to poll data from the ECU via OBDII and I2C with output to visual indicators.

Autonomous Vision Targeting System, FIRST Robotics – Team 8046

August 2021 - June 2023

- Led the design of an autonomous, retroreflective vision targeting system using a Limelight camera.
- Integrated the system with robot control to enable autonomous scoring in FIRST Robotics Competition.

VHDL Arcade Game, Tufts University

November 2024 - December 2024

- Designed a 2048-style game on an UPduino iCE40 FPGA entirely in VHDL.
- Implemented complex logic, custom RAM and ROM modules, with gamepad input and VGA display output.

Skills

Programming: C, C++, Python, ARM Assembly, CMSIS, FreeRTOS, OOP

Embedded & Electronics: VHDL, Digital Logic Design, I2C, UART, CAN, Benchtop Tools

Circuit & PCB Design: Altium Designer, KiCAD, LTSpice

Robotics & Automation: OpenCV, Limelight, Robotic Control, PLC Programming

Other: SolidWorks, Onshape, MATLAB, Git, LaTeX, ECOs, Microsoft Office