

Vivian Zeru

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EDUCATION

- MS in Electrical & Computer Engineering** | *Vanderbilt University* *Expected May 2027*
- Accelerated Graduate Program in Engineering: Receiving MS/BE degrees in 4 years concurrently.
 - Coursework: Electronics 2 (Analog Circuits), VLSI Design (Cadence, AWS), Advanced Digital Electronics (Transistor-Level Digital Circuit Design)
- BE in Electrical & Computer Engineering** | *Vanderbilt University* *Expected May 2027*
- Cornelius Vanderbilt Scholar: Awarded to <1% of applicants for high academic/community achievement
 - Dean's List All Semesters (x4): Awarded for high GPA achievement (>3.5).
 - Coursework: Analog Circuits/Systems, Microelectronic Systems, Electronics 1, Electromagnetics, Microcontrollers (AVR), Rapid Prototyping (Arduino, Fusion 360 CAD)

HARDWARE EXPERIENCE

- Undergraduate Research Assistant: Hardware Team** | *SYMBIO-X Lab* *Feb 2025 – Present*
- Designing and prototyping novel mixed-signal Eagle PCBs for wearable medical applications, utilizing antenna design, wireless charging, and ADCs with a focus on miniaturization and ultra-low power consumption.
 - Executed precise SMD soldering techniques on QFN/WLCSP microscopic components for high-reliability assembly (PCBA) on 2 wearable hardware sensors for medical health monitoring.
 - Performed system-level validation of low-power wearable PCBs using multimeters and firmware flashing, enabling functional biosensor.
- Electronics Engineer for Stormwater Runoff Device** | *Engineers Without Borders* *Sep 2023 – Present*
- Assisted in hardware design of a 2-layer sensor PCB (EasyEDA) to reduce device footprint; collaborated with mechanical teams on system integration within a 3D-printed enclosure.
 - Decreased microcontroller power consumption by **99.9%** (150 mA to 20 μ A) using deep sleep mode every 15 seconds in collaboration with programming/CS teams.
- Undergraduate Laboratory Assistant and Lab Proctor** | *ECE Tech Crew* *Aug 2024 – Present*
- Assisted students in Electronics 1 Laboratory in analyzing, debugging, & designing diodes, MOSFETs, BJTs, amplifiers, and CMOS circuits.
 - Managed ECE Makerspace 2-3 hours weekly to ensure component safety/quality and help students with projects.

HARDWARE PROJECTS

- 4-Bit Multiplier IC** | *Cadence Virtuoso, HSPICE, Hierarchical Design, Physical Verification* *Sep 2025*
- Designed/implemented complex 4-bit multiplier IC using hierarchical methodology, constructing the system from transistor-level standard cells into 4 half-adders and 8 full-adders to implement the multiplication algorithm.
 - Conducted full physical verification and pre/post layout simulation in HSPICE to increase reliability.
- Custom ESP32 Environmental PCB Sensor** | *Eagle, System-Design, PCB Design, I2C, C++* *Jun – Aug 2025*
- Developed board design for 2-layer Eagle PCB sensor system prototype (schematic + board layout) to detect temperature, humidity, pressure, altitude: BME280.
 - Completed hardware system integration with USB-C power integrity delivery system with low-noise LDO regulator & 40 kHz crystal oscillator for stable operation.
 - Optimized board layout for miniaturization, achieving a 25% size reduction while manually routing to ensure signal integrity for production.
- VLSI Gates & 4-Bit Adder ICs** | *Cadence Virtuoso, AWS, VLSI Design, Backend Design* *Aug – Sep 2025*
- Designed a 45 nm node standard cell library (Inverter, NAND, NOR gates) at the transistor level, optimizing cell layout for area/performance with a 10-track height design.
 - Designed half-adder, full adder, 2-bit adder, 4-bit adder, utilizing hierarchical layout design & optimized NAND.
 - Conducted full physical validation (DRC, LVS, PEX) to ensure manufacturability, resulting in a clean, tape-out ready standard cells.

LEADERSHIP AND PROFESSIONAL EXPERIENCE

- Founding Member** | *ECE Tech Crew* *Feb 2024 – Present*
- Trained 9 students in Keysight tools for debugging circuits in senior design & research (oscilloscopes, multimeters).
 - Grew organization membership by >300% (7 to 30+ members) through targeted marketing/outreach initiatives.
 - Chosen to present to ECE External Advisory Board & national ABET accreditation for success in ECE.
- 2025 Vice President and Fall 2024 Secretary** | *Engineers Without Borders* *Oct 2024 – Present*
- Fostered strong internal and external stakeholder relationships by managing logistics and communicating initiatives to a 10+ member team, driving project continuity.
- Information Services Management (ISM) Intern** | *UPS* *Jun 2024 – Aug 2024*
- Presented technical project results to executive leadership, demonstrating advanced communication skills.
 - Collaborated on a cross-functional team in high-pressure hackathon to develop prototype, finishing top-9/53 teams.

TECHNICAL SKILLS

Hardware Design/Simulation : Eagle, Altium, SPICE (LTspice), Fusion 360 (CAD), Cadence Virtuoso (VLSI)
Hardware Debugging/Assembly : Oscilloscopes, Multimeters, DC Power Supplies, SMD Soldering (QFN/WLCSP), PCBA, Function Generators
Embedded Systems, Protocols, Programming : C/C++, Python, Arduino, AVR Assembly, I2C, SPI, UART, Git