

ASIRI SANDAKELUM

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Professional Summary

Mechanical Engineering graduate (BSc Eng, Hons, University of Moratuwa, 2026) with hands-on experience in mechanical design, FEA simulation, CAD modelling, and manufacturing systems, complemented by a strong foundation in IoT and embedded systems. Proven ability to deliver results in industrial settings through an internship in composite manufacturing and applied research in biomechanical design. Seeking full-time opportunities to apply a multidisciplinary, results-driven approach to engineering challenges.

Education

University of Moratuwa

BSc Eng (Hons) specialised in the field of Mechanical Engineering.

Moratuwa, Sri Lanka

2022 – Present

- **Relevant Coursework:** Manufacturing Processes, Machine Design, Mechatronics & PLC, Embedded Systems, Engineering Mathematics, Thermodynamics, Fluid Mechanics, Engineering Materials, Operations Research

Work Experience

Future Fibres Lanka (Pvt) Ltd - Maintenance Section

Mechanical Engineering Intern

Biyagama EPZ, Sri Lanka

Dec 2024 – May 2025

- Redesigned a **Bobbin Winding Tensioner** in SolidWorks, eliminating roller misalignment; improved yarn tension consistency and reduced thread breakage, verified through fabrication and live testing.
- Developed an **IoT-based Temperature & Humidity Monitoring System** (ESP32, DHT22, DS18B20) with real-time cloud logging via ThingSpeak, enabling remote environmental tracking across production zones.
- Conducted a carbon dust filtration case study for the AeroSIX plate cutting area; engineered a sealed HEPA filtration enclosure that significantly improved air quality and compliance with worker safety standards.
- Drafted AutoCAD layout drawings for floor plans, piping systems, and drainage; supported CMMS implementation and contributed to preventive maintenance scheduling and 5S standardisation programmes.
- Gained direct exposure to carbon fibre composite manufacturing processes for high-performance rigging systems distributed to global marine and sailing markets.

Key Engineering Projects

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Development of an Active Knee Exoskeleton

July 2026

- Optimised linkage parameters using a Genetic Algorithm (GA) to replicate the human knee Instantaneous Centre of Rotation (ICR), achieving a mean tracking error of **0.47 mm**.
- Developed a decentralised Bowden cable actuation system to reduce distal limb inertia and improve wearer comfort during gait assistance.
- Implemented embedded sensing and gait-phase detection for assistive torque generation and rehabilitation-oriented control.
- **Tools:** MATLAB, Genetic Algorithm, SolidWorks

Finite Element Analysis of Piston for Structural Assessment

May 2026

- Modelled round-head and flat-head piston geometries in SolidWorks and performed static structural and steady-state thermal FEA in **ANSYS Workbench**, comparing aluminium and magnesium alloys under a 15.4 MPa combustion pressure and 660 °C crown temperature.
- Benchmarked results against published literature, confirming that flat-head pistons experience higher stress than round-head designs and identifying the round-head magnesium-alloy piston as the most thermally efficient configuration.
- **Tools:** SolidWorks, ANSYS Workbench (Static Structural, Steady-State Thermal)

Gearbox Design - Combat Robot Weapon Systems

Nov 2024

- Designed a high-torque multi-speed gearbox for vertical and horizontal spinner weapons; completed gear selection, shaft stress analysis, bearing selection, and power transmission calculations from first principles.
- **Tools:** Solid Edge, Machine Design Principles

Below-Knee Prosthetic Leg - Fatigue Load Testing Mechanism

Dec 2025

- Designed and prototyped a custom mechanical motion-generation system, transforming design requirements into a functional mechanism through concept development, mechanism synthesis, and iterative design refinement.
- Applied engineering design methodologies, CAD modeling, and DFMA principles to optimize manufacturability and facilitate rapid prototype development and testing.
- **Tools:** SolidWorks, Mechanical Design, Product Development, DFMA, 3D Printing (PLA)

