BEYOND CONVENTIONAL POWERTRAIN SVT 2015

Institution of MECHANICAL ENGINEERS

16-17 June 2015
University of Warwick
www.imeche.org/events/C6188

Automobile Division
Conference

BEYOND CONVENTIONAL POWERTRAIN SVT 2015

16-17 June 2015, University of Warwick

AS POWERTRAIN TECHNOLOGIES AND FUEL SOURCES DIVERSIFY, MEASURES OF VEHICLE EMISSIONS TAKEN SOLELY FROM THE TAILPIPE WILL NOT ACCOUNT FOR CO_2 EMISSIONS AND WIDER ENVIRONMENTAL IMPACTS.

Sustainable Vehicle Technologies (SVT) 2015 will be split over two days, looking first at recent developments in powertrain technology and the modelling tools to investigate them, before moving on to vehicle efficiency measures outside of the powertrain.

In both instances, the presentations will cover both light and heavy duty vehicles and address ICE, hybrid, electric and fuel cell solutions.

This conference will build on themes established at the 2009 Low Carbon Vehicle Conference and SVT 2012, considering the developments in vehicle technology that are shaping the latest propulsion systems.

BENEFITS OF ATTENDANCE:

- **Understand** the latest weight reduction technology
- **Explore** alternative propulsion systems
- **Learn** more about lifetime CO_2 analysis
- **Hear** the latest regulatory developments and how they will affect you
- **Network** with leading figures in vehicle technology

EXHIBITOR:

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PROGRAMME

DAY 1 — TUESDAY 16 JUNE 2015

INTEGRATED LOW-CARBON POWERTRAINS

09:30 **REGISTRATION, REFRESHMENTS AND CONFERENCE WELCOME**
Professor Lord Bhattacharyya, WMG, University of Warwick

09:35 **KEYNOTE ADDRESS**
Tony Pixton, Chief Executive, APC

09:50 SESSION 1 - ENGINE ARCHITECTURES

3-CYLINDER VDE ENGINE
Andrew Brumley, Chief Engineer, Ford Motor Company

INTEGRATION OF FORM AND FUNCTION – IMPACT POWERTRAIN
Dr Simon Edwards, Global Director, Technology, Ricardo

RANKINE CYCLE EXHAUST HEAT RECOVERY – SET TO REDUCE FUEL CONSUMPTION BY MORE THAN 5% ON COMMERCIAL VEHICLES
Robert Winstanley, Lead Technical Services Engineer, ANSYS

11:00 **NETWORKING REFRESHMENT BREAK**

11:30 SESSION 2 - MILD HYBRID AND ADVANCED BOOSTING

POTENTIAL OF 48V BOARDNET
Speaker to be announced

A NUMERICAL STUDY OF ELECTRICALLY ASSISTED BOOSTING SYSTEM LAYOUTS
Dr Richard Burke, Lecturer, University of Bath

RAPID ASSESSMENT OF ELECTRIC SUPERCHARGER SYSTEM LAYOUTS FOR ENGINE DOWNSIZING
Alessandro Renna, CAE Engineer, AVL Powertrain

13:00 **NETWORKING LUNCH**

14:00 SESSION 3 - ADVANCED TRANSMISSION AND DRIVELINE

THE RICARDO LOW-COST, MILD-HYBRID, ELECTRIC-AUTOMATED MANUAL TRANSMISSION (EAMT)
Jonathan Seed, Chief Engineer Design & CAE, Ricardo

METHODOLOGY FOR EFFICIENCY PREDICTION FOR ADVANCED DRIVE SYSTEMS
Confirmed Representative, GKN

MEASUREMENT AND REDUCTION OF PARASITIC LOSSES FOR HEAVY DUTY AXLES
Barry James, Chief Technical Officer, Head of R&D, Romax Technology

15:30 **NETWORKING REFRESHMENT BREAK**

16:00 SESSION 4 - ENERGY STORAGE AND ELECTRIC MACHINES

NEXT-GENERATION ENERGY STORAGE
Nigel Taylor, Senior Manager Advanced Energy Storage & Consumption, Low-Carbon Vehicles Research, Jaguar Land Rover

HIGH-PERFORMANCE AND LOW CO_2 FROM A FLYBRID® MECHANICAL KINETIC ENERGY RECOVERY SYSTEM
Dr Andrew Deakin, Chief Development Engineer, Torotrak Group

ADVANCED STEELS FOR FUTURE AUTOMOTIVE POWERTRAIN
Dr Iain McGregor, Manager Technology, Tata Steel

17:30 **DRINKS RECEPTION AT APC SHOWCASE**
This will be followed by a buffet on the IDL concourse

