Abhishek Raghuwanshi

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Education

University of British Columbia *Vancouver, BC*
Bachelor of Applied Science in Electrical Engineering (3rd Year) ***Sep. 2022 – May 2027***

Awards: Martin Sikes Memorial Award in ECE UBC 2024, OIS Award 2022
Activities: VP Student Life @ UBC ECESS, Facilities director+Company relations manager @ UBC EUS
• Wrote a project paper on **Atomic Layer Deposition (ALD)** for **Semiconductor device optimization**.

Skills

Hardware: System Verilog, Quartus, RTL, Testbench+simulation, Modelsim, PCB design(Altium, KiCAD), SPICE, Serial protocols (UART, I2C, SPI), microcontroller systems(STM32, ESP32, Nrf5280,Nuvoton, EFM8, ATMEGA)
Languages: C, C++, Python, HTML+CSS, JavaScript, Assembly(ARM and 8051), SQL, Pascal, LaTeX, makefiles
Tools: Matlab, Simulink, Git, VS Code, Visual Studio, PyCharm, IntelliJ, STMCube IDE, Solidworks, Onshape, Microsoft Office, Google Workspaces, Oscilloscopes, Arduino, Raspberry Pi, 3D printing

Technical Experience

Electronics Team Lead **Sep. 2023 – Present**
UBC Subbots *Vancouver, BC*

- **Led a team of 18 students** in designing electronics for an Autonomous Underwater Vehicle (AUV) to participate in the International RoboSub Competition, California.
- **Developed electronic speed controller PCB** to convert PWM signals to 3-phase outputs, integrating IMU feedback with **closed loop control system** in C++ with **Simulink** model.
- Designed **power distribution PCB** in Altium, **improving power and space efficiency by 25%**, integrating a battery monitor, and implementing an emergency kill switch for enhanced safety and reliability.
- Enabled successful project completion with a **modular, debug-friendly design using I2C communication** in the robot, leading the team to semifinals for the first time in the International RoboSub competition.

Projects

Webserver controlled BLE robot | *ESP32, Nrf52840, C++, HTML+CSS, Py(Flask+BLEak), Node.js* **Jan 2025**

- Designed a **custom motor driver PCB**, improving motor control efficiency and reducing power consumption by 20%, and developed Bluetooth-controlled robot with <100ms latency and stable 10-meter connection.
- **Built a web server (with both Js and Python)** and **responsive website** for real-time robot control, **supporting up to 5 users** simultaneously with a joystick web-interface for intuitive movement.
- Implemented **PID control** on an Nrf52840 based BLE micrcontroller for a self-balancing robot, enhancing stability and movement accuracy by 25% for smoother operation.

Metal detecting RC robot | *PIC32, ATmega, STM32, C, Python, Putty, makefiles* **Mar 2024**

- Developed **two-way UART** communication via **JDY40 Bluetooth** (100m range) with <5% data loss and programmed PIC32 microcontroller for magnetic flux detection (1.41mH–1.43mH) with 98% accuracy.
- Built a **software remote** as extra feature using **C for STM32 and Python for UI**, enabling robot control via keyboard (WASD), tracking position, and plotting frequency data for verifying accuracy.
- Created analog inductance display using a servo motor controlled by timer interrupts on **PIC32** to show metal presence in specified ranges.

Reflow Oven Controller | *Nuvoton microcontroller system, 8051 assembly, Python* **Feb 2024**

- **Designed hardware controls** for selecting reflow profile parameters (soak temperature/time, reflow temperature/time) and oven settings using **N76E003 microcontroller** in pure **8051 assembly**.
- Developed **Python script** for logging temperature data and displaying animations to improve user awareness.
- **Implemented dual timers in assembly** to track state durations, display time information, and generate PWM for controlling oven power via SSR box.

RISC Machine | *System Verilog (RTL+Testbench), ARM assembly, Altera FPGA* **Nov 2023**

- Engineered a a fully-functioning **32 bit CPU and Datapath** using **System Verilog** that decodes **ARM instructions** and executes them completely on a **DE1-SOC FPGA**.
- Executed extensive coding in System Verilog synthesized in **Quartus** and created extensive **test benches** to verify the functioning of every feature using **RTL simulation waveforms** in the project using **Modelsim**.

Extracurricular Activities and Interests

- Organized **NASA International Space Apps** hackathon successfully in Vancouver, with 132 participants.
- Sports: Triathlon Ultra-Iron Person, Intramural Tier-1 Basketball Champion, ECE and EUS sports teams captain.
- Recreational **electric guitar player**, made a project to use an **FPGA board** as a **digital FX pedal.**