

# AKILA ABEYKOON

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## EDUCATION

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### North Carolina State University - B.S. Computer and Electrical Engineering

August 2023 – December 2026

- **GPA:** 3.84
- **Relevant Courses:** Embedded Systems, Microprocessor Architecture, Embedded System Architectures, Data Structures and Object-Oriented Programming, Design of Complex Digital Systems, Digital Logic Design

## SKILLS

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**Programming:** C, C++, Python, Assembly, Verilog, Java, MATLAB, C#, React, Node.js, Flask, Linux

**Hardware/Tools:** Oscilloscope, Spectrum Analyzer, Signal Generators, Analog Discovery 3, PCB Design, SDR

**Software/Tools:** Git/GitHub, KiCAD, Vivado, Code Composer Studio, STM32Cube, Visual Studio, IntelliJ, CLion

**Technical Skills:** Analog Circuit Design, Digital Circuit Design, Circuit Simulation, CMOS Design, PCB Layout, Data Analysis

## PROJECTS & OUTSIDE EXPERIENCE

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### Inductive Sensing Trigger for Power Tools - *Texas Instruments, Cary, NC*

August 2025 – Present

- Designing custom PCB layouts for inductive sensing trigger systems in power tool applications.
- Programming MSPM0 microcontroller firmware to process sensor data and output analog/PWM signals for tool integration.
- Tested and debugged analog interface circuits using oscilloscope and spectrum analyzer for trigger system integration
- Converting prototype EVM systems into production-ready PCB designs for industrial power tool applications.

### Autonomous Vehicle System - *Embedded Systems, Raleigh, NC*

January 2025 – May 2025

- Built an IoT-enabled autonomous car system using an MSP430, integrating analog sensors, motor drivers, and LCD output.
- Programmed ADC-based detection logic to enable line-following behavior using PWM-driven motors and H-Bridge control.
- Integrated an ESP32 module for Wi-Fi-based navigation; configured UART for real-time debug output and IP display.
- Demonstrated autonomous operation: system received Wi-Fi commands to navigate checkpoints, then independently followed a black loop and exited, all while updating status via LCD.

### Underwater Drone - *AquaPack Robotics, Raleigh, NC*

August 2024 – Present

- Electrical team member developing Autonomous Underwater Vehicle with focus on embedded systems implementation
- Designed critical alert systems using STM32 and AD3 to control programmable lighting for threat detection display.
- Prototyped and validated analog interface circuits on breadboard with peripheral components before PCB layout
- Migrated embedded firmware across hardware platforms, debugging analog interface and signal integrity issues

### Computer Architecture Pipeline Simulator - *North Carolina State University, Raleigh, NC*

August 2025 – December 2025

- Designed and implemented cycle-accurate simulator in C/C++ modeling complete pipeline from instruction fetch through retirement, including branch prediction, memory hierarchy, and out-of-order execution.
- Developed two-level cache hierarchy with LRU replacement, write-back policies, and stream buffer prefetching.
- Implemented out-of-order superscalar execution with register renaming, reorder buffer, and issue queue.
- Analyzed SPEC benchmarks using Python/MATLAB; evaluated configurations with CACTI for area, energy, and timing

## PROFESSIONAL EXPERIENCE

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### SDR Systems Researcher - *North Carolina State University, Raleigh, NC*

August 2025 – Present

- Collaborating with Lockheed Martin engineers to develop signal processing pipeline for detecting, classifying, and jamming low-power RF signals.
- Implementing GNU Radio workflows and UHD interfaces for real-time SDR signal processing and transmission control
- Designed PCB enclosures for software-defined radios and embedded platforms enabling drone-mounted deployment
- Integrating spectrum analyzer and SDR hardware with embedded testbed infrastructure for wireless communication systems

### Firmware Intern - *Joint School of Nanoscience and Nanoengineering, Greensboro, NC*

Summer 2025

- Conducted research on automated large-scale analysis of IoT firmware using emulation and static analysis tools.
- Automated system emulation for 500+ firmware images, debugging boot sequences and network configuration issues.
- Developed a bash and python script to automate metadata extraction from emulated firmware for analysis at scale.
- Implemented static code analysis techniques across firmware binaries; profiled bottlenecks and optimized processing.