Ohm Patel

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Education

North Carolina State University Expected May 2027
Bachelor of Science in Computer Engineering – 4.0 GPA; Dean's List *Raleigh, NC*
Member of IEEE Board and IEEE-Eta Kappa Nu (Beta Eta Chapter)

Skills

Languages: C, C++, Python, Assembly, Verilog, MATLAB
Embedded & Systems: Microcontrollers, Digital Logic, FPGA (Xilinx Vivado), Sensors/Actuators, PWM, Interrupts, IoT, SPI, UART, Networking, WiFi/Wireless
Tools & Practices: Linux, Git, KiCAD, LTSpice, Debugging, Systems Integration, Algorithms & Data Structures, Technical Communication, Leadership

Experience

Undergraduate Researcher Sep 2025 – Present
NC State Electrical & Computer Engineering *Raleigh, NC*

- Supporting **NSF-funded** research on advanced **electromagnetic education** through hands-on development of **high-voltage** demonstration equipment and AR-based visualization tools for graduate-level coursework.
- Designing and developing a **fiber-optic** MIDI interrupter system for high-voltage Tesla coil control, programming a **microcontroller in C** to process signals and drive solid-state switching circuits for Tesla coil demonstrations.
- Engineering custom **PCBs in KiCAD** for signal conditioning, optical isolation, and microcontroller integration, enabling safe computer-to-Tesla coil communication.
- Developing **Python-based** control software for real-time MIDI file processing and **fiber-optic signal transmission**, creating a complete hardware-software interface for high-voltage switching applications.

Board Member Apr 2025 – Present
IEEE Student Branch NC State University *Raleigh, NC*

- Built **automation** tools that streamlined logistics, cutting manual admin workload by **50%**.
- Analyzed user requirements and member feedback to improve product features and user experience.
- Integrated dynamic event registration and announcements with **Firebase** and **serverless functions**.

Robotics & Systems Coach Apr 2025 – Sep 2025
Zebra Robotics *Raleigh, NC*

- Deployed **Windows PC management system** for monitoring, troubleshooting, and remote control.
- Configured **server and network infrastructure**, enabling storage and connectivity for over **10TB** of data.
- Helped develop curriculum in **Python, C, circuits, robotics, and embedded systems** for **25,000+ students**.

Projects

Autonomous Embedded Car | *C, Assembly, Embedded Systems, Microcontrollers, I/O* Aug 2025 – Dec 2025

- Programmed a TI-MSP430 microcontroller in C to implement autonomous line-following and Wi-Fi-assisted navigation using SPI and UART communication protocols.
- Integrated **motor drivers, IR/optical sensors, and LCD** with GPIO, ADC, and timers, implementing **PWM**, interrupts, and feedback control for real-time actuation.
- Developed and debugged low-level firmware using oscilloscopes and logic analyzers to validate sensor signals.
- Designed and tested modular embedded software components for sensing, decision-making, and actuation to improve reliability and maintainability.

ESP32 Smart Home Gadgets | *ESP32, Home Assistant, IoT, KiCAD* May 2025 – Present

- Designed **WiFi-enabled ESP32 IoT** devices from breadboard prototypes to stable deployments, including an automatic curtain opener and environmental sensor nodes.
- Implemented embedded firmware with power management, automatic reconnection, and OTA updates for reliable 24/7 wireless operation.
- Integrated devices with **MQTT** and REST APIs for seamless communication with Home Assistant and other smart home services.