

Abdul Barek

Prospective PhD Student in Automotive and Energy Systems
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Research Profile

MSc Automotive Engineering graduate with experience in educational PEM fuel-cell testing and MATLAB/Simulink analysis of vehicle and powertrain systems. Interested in doctoral research on fuel-cell performance, electrified vehicles and control systems, with a flexible starting intake. Brings a mechanical-engineering foundation and practical experience in maintenance and fault diagnosis.

Education

MSc Engineering (Automotive) | 2025 - 2026

University of Hertfordshire, United Kingdom

Programme: MSc Automotive Engineering. Completed July 2026.

BSc in Mechanical Engineering | 2016 - 2021

Sonargaon University, Bangladesh

Diploma in Engineering, Automobile Technology | 2011 - 2016

Dhaka Polytechnic Institute, Bangladesh

Research Experience

MSc Dissertation | University of Hertfordshire | 2026

Performance Analysis of an Educational Proton Exchange Membrane Fuel Cell Stack

Supervisor: Dr Mahmoud Chizari

- Investigated a reversible educational PEM fuel-cell system through practical testing, electrical measurements and analysis of operating behaviour.
- Recorded hydrogen filling time and discharge duration over ten test runs. Measured voltage and current during discharge and calculated electrical power output.
- Organised experimental results in Excel and examined variation in voltage response, power and operating duration across repeated tests.
- Analysed MATLAB/Simscape simulation outputs for an automotive-scale PEM stack, including polarisation behaviour, auxiliary power demand, thermal response and hydrogen consumption.
- Discussed sealing, hydrogen delivery and measurement consistency as limitations of the educational setup, and proposed improvements for future testing.

Research Interests

PEM fuel-cell characterisation and thermal management; electrified powertrains and vehicle energy use; modelling and control of vehicle systems. Interested in developing parameter sensitivity studies and comparisons between models and experimental data during doctoral research.

Manuscript in Preparation

Developing my MSc educational PEM fuel-cell dissertation into a research manuscript for journal submission. Status: in preparation.

Technical Skills

Modelling and simulation: MATLAB and Simulink for academic vehicle and powertrain analysis; Simscape experience through PEM fuel-cell simulation.

Experimental analysis: Voltage and current measurement, calculation of electrical power, repeated-test comparison and interpretation of time-dependent fuel-cell behaviour.

Data and reporting: Excel calculations and plots, engineering data interpretation, literature review and technical report writing.

Engineering practice: Mechanical fault diagnosis, preventive and corrective maintenance, equipment inspections and safety checks.

Professional development: MATLAB Onramp and Simulink Onramp, MathWorks - completed.

Selected Academic Projects

Electric Vehicle Modelling | MSc coursework

- Used MATLAB/Simulink to model an electric vehicle and analyse vehicle performance and energy use.

Hybrid Powertrain Performance Analysis | MSc coursework

- Compared plug-in and fuel-cell hybrid configurations using a Renault Zoe-based coursework model, examining battery state of charge, energy use and hydrogen consumption.

Engine and Powertrain Performance | MSc coursework

- Analysed supplied Honda CB500 engine data in Excel, examining shaft power and brake-specific fuel consumption across the reported operating points.

Engineering Experience

Senior Assistant Engineer | Real Oil, Bangladesh | Dec 2023 - Nov 2024

- Led mechanical fault diagnosis and maintenance activities, supervised technical staff and supported equipment safety checks.
- Supported process improvement and quality compliance, coordinating maintenance work and communicating technical issues within the team.

Junior Assistant Engineer | Real Oil, Bangladesh | Dec 2021 - Nov 2023

- Supported preventive and corrective maintenance, mechanical troubleshooting and equipment inspections.
- Assisted shutdown and turnaround activities, maintained records and followed workplace health and safety procedures.

Industrial Training

Navana Toyota 3S Center | General Repair | Dhaka, Bangladesh

Completed a 12-week industrial attachment from 1 September to 23 November 2015, supporting basic passenger-vehicle repair and maintenance.

Leadership and Languages

Leo Club of Dhaka Platinum Unique: President, 2024 - 2025; previously Vice President and Treasurer. Member since 2018, contributing to community service and club activities.

Bengali: native | English: fluent | Hindi and Urdu: intermediate