Vehicle System Engineering (VSE)

Leader Assoc. Prof. Dr. Fauzan bin Ahmad

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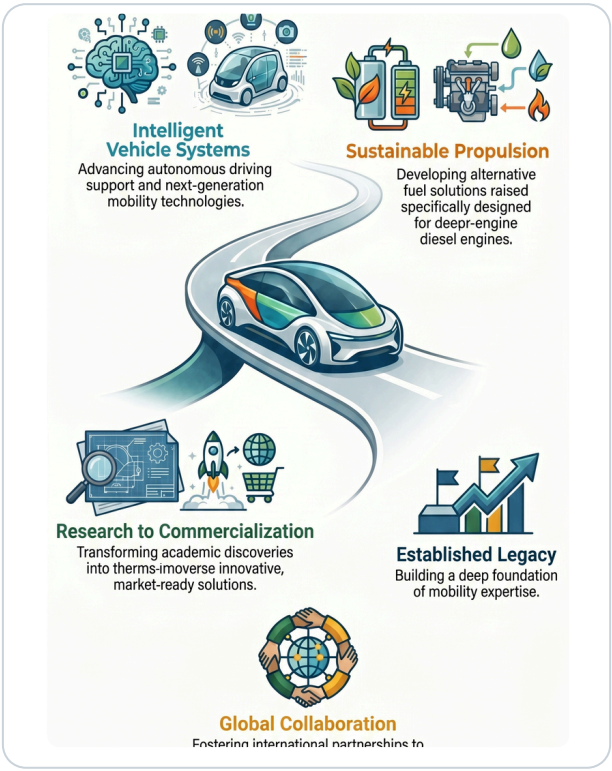
Office Location G3 Laboratory, UTM KL

Research Focus Areas

Hydrogen, Water Emulsion, Diesel Engine, Advanced Driver Assistance System, Signal & Image Processing

Overview

Vehicle System Engineering i-Kohza (VSE) established in 2012, focuses on next-generation mobility technologies, particularly intelligent vehicle systems, autonomous driving support, and alternative fuels for diesel engines. It combines academic research with real-world application, aiming to develop innovative solutions that can be commercialized. The i-Kohza fosters close collaboration among members and international collaborators to cultivate technical excellence.



↘ Selected Research Projects

- **Automated Vehicles Optimal Path Planning based on Enhanced Rapid Random Trees Algorithm,** Research University Grant, 2025-2028.
- **Infusion of Hydrogen Nano-Bubble in Diesel Fuel for Enhancement of Combustion Performance,** Professional Development Research University, 2025-2027.
- **Autonomous Vehicle Odometry Tracking for Accurate Pose Estimation In Sparse environment navigation,** Ministry of Higher Education (FRGS), 2024-2027.

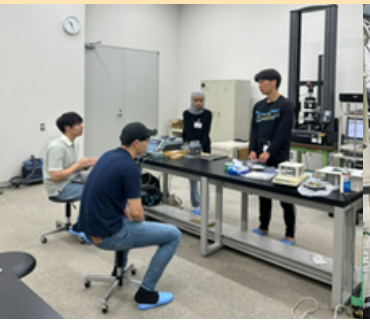
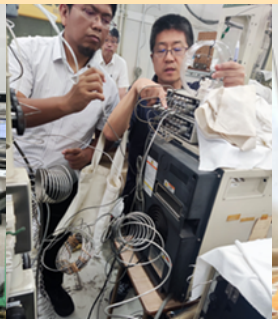
↘ Research Outputs

