Vivian Zeru

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vivian-zeru | vivian-lz

Education

Vanderbilt University *Aug 2023 – May 2027*
Bachelor of Engineering in Electrical and Computer Engineering

- **Coursework (by Summer 2026):** Microelectronic Systems, Microcontrollers (AVR), Embedded Systems, Electronics 1, Electromagnetics, Analog Circuits/Systems, Digital Systems (RISC-V), Circuits, Rapid Prototyping
- **Cornelius Vanderbilt Scholar:** Awarded to <1% of applicants for merit-based leadership & community achievement.

Vanderbilt University *Aug 2025 – May 2027*
Master of Science in Electrical and Computer Engineering

- **Coursework:** Electronics 2 (Analog), Advanced Digital Electronics (Transistor-Level Design), VLSI Design (Cadence)
- **Accelerated Graduate Program in Engineering:** Accepted for reaching senior standing by end of sophomore year (86 credits required, 92 completed) & 3.5+ GPA to earn 2 degrees simultaneously in 4 years.

Technical Projects

Custom ESP32 Environmental PCB Sensor *Jun 2025 - Present*

- Developed 2-layer PCB (schematic+layout) in Eagle to detect temperature, humidity, pressure, & altitude with BME280.
- Developed system with USB-C, 5-3 V LDO, 40 kHz Crystal, CP2102 USB-UART, I2C, & C++ firmware.
- Achieved 25% size reduction using raw ICs v. ESP32/BME280 modules & placed and routed layout to ensure signal integrity for manufacture-ready device.

Plant Health Monitoring Device *Jun 2025 - Present*

- Created ESP32 module powered Eagle PCB and firmware (C++) to detect plant needs (BME280, soil moisture, BH1750).
- Developing IC design to decrease space & control design; implementing ML processing to predict next plant watering.

4-Bit ALU (Arithmetic Logic Unit) *Jun 2025 - Jul 2025*

- Designed in Verilog with 2-bit opcode for 4 options: Add, Subtract (using two's complement), Logical AND, Logical OR.
- Implemented 2 scalable design methodologies: behavorial (cases) & structural (gate-level hardware).
- Built 1 testbench for 100% design verification, Synopsys VCS simulating 6.74% decrease in CPU runtime (structural).

Professional Experience

Undergraduate Research Assistant - Electrical Engineering Team *Nashville, TN*
Du Group Vanderbilt *Feb 2025 - Present*

- Performed schematic circuit analysis on pH sensor to study physical circuit design.
- Executed precise SMD soldering techniques on QFN/WLCSP microscopic components for high-reliability assembly (PCBA) on 1 wearable hardware sensor for ECG, EEG, and NIRS health monitoring.
- Debugged and validated low-power wearable PCB using multimeters and firmware flashing, enabling functional biosensor.

Information Services Management (ISM) Intern *Louisville, KY*
UPS (United Parcel Service) *Jun 2024 - Aug 2024*

- Developed/deployed scheduling feature for nationwide aircraft maintenance employee management system application in production today for 2285 monthly users; selected to present to executive leadership for clarity and technical depth.
- Created real-time asset tracking app in 24-hour hackathon, enabling $33M savings; selected top 9 of 53 teams.

Leadership Experience

VP (2025), Secretary (2024), Electronics Engineer (Stormwater-Runoff Device) *Nashville, TN*
Engineers Without Borders USA - Vanderbilt University Chapter *Sept 2023 - Present*

- Designed 2-layer PCB (EasyEDA) with ESP8266 & sensors to decrease space & fit mechanical-design constraints for Solidworks-designed 3D-Printed box; debugged to improve layout signal integrity.
- Decreased microcontroller power consumption by 99.9% (150 mA to 20 μA) using deep sleep mode every 15 seconds.
- Manage internal/external logistics and communicate to 10+ members via weekly emails & 8+ Instagram posts.

Lab Proctor and Founding Member *Nashville, TN*
ECE Tech Crew *Feb 2024 - Present*

- Trained 9 students in Keysight tools for debugging circuits in senior design & research (oscilloscopes, multimeters).
- Drove membership from 7 to 30+ with merchandise, flyers, signs; communicating on Slack/email with students & faculty.
- Chosen to present to the ECE External Advisory Board (10+ faculty) at Vanderbilt on behalf of the organization.

Skills

Hardware Design/Simulation: Cadence, AWS, Verilog, SPICE (LTSpice), Eagle, Altium, Intel Quartus/ModelSim, Fusion 360, Mathematica

Embedded Systems: C++ (Arduino), C (STM32), Python (Raspberry Pi), Assembly (RISC-V, AVR)

Lab & Tools: Oscilloscope, Multimeter, Waveform Generator, Power Supply, SMD Soldering (QFN/WLCSP), Soldering Iron, PCB Assembly