Current Research Activities

Future Power Systems Research

Research News

Ongoing Projects: **SERVE - pdf 15 KB (/Documents/college-eps/mechanical/research/fps-research/serve.pdf)**

The Future Power Systems Group is currently working towards the first year on the SERVE program - Flex-diesel Engines with Sustainable Bio- fuels for Clean and Efficient On- and Off-Road Vehicle Engines.

The project aims to provide technical solutions that will allow the diesel engine to operate with a diverse range of renewable fuels and it has two major objectives: 1) to identify the changes required by the engine system (including aftertreatment) to run on blends containing up to 30% of a variety of both generations bio-diesel fuels; 2) to develop novel 'Flex-diesel' technologies involving onboard pre- and after-treatment to maintain optimized engine performance and emissions with increasing percentages of fully sustainable bio-fuels and thermal management.

This project is funded by the UK Government and the Technology Strategy Board (formerly known as DTI - Department of Trade and Industry) in collaboration with Jaguar Cars. Total Funding £2.12 million.

New Project: **Impact of DMF on Engine Performance and Emissions as a New Generation of Sustainable Biofuel - pdf 22 KB (/Documents/college-eps/mechanical/research/fps-research/biofeul.pdf)**

This project is funded by EPSRC . Total Funding £0.520 million.

New Project: **Diesel Particulate Filter Regeneration with On-Board Produced Hydrogen-Rich Gas - pdf 15 KB (/Documents/college-eps/mechanical/research/fps-research/diesel-regeneration.pdf)**

This project is funded by EPSRC . Total Funding £0.156 million.

Completed Projects: **CHASE pdf - 163 KB (/Documents/college-eps/mechanical/research/fps-research/chase.pdf)**

The Future Power Systems Group has successfully completed the CHASE program. (Controlled Homogeneous Auto-ignition Supercharged Engine).

This project aims to develop a clean and efficient powertrain system centred on a supercharged homogeneous charge compression ignition engine with on-board fuel reformer and thermal management.

This project is funded by the UK Government through the Foresight Vehicle Program in collaboration with Jaguar Cars. Total Funding £2.359 million.

Completed Projects: **CHARGE - pdf 51 KB (/Documents/college-eps/mechanical/research/fps-research/charge.pdf)**

The Future Power Systems Group has successfully completed the CHARGE program.

(Controlled Homogeneous Auto-Ignition Reformed Gas Engine).

This project aimed in general at developing a clean and efficient powertrain system, in order to meet the challenge and requirement for the next generation of vehicles.

This project is funded by the UK Government through the Foresight Vehicle Program in collaboration with Jaguar Cars. Total Funding £0.565 million.

Current Research Work includes:

Homogeneous Charge Compression Ignition

- **CHASE V6 HCCI Engine & Reforming - jpg 900 KB (/Images/Research-and-teaching/Engineering-and-Physical-Sciences/Mechanical-Engineering/research/fps-research/CHASEV6HCCIEngineReforming.jpg)**
- **CHASE V6 HCCI Engine, Modelling and Thermal Management - jpg 900 KB (/Images/Research-and-teaching/Engineering-and-Physical-Sciences/Mechanical-Engineering/research/fps-research/CHASEV6HCCIEngineModelingandThermalManagement.jpg)**
- **Combustion quality - jpg 891 KB (/Images/Research-and-teaching/Engineering-and-Physical-Sciences/Mechanical-Engineering/research/fps-research/HCCIOpticalEngineCombustion-FlowsOpticalLaserDiagnosticandModeling.jpg)**
- **Optical diagnostics - jpg 676 KB (/Images/Research-and-teaching/Engineering-and-Physical-Sciences/Mechanical-Engineering/research/fps-research/HCCIcombustiondiagnosticsinOpticalEngine.jpg)**

Alternative fuels: biodiesel, ethanol, biogas, natural gas, hydrogen

- **Jaguar V6 Lion Diesel Engine - jpg 734 KB (/Images/Research-and-teaching/Engineering-and-Physical-Sciences/Mechanical-Engineering/research/fps-research/JaguarV6DieselEngine.jpg)**
- **Single Cylinder Lister-Petter DI Diesel Engine - jpg 730 KB (/Images/Research-and-teaching/Engineering-and-Physical-Sciences/Mechanical-Engineering/research/fps-research/SingleCylinderLister-PetterDIDieselEngine.jpg)**
- **Single Cylinder Medusa SI Engine - jpg 761 KB (/Images/Research-and-teaching/Engineering-and-Physical-Sciences/Mechanical-Engineering/research/fps-research/SingleCylinderMedusaSIEngine.jpg)**

On-board Hydrogen Generation by Exhaust Gas Fuel Reforming

- Application in HCCI (CAI)
- Diesel
- Natural Gas SI

Analysis of Emissions & Particulates

- **Aftertreatment for combustion engines - jpg 900 KB (/Images/Research-and-teaching/Engineering-and-Physical-Sciences/Mechanical-Engineering/research/fps-research/Aftertreatmentforcombustionengines.jpg)**
- Gaseous speciation by mass spectrometry
- Particulate emissions and deposits analysis by pyrolysis / GC and thermal desorption

Modelling

- Monolithic fuel reformer / exhaust converter
- Modelling of engine systems – closed cycle, gas dynamics, variable compression ratio engines
- CFD in high velocity internal flows and mixing
- **Optimising the Airflow of Land Rover Air Intake System - jpg 633 KB (/Images/Research-and-teaching/Engineering-and-Physical-Sciences/Mechanical-Engineering/research/fps-research/OptimisingtheAirflowofLandRoverAirIntakeSystem.jpg)**

Enhanced Condensation Heat Transfer
Trans-sonic Flows in Steam Turbines

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