



Tharinda Abeywardhana

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I like understanding why things work the way they do, then building them to find out if I'm right. Most of my projects start with a question, why does this converter ring at that frequency, why is this signal noisier than it should be, and end with a PCB and a scope probe. I've spent the last couple of years working across power electronics, embedded systems, and high-speed PCB design, and what I enjoy most is the point where the schematic meets real hardware and you have to figure out what you got wrong. I'm looking for a hardware research internship where I can work on real problems alongside people who care about getting the details right.

EDUCATION

University of Moratuwa, Sri Lanka

March 2024 – Present

- – B.Sc. Engineering (Hons.) in Electronic and Telecommunication Engineering
 - **Cumulative GPA (end of 3rd Semester):** 3.72 / 4.00 (93%) [Transcript]
 - Dean's List: Semester 1

Dharmapala Vidyalaya, Colombo, Sri Lanka

- – GCE Advanced Level (2022) – Physical Science Stream
 - Combined Mathematics (A*), Physics (A*), Chemistry (A*)
 - Z-Score: 2.35 — Ranked 127th in Colombo District, 530th nationally (top 1.2% of 45,000+ candidates)
 - GCE Ordinary Level (2020) – 9A* passes

Coursera

• University of Colorado Boulder

- Introduction to FPGA Design for Embedded Systems
Instructor: Timothy Scherr, Senior Instructor and Professor of Engineering Practice [View Certificate](#)
- Hardware Description Languages for FPGA Design
Instructor: Timothy Scherr, Senior Instructor and Professor of Engineering Practice [View Certificate](#)
- Power Electronics Specialization
Instructor: Professor Robert Erickson [View Certificate](#)
 - * Introduction to Power Electronics [View Certificate](#)
 - * Converter Circuits [View Certificate](#)
 - * Converter Control [View Certificate](#)
 - * Magnetics for Power Electronic Converters [View Certificate](#)

• The Hong Kong University of Science and Technology

- Differential Equations for Engineers
Instructor: Professor Jeffrey R. Chasnov [View Certificate](#)

Department of Electronic and Telecommunication Engineering, University of Moratuwa

- System Verilog for ASIC/FPGA Design & Simulation

TECHNICAL STRENGTHS

Circuit Simulation & Analysis	LTspice, NI Multisim, Altair PSIM, MATLAB
PCB Design & Layout	Altium Designer (multi-layer, high-speed, power distribution)
Hardware Description Languages	SystemVerilog, Verilog, VHDL
FPGA & Digital Design	Xilinx Vivado, Intel Quartus, Verilator
Embedded Systems	STM32, ESP32, Raspberry Pi, ROS 2
Programming Languages	C/C++ (embedded), Python, MATLAB, Java
RF & Signal Processing	GNU Radio, bladeRF, MATLAB Signal Processing
Mechanical Design	SOLIDWORKS


POWER ELECTRONICS & HARDWARE PROJECTS

Buck Converter Design - MIT 6.622 Specification

March 2026 – May 2026

- Designed a high-efficiency synchronous buck converter to step 24–36 V down to 14 V at 50–125 W output.
- Sized the inductor and output capacitor to maintain output ripple below 100 mV.
- Performed switching frequency selection and CCM/DCM boundary analysis.
- Designed and simulated a PI closed-loop voltage controller achieving $\geq 90\%$ efficiency across the load range.
- Verified the design through thermal modeling and switching loss analysis.

Tools: LTspice, MATLAB, Altair PSIM, Altium Designer


Repository:  GitHub

Advanced 12-Layer High-Speed PCB System Design - iMX6 Rex

Jan 2026 – May 2026

- Designed a 12-layer PCB from scratch based on the open-source FEDEVEL iMX6 Rex schematic (NXP i.MX6, up to 1.2 GHz quad-core, DDR3-1066).
- Engineered a 12-layer stackup (Signal/GND/Signal/GND/Power \times 4/GND/Signal/GND/Signal) optimized for signal integrity and low-impedance power delivery.
- Routed length-matched, impedance-controlled differential pairs for DDR3, PCIe, SATA, Gigabit Ethernet, HDMI, LVDS, and USB with controlled return paths.
- Performed BGA fanout/escape routing and designed a multi-rail PDN (1V375, 1V5, 2V5, 3V3) with hierarchical decoupling to minimize voltage droop.
- Applied EMI/EMC reduction techniques, thermal-aware component placement, and DFM/DRC validation in Altium Designer.

