Sanjay Ravishankar

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EDUCATION

Carnegie Mellon University — Pittsburgh, PA
Bachelor of Science in Electrical and Computer Engineering (GPA: 4.0) — *Expected May 2029*
Relevant Courses: Intro to ECE (18-100), Intro to Biomedical Engineering (42-101), Principles of Imperative Computation (15-122), Linear Algebra/Vector Calculus (21-254), Differential Equations (21-260), Philosophy of AI (80-249)

Edison Academy Magnet School — Edison, NJ
High School Diploma (GPA: 4.7 · Rank: 2/41) — *June 2025*
Relevant Courses: Mechanical Eng., AP CSA, AP Physics C (Mech, E&M), AP Chemistry, AP Biology, AP Statistics

EXPERIENCE

Research Assistant — *September 2025 - Present*
The ∀ (For All) Lab @ CMU — Pittsburgh, PA

- Contributing to firmware, electronics, and data visualization for detection of hot flashes in postmenopausal women
- Optimizing EmotiBit firmware on Adafruit ESP32 Feather through PlatformIO to maximize photoplethysmography (PPG) sensor sampling rates for heart rate variability measurements and motion artifact correction
- Designed custom Matlab backend to augment the native Emotibit Oscilloscope app, enabling concurrent real-time streaming, digital filtering, and spectral analysis for 20+ data streams across physiological sensors from EmotiBit, TMSi, ECG monitor, and other LSL (Lab Streaming Layer) capable devices

Hardware Engineering Intern — *November 2025 - December 2025*
Andean Systems — Pittsburgh, PA

- Created a software-defined PLC prototype with Jetson Orin Nano and modified GRBL on Arduino to control a 6+ axis CNC system for automated e-waste recycling, replacing an existing unstructured and undocumented system
- Designed a modular 1.2kW power and signal distribution box with onboard DC/DC conversion, overcurrent protection, thermal management, and expandability for sensors and actuators
- Reduced total power consumption by over 30% and physical space occupied by electronics by over 50%
- Developed closed-loop stepper control and sensor fusion algorithms to estimate load/force from encoders, hall-effect current sensors, current transformers and load cells
- Prototyped through small demos for the rest of the team, component research, soldering, and debugging

Technology Volunteer — *September 2023 - May 2025*
Lakeview School, NJ Institute for Disabilities — Edison, NJ

- Designed and fabricated an STM32H7-based reader pen PCB in KiCAD for a child with dyslexia
  - Reduced cost by 67% compared to market devices
  - Deployed TinyML model via STM32CubeIDE for on-device OCR and text-to-speech
- Built an ESP32 smartphone-controlled vibrating shoulder sleeve to reduce a child's self-injurious behaviors
- Recognized by the New Jersey Center for Deafblindness at a state summit

PROJECTS

Micromouse · C/C++, STM32, Arduino, EasyEDA, KiCAD — *September 2024 – Present*

- Built Pixel the Micromouse, an autonomous maze-solving robot on an STM32F4 with infrared peripherals for real-time pathfinding and navigation
  - Designed custom PCBs in KiCAD and EasyEDA
  - Developed firmware with PlatformIO, implementing flood-fill algorithm and iterative sensor calibration
- Awarded 1st Place, High School Division at the IEEE Region 1 Micromouse Competition (2024)

Supermic · Verilog, FPGA, xschem, OpenROAD — *July 2024 - August 2024*

- Collaborated with five students to develop an open-source PDM microphone beamforming solution using SkyWater 130nm, tested on Basys FPGA and synthesized in Tiny Tapeout (sponsored by MIT Beaver Works)
- Designed a circular buffer delay-line architecture in Verilog to correct spatial and temporal offsets across eight decimated SDR input signals

SKILLS — Python, C, C++, Rust, TypeScript, SQL, Git, SVN, MATLAB, Simulink, Verilog, VHDL, Unity, Unreal, PlatformIO, Arduino, ESP32, Raspberry Pi, STM32, FPGA, OpenROAD, Verilator, Altium, KiCAD, EasyEDA, AWS, Excel, PowerPoint, Oscilloscope, Multimeter, Spectrum Analyzer, Soldering, 3D Printing

INTERESTS — Drawing, singing, baking, Lo-Fi music