Selected Recent Publications

- Hasbullah Abdul Rahman, Nur Atiqah Ramlan, **Wira Jazair Yahya**, Mohamad Qayyum Mohd Tamam, (2025). A comparative analysis of mixing methods for real time emulsion fuel supply systems for common-rail fuel injection diesel engine, Fuel. 381: 133469.
- Muhammad Adib Abdul Rashid, **Ahmad Muhsin Ithnin**, Wira Jazair Yahya, Wan Nur Izzati Wan Mahdi, Nurul Aiyshah Mazlan, Abdullah Aiman Zulmajdi, Dhani Avianto Sugeng, Kinoshita Eiji, (2025). Emulsifier-free B50 biodiesel-water-ethanol emulsion fuel: A study on combustion characteristics, fuel performance, and emissions, Fuel. 392: 134873.
- Frendy Rian Saputro, **Ahmad Muhsin Ithnin**, Dhani Avianto Sugeng, Wan Nur Izzati Wan Mahdi, Wira Jazair Yahya, Wargiantoro Prabowo, Trisno Anggoro, Erlan Rosyadi, (2025). Effects of oxyhydrogen enrichment on diesel engine performance and emissions using B35 and its water-in-biodiesel emulsion, International Journal of Hydrogen Energy 142: 109-121.
- Wan Nur Izzati Wan Mahdi, **Ahmad Muhsin Ithnin**, Wira Jazair Yahya, Dhani Avianto Sugeng, Frendy Rian Saputro, Muhammad Adib Abdul Rashid, (2025). A comparative review of alternative fuels: Diesel-HHO and diesel-hydrogen via enrichment method in diesel engines application, International Journal of Hydrogen Energy 120: 444-472.

Patents

- A System for Treating Palm Oil Mill Effluent (UI2015701995)
- A Method for Controlling a Vehicle Steer by Wire System (PI2013700998)
- A Fuel Emulsification System (UI2014702681)
- A Method of Detection and Warning System for Motorcycle Vehicular Collision Avoidance (DEWAMCA) (PI2017001216)
- A method for supplying non-surfactant emulsion fuel (PI2018000086)
- A method of controlling emulsion fuel delivery from an emulsion fuel supply system for diesel powered vehicle (PI2018000465)
- A System for Producing an Emulsion (PI202200457)
- A refractometer with optical cascaded multimode interference structures (PI2022006397)
- All-Terrain Zero-Gravity Assembly for Harvesting Harvestable Plants Including Oil Palm Trees, Coconut Palms, and other Yield-Producing Species, and Method Therefor (PI2025004506)



Facilities and Equipment

Engine dynamometer



Able to measure engine performance (in-cylinder pressure, BTE, BSFC) and emissions (Smoke Opacity, NOx, CO, CO2, HC)

Fuel properties measurement



Kinematic viscosity, calorific value, acid number, water content.

Industrial burner



Able to measure burner performance and emissions.

Roller dynamometer



Able to measure vehicle performance and emissions.

Motion capture and biosignal measurement



Kinematics and biomechanics pose analysis

Hardware-in-the-Loop system



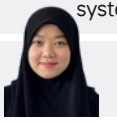
Hardware and software-in-the-loop prototyping mainframe

Driving simulator



Six Degree Of freedom (DOF) vehicle simulator

Members

Assoc. Prof. Dr. Fauzan bin Ahmad		Advanced Nanomaterials, Optoelectronics and Photonics, Optical Sensors
Prof. Ir. Ts. Dr. Wira Jazair bin Yahya	Alternative Fuel for Diesel Engine	
Assoc. Prof. Dr. Mohd Azizi bin Abdul Rahman		Robotics, Applied AI and Biosignal Processing
Assoc. Prof. Ir. Ts. Dr. Mohd Hatta bin Mohammed Ariff	Vehicle Dynamic Control, System Modeling and Applied AI	
Assoc. Prof. Ts. Dr. Ahmad Muhsin bin Ithnin		Combustion, Hydrogen, Engineering Design, Alternative Fuel for Diesel Engine
Assoc. Prof. Dr. Istas Fahrurrazi bin Nusyirwan	Air traffic systems surveillance, real time data collection system, data fusion and data analytics solution	
Dr. Siti Nur Fatin binti Zuikafly		Advanced Nanomaterials, Optoelectronics and Photonics, Optical Sensors
Dr. Muhammad Quisar bin Lokman	Low Power MCUs and Sensors	