DAY 2 — WEDNESDAY 17 JUNE 2015

TECHNOLOGIES FOR VEHICLE EFFICIENCY

09:30 **REGISTRATION, REFRESHMENTS AND CONFERENCE WELCOME**
David Greenwood, Professor of Advanced Propulsion Systems, University of Warwick

09:35 **KEYNOTE ADDRESS**
Jerry Hardcastle OBE, Vice President, Nissan Technical Centre Europe

09:50 SESSION 1 - REAL-WORLD EMISSIONS

ENERGY USE IN VEHICLES
Ian Ellison, Sustainability Manager, Jaguar Land Rover

USING ENHANCED LOGGED TELEMATICS DATA TO ASSESS THE IMPACT OF DRIVER BEHAVIOUR ON ENERGY USE OF AN ELECTRIC VEHICLE
Michael Abbott, EngD Candidate, WMG, University of Warwick

IMPLEMENTATION OF ENERGY-EFFICIENT CABIN TECHNOLOGIES TO IMPROVE OVERALL VEHICLE EFFICIENCY
Aled Gravelle, Engineer Specialist, Jaguar Land Rover

11:00 **NETWORKING REFRESHMENT BREAK**

11:30 SESSION 2 - ROAD LOAD REDUCTION

SHAPE OPTIMISATION FOR AERODYNAMIC EFFICIENCY USING ADJOINT METHODS
Mark Sealy, Engineering Director, Commercial Vehicle Sector

HEAVY DUTY VEHICLES CO_2 EMISSIONS – REFRIGERATED VEHICLE DESIGN TO STAY AHEAD OF THE CURVE
Lionel Curtis, Technical Director, Cartwright Group

STAMPED THERMOPLASTIC COMPOSITES FOR FAST CYCLE TIMES
Professor Richard Dashwood, Academic Director, WMG

13:00 **NETWORKING LUNCH - TOUR OF WMG AVAILABLE**
Please contact Event Enquiries to find out more by emailing **eventenquiries@imeche.org**

14:00 SESSION 3 - POWERTRAIN MODELLING SIMULATION

HIGH-VOLTAGE COMPONENT THERMAL MANAGEMENT: USING MBSE METHODS
Dr Charles Jones, Technical Specialist, Electronics & Controls, AVL Powertrain

SIMULATION OF DYNAMIC TORQUE RIPPLE IN AN AUXILIARY POWER UNIT FOR A RANGE-EXTENDED ELECTRIC VEHICLE
Dian Liu, PhD Student, University of Bath

RAPID CONCEPT DESIGN AND OPTIMISATION OF HYBRID ELECTRIC POWERTRAINS OVER MULTIPLE DRIVE CYCLES
Dr Kathryn Taylor, R&D Project Engineer, Romax Technology

15:00 **NETWORKING REFRESHMENT BREAK**

15:30 SESSION 4 - VEHICLE APPLICATIONS

DEVELOPMENT OF A RANGE-EXTENDED ELECTRIC 7.5 TONNE TRUCK
Robert Watson, Chief Engineer, Teva Motors

THROUGH-THE-ROAD PARALLEL HYBRID WITH IN-WHEEL MOTORS
Mike Bassett, Head of Hybrid Group, MAHLE Powertrain

A THERMODYNAMIC TRANSIENT MODEL OF AN EVAPORATIVELY COOLED POLYMER ELECTROLYTE MEMBRANE FUEL CELL SYSTEM FOR AUTOMOTIVE APPLICATIONS
Dr Pratap Rama, Manager & Chris Gurney, Senior Research Engineer, Platform Architecture & Sub-Systems Engineering, Intelligent Energy

FUELS CELLS AT LOW TEMPERATURES
Dr Ralph Clague, Head of Motive Systems & Architecture, Intelligent Energy

FORMULA E BATTERY DEVELOPMENT
Confirmed Representative, Williams

17:30 **CLOSE OF CONFERENCE**

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- This programme is subject to change.
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- Jon Beasley, APC
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- Robert Genway-Hayden, GKN Driveline
- Jon Horsley, TSB
- Mike Richardson, Jaguar Land Rover
- David Greenwood, University of Warwick
- Matthias Wellers, AVL
- Nick Carpenter, Delta Motorsport
- Chris Wheelans, Jaguar Land Rover

SPEAKERS AND CONTRIBUTORS

MICHAEL ABBOTT
ENGD CANDIDATE, WMG, UNIVERSITY OF WARWICK

Michael Abbott became an EngD student at WMG after completing an MPhys at Warwick University in 2014. His research interests focus on new technologies in the automotive sector, particularly those that are helping progress electrification and hybridisation. He is helping develop WMG's wireless charging capability, a key technology that could overcome the current issues surrounding the uptake of electric vehicles.

