NADUN THATHSARA

Materials Science & Engineering Graduate

Nadun-Thathsara Portfolio

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Dandagamuwa, Kuliyapitiya

PERSONAL PROFILE

Highly motivated Materials Science & Engineering graduate *(Minor in Mathematics)* with hands-on experience in nanomaterials synthesis, characterization (SEM, FTIR, XRD, UV-Vis), and data analysis (Python/R). Demonstrated research capability through a final-year project on nanostructured graphite-based nanofluids for enhanced heat transfer applications. Gained industry exposure via R&D internship at Michelin Lanka, contributing to projects on rubber-compound optimization and tire performance analysis. Eager to advance innovative research on carbon nanomaterials for 3D printing and pursue postgraduate study in a collaborative, high-impact setting.

WORK EXPERIENCE

Research & Development Intern - Paid Internship *Dec 2023 - Jun 2024*
Michelin Lanka Research and Development Center

Contributed to multiple R&D projects on rubber-compound optimization and tire performance.

Analyzing Frequency-Dependent Properties in Cured Tire Compounds

- Implemented DMA frequency-sweep and WLF mode expanding test range and reducing specimen waste. Created SOP for these modes.
- Optimized temperature-sweep parameters considering vehicle speed, sharpening tan(δ) based predictions of rolling resistance and traction.

Investigating the Effect of Mastication Time on the Properties of Cured Rubber Compounds

- Used HBU, RPA, and DMA to identify optimum mastication time that reduces stickiness and increase mechanical performance; hands-on experience on mixing and formulation of rubber compounds.

Investigating the Correlation Between DMA Tension Mode Tan(δ) and Rolling Resistance

- Demonstrated correlation between tension-mode tan(δ) and drum rolling resistance across diverse rubber/filler systems, enabling early lab-scale screening.

PROJECTS

Nanostructured Exfoliated Graphite-Based Nanofluids for Heat Transfer Applications *2024 - 2025*
Final Year Project
Supervised by - Dr. (Mrs.) Hansinee Sitinamaluwa

Conducted research on synthesizing nanofluids using electrochemically exfoliated graphite (EEG) and ball-milled graphite, focusing on environmentally sustainable methods. Characterized multi-layer graphite nanoflakes using SEM, FTIR, XRD, and UV–Vis spectroscopy. Evaluated thermophysical properties—thermal conductivity, viscosity, and stability—of nanofluids in deionized water, achieving up to 25% enhancement in thermal conductivity at 0.5 wt% EEG.

Design and Development of a Transient Hot Wire-Based Thermal Conductivity Measuring Instrument
Designing and prototyping a transient hot wire-based measurement system to test nanofluid thermal conductivity, addressing the lack of available equipment for such evaluations.

Design and Implementation of a Corrosion Protection System for a Subsea Oil Pipeline *2024*
20 km carbon-steel pipeline: Zn sacrificial-anode layout, 3LPE/concrete coating, COMSOL validation.

Design of Manual Transmission Gearbox *2023*
Five-speed automotive gearbox—gear-ratio optimization, gear geometry, shafts & bearings, Solid Edge simulation.

Mathematical Modeling of Slip Casting of Tubular Membranes Using Multi-Layer Moulds *2023*
Developed permeability-based model to predict multilayer mould casting time for process control.

Smart MediBox Design (IoT Pill Dispenser) *2023*
Node-RED/Wokwi prototype with Altium PCB for scheduled medication reminders.

Designing a Low-Cost Body Trainer Exercise Machine *2023*
Performed material selection and 3D CAD modeling of a budget exercise machine based on analysis of local consumer requirements.

Design of Aluminum Extrusion Die *2022 - 2023*
Calculated extrusion pressure, extrusion ratio and shrinkage allowances; selected H13 hot-work tool steel and defined a heat-treatment cycle to minimize die defects.

Designing a Child-Sensitive Milk Bottle *2022*
Selected PCM and multilayer insulation to keep feed at 37 °C; performed thermal-performance calculations.

PUBLICATIONS

- A. A. C. L. Abeysinghe, **B. M. N. T. Banneheka**, H. S. Sitinamaluwa, *"Electrochemically Exfoliated Nanostructured-Graphite Nanofluids for Heat Transfer Applications,"* 2025 Moratuwa Engineering Research Conference (MERCon), IEEE, 2025. (Accepted for publication)

EDUCATION

BSc. Engineering Hons. Materials Science and Engineering *July 2021 - July 2025*
Minor in Mathematics
University of Moratuwa

- **GPA**: 3.47 / 4.00 (**Upper Second Class Honours**)
- Core modules undertaken: Nanomaterials, Electronic and Optical Device Engineering, Polymer Engineering, Latex Science and Technology, Characterization of Materials, Optimization, Experimental Design and Quality Control, Embedded Systems and Applications

Diploma in English *2020 - 2021*
Wayamba University Sri Lanka

- Merit Pass

Certificate in Java Application Development using JavaSE *Oct 2019 - Jan 2020*
University of Colombo School of Computing

GCE (A/L) | Physical Science *2017 - 2019*
Central College Kuliyapitiya

- Physics: A, Chemistry: A, Combined Mathematics: A
- District Rank: 30, Z-Score: 2.2639

Diploma in Information Technology *2016 - 2017*
ESOFT Metro Campus

Other courses

- Generative AI with Large Language Models (Coursera) verify
- Machine Learning using Python verify
- Six Sigma: Certified Lean Six Sigma Yellow Belt (Accredited) verify

SPORTS

Chess

University of Moratuwa Chess Club Membership — *2021 - 2025*

Central College Kuliyapitiya Chess Club Membership — *2011 - 2017*

Swimming

University of Moratuwa Swimming Club Membership — *2023 - 2025*

ACHIEVEMENTS

Dean's List

Dean's List is awarded to students who have a semester GPA higher than 3.80.

- Semester 5: 3.89/4.00
- Semester 8: 3.89/4.00

Youth Chess Championship – North Western Province — *2013*

- 9^{th} place

Sri Lanka Inter School Chess Championship — *2012*

- 2^{nd} place

Queenstar - All Island Lightning Chess Championship — *2011*

- 3^{rd} place

SKILLS

Technical Skills

- Materials Characterization
- Experimental Design
- Data Analysis: Python, R
- CAD: AutoCAD, Solid Edge
- Modeling & Simulations: FEA, CFD (Ansys Fluent)
- Programming: Python, C#

Software Tools

- AutoCAD, Solid Edge
- Ansys Fluent, Comsol Multiphysics
- ImageJ
- LAMMPS
- Quantum ESPRESSO
- LTspice, SCAPS-1D

Languages

- Sinhala (Native)
- English (Proficient)
- Tamil: Basic, O/L Grade B

REFERENCES

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