Tools: Altium Designer


Repository:  GitHub

ThermoBand - Wearable Temperature Monitoring Device

Feb 2025 – Jul 2025

- Designed two custom 4-layer PCBs for a wearable temperature monitoring system with wireless telemetry.
- Developed the power management PCB with LiPo battery charging/discharging control, integrated voltage regulation, multi-rail power distribution, and protection circuitry.
- Designed the sensor interface PCB with analog conditioning for the temperature sensor, including precision amplification and low-pass filtering.
- Optimized the signal path for measurement accuracy, noise rejection, and wearable form-factor constraints.

Tools: Altium Designer


Repository:  GitHub

Smart IV Fluid Monitoring and Alert System

Jul 2025 – Dec 2025

- Designed a custom 2-layer PCB integrating an ESP32 microcontroller, IR sensing front-end, and Wi-Fi telemetry for real-time IV fluid monitoring.
- Implemented an analog sensor conditioning stage for IR signal processing with amplification and filtering.
- Developed the system for continuous monitoring with real-time wireless alert capability.
- Managed power delivery constraints and battery efficiency to support reliable continuous operation.

Tools: Altium Designer, ESP32 Firmware

Repository:  GitHub


Smart Autonomous Floor Mopping Robot

Feb 2026 – Present

- Serving as system architect, power electronics lead, and autonomous navigation engineer for a fully autonomous floor cleaning robot.
- Designed a power management PCB with LiPo charging/discharging circuits, multi-rail voltage regulation, and current monitoring for coordinated power delivery across three subsystems.
- Designed a sensor management PCB with an STM32 microcontroller for cliff and obstacle detection, wheel encoder interfacing, pump control, and closed-loop motion feedback.
- Leading the autonomous navigation stack using LiDAR-based SLAM, path planning, and coverage navigation on Raspberry Pi with ROS 2.
- Integrating the power, sensing, and navigation subsystems with real-time power budgeting and thermal management.

Tools: Altium Designer, STM32, LTspice, ROS 2, LiDAR, Raspberry Pi

Status: In Development


Repository:  GitHub

Fully Analog Acoustic Guitar Tuner

Jul 2025 – Dec 2025

- Designed a fully analog guitar tuning device with no digital signal processing.
- Developed the analog signal-conditioning chain including a low-noise microphone preamplifier and precision band-pass filters for string-specific frequency detection.
- Implemented a frequency-to-voltage conversion stage for tuning indication.
- Designed a shielded enclosure with proper grounding and EMI mitigation to preserve front-end signal integrity.

Tools: LTspice, Altium Designer

Repository:  GitHub

Smart Inverter Design and Control System

April 2026 – Present

- Designing a high-efficiency DC-AC inverter targeting 2 kW output capability and 24 V DC to 230 V AC conversion.
- Implementing closed-loop sinusoidal PWM control with real-time feedback for output voltage regulation and harmonic suppression.
- Developing multi-stage LC filtering to achieve low total harmonic distortion and compliance with grid standards.
- Integrating protection circuits for overcurrent, overvoltage, and thermal management with fault detection.
- Working on the gate driver and control PCB design for high-speed switching frequency operation and isolated MOSFET/IGBT drive signals.


ADDITIONAL ENGINEERING PROJECTS

Two-Way Digital Paging System - Software Defined Radio

Jul 2025 – Dec 2025

- Designed and implemented a complete two-way communication system using SDR hardware (*bladeRF*) instead of fixed radio transceivers.
- Built the full baseband signal processing chain including audio conditioning, packet framing with addressing, acknowledgment handling, and digital modulation using BPSK/QPSK.
- Deployed the system on the GNU Radio framework for end-to-end implementation and testing.
- Validated system operation through real-world RF experiments.

Tools: GNU Radio, bladeRF, MATLAB

Repository:  GitHub

VOLUNTEER AND LEADERSHIP EXPERIENCE

Electronic and Telecommunication Engineering E-Club, University of Moratuwa

- **HR Coordinator** Aug 2025 – Present
- **Event Organizer (Eid26)** Aug 2025 – Present

Sasnaka Sansada Foundation

- **LearnSteer National Project Coordinator**

Dec 2024 – Nov 2025

Led nationwide Physics workshops and examinations for GCE Advanced Level students.

- **Member, Colombo District Team**

Jun 2023 – Present

Educational outreach and teaching support for rural school students.

REFERENCES

Dr. Ranga Rodrigo

Senior Lecturer

Department of Electronic and Telecommunication Engineering

University of Moratuwa, Sri Lanka

B.Sc.Eng.Hons. (Moratuwa, Sri Lanka), M.E.Sc. (Western, Canada), Ph.D. (Western, Canada)

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Dr. Upeka Premaratne

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