Reverse Engineering - Bicycle Disc Brake System

May 2024

- Performed full material characterisation (burn tests, density measurements, Rockwell hardness testing); developed optimised 3D models and validated performance via FEA simulation and generative design.
- **Tools:** Fusion 360, ANSYS FEA, Generative Design

- Autonomous Line and Wall Following Robot - Robotics

July 2026

 - Designed and built a differential-drive robot combining IR-array line following, PD-controlled wall following, and ultrasonic-based junction/obstacle detection; added a WiFi hotspot web dashboard for real-time manual and autonomous control.
 - Tuned PD control loops and implemented slew-rate limiting and motor floor compensation to eliminate drift and stalling during wall-following.
 - Tools: MicroPython, Raspberry Pi Pico W, HC-SR04 ultrasonic sensors, L298N motor driver

- Operational Throughput Enhancement - Abans Auto (Pvt) Ltd

May 2026

 - Identified bottlenecks in PDI/QC (75 min/unit) and batch material handling (90 min/batch) at a Hero Motorcycle Assembly Plant; proposed drive-through workstation layout, dedicated functional test track, and strategic safety stock management.

- Autonomous Car Wash Robot - Mechatronics Group Project

Jul 2023

 - Led mechanical design and systems integration for a fully autonomous car wash robot; interfaced Arduino Mega and ESP8266 with a custom MIT App Inventor mobile application.
 - Tools: SolidWorks, Arduino, MIT App Inventor

- Production Line Optimisation - Aruna Tea Factory

Nov 2024

 - Identified throughput bottlenecks in withering and packing sections; proposed equipment modifications and rescheduling strategies validated through simulation-based analysis.

Leadership & Volunteering

- Department of Mechanical Engineering, University of Moratuwa

Student Representative (Final Year)

2025 - Present

 - Represent student interests by serving as the primary communication channel between the department administration and the student body.
 - Coordinated the dissemination of academic and administrative information across the cohort, ensuring effective student engagement.
 - Supported the organisation of career development programs, industry networking events, and departmental activities.
 - Collaborated with academic staff and student committees to address student concerns and improve the overall academic experience.

- IEEE Robotics & Automation Society (RAS), University of Moratuwa

Vice Chairman

Nov 2024 – Oct 2025

 - Directed executive decision-making and annual strategic planning for one of the university’s most active IEEE student chapters.
 - Mentored junior committee members in project management, event planning, and technical execution.

Co-Chair, BatTalk 2.0

Mar 2024 – Oct 2024

 - Organised a flagship technical talk series on AI/ML career dynamics, coordinating with industry professionals and university faculty; managed end-to-end logistics and speaker outreach.

- Sasnaka Sansada Foundation

District Coordinator — Nuwara Eliya

Mar 2024 – Dec 2024

 - Managed district-level outreach operations, volunteer recruitment, and provincial seminar logistics.

Ganitha Sawiya Coordinator

May 2022 – May 2023

 - Organised 50+ mathematics seminars and educational workshops across the Nuwara Eliya District, directly improving O/L and A/L mathematics pass rates among rural school students.

- EXMO 2023 — University of Moratuwa

Exhibit Coordinator

Apr 2023 – Jul 2023

 - Curated and managed mechanical engineering exhibits for Sri Lanka’s premier university engineering exhibition; oversaw space allocation and technical safety for thousands of visitors.

Technical Skills

CAD & Design: SolidWorks, Fusion 360, Solid Edge, AutoCAD
Simulation & Analysis: ANSYS (FEA), MATLAB
Programming: Python, C/C++, Arduino IDE
IoT & Embedded Systems: ESP32, DHT22, DS18B20, ThingSpeak, Node-RED, MQTT
Manufacturing: Basic manufacturing processes, DFM, CNC machining, sheet metal fabrication, welding, 3D printing
Engineering Software: MS Office Suite, Photoshop, DaVinci Resolve, After Effects
Languages: English (Professional Proficiency), Sinhala (Native)
Core Competencies: Mechanical design, preventive maintenance, process optimisation, technical documentation, cross-functional team leadership

References

Dr. Pubudu Ranaweera

Senior Lecturer

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