MIKE BASSETT
HEAD OF HYBRID GROUP, MAHLE POWERTRAIN

Mike Bassett graduated from Bristol University in 1993, and studied for a PhD at the University of Manchester Institute of Science and Technology (UMIST), focusing on the 1D modelling of engines. Mike joined Lotus Engineering in 2000, where he worked in the software development department. He moved to MAHLE Powertrain in 2007 and has been the Head of the Hybrid Group since 2010.

DR RICHARD BURKE
LECTURER, UNIVERSITY OF BATH

Richard Burke received a PhD from the University of Bath in 2011 and has worked as a researcher on powertrain systems since then. Richard's research interests involve the transient performance of powertrain systems and notably understanding, modelling and controlling thermal effects. His projects include diesel engine thermal management, turbocharger and electrical machine heat transfer analysis and powertrain control effects.

DR RALPH CLAGUE
HEAD OF MOTIVE SYSTEMS & ARCHITECTURE, INTELLIGENT ENERGY

Ralph Clague spent the first half of his career in the design and analysis of internal combustion engines, before starting research at Imperial College London into fuel cell degradation and failure modes in 2005. After gaining his PhD he returned to the automotive sector to design future vehicle powertrains based on fuel cells, battery super-capacitors and electric machines at McLaren Automotive and Gordon Murray Design.

LIONEL CURTIS
TECHNICAL DIRECTOR, CARTWRIGHT GROUP

Lionel Curtis started his career as an apprentice toolmaker prior to completing a degree in Automotive Engineering. For the last 25 years he has been involved with various commercial vehicles including buses, trucks and trailers. Having spent several years in the UK trailer industry, he is now Technical Director for one of the largest trailer and truck bodywork manufacturers in the UK.

DR ANDREW DEAKIN
CHIEF DEVELOPMENT ENGINEER, TOROTRAK GROUP

Andrew Deakin joined Flybrid Automotive in 2012 and has been responsible for developing mechanical hybrid systems that use flywheels to store and release kinetic energy to and from the vehicle. When Torotrak Group acquired Flybrid Automotive in early 2014, Andrew became Chief Development Engineer for the group, and took on responsibility for its low-carbon supercharging and transmission technologies.

DR SIMON EDWARDS
GLOBAL DIRECTOR, TECHNOLOGY, RICARDO

Simon Edwards worked for Leyland DAF Trucks. He was employed in the Advanced Technology Department, undertaking vehicle aerodynamics and engine friction reduction activities. From 1993 to 2006 he worked for Ricardo, on engines development and research projects, firstly in the UK and latterly, after a UK Royal Academy of Engineering fellowship with DaimlerChrysler, in Stuttgart, Germany. In July 2012 Simon rejoined Ricardo and is currently Global Director of Technology, responsible for the research and collaboration portfolio of the company.

ALED GRAVELLE
ENGINEER SPECIALIST, JAGUAR LAND ROVER

Aled Gravelle works for Jaguar Land Rover in the STRIVE vehicle efficiency team within research. His main responsibility is to generate and develop 1D simulation models for JLR conventional, hybrid and electric vehicles that aim to assess the effect of novel research ideas on vehicle efficiency and fuel economy. Prior to this, Aled worked at Delphi Diesel Systems as a test engineer for common rail diesel fuel pumps.

CHRIS GURNEY
SENIOR RESEARCH ENGINEER, PLATFORM ARCHITECTURE & SUB-SYSTEMS ENGINEERING, INTELLIGENT ENERGY

Chris Gurney graduated from the University of Birmingham in 2009 with a PhD in Applied Mathematics. He joined Intelligent Energy in 2011 as a research engineer examining aspects of water separation, thermal management and system modelling. Chris is now responsible for the simulation module and thermal module work packages, overseeing developments in steady state and transient system modelling, predicting future system design architectures and developing methods of heat rejection in air-cooled and evaporatively cooled fuel cell technologies.

DR CHARLES JONES
TECHNICAL SPECIALIST, ELECTRONICS & CONTROLS, AVL POWERTRAIN

Charles Jones has worked for AVL Powertrain for the last five years, specifically four years in Hybrid Controls Engineering and one year in Powertrain Systems Engineering including the use of SysML and model-based methods. Prior to joining AVL, Charles was Technical Manager at LuK Leamington, where he specialised in functional design and development for embedded controllers for vehicle automated transmissions and clutches.

SPEAKERS AND CONTRIBUTORS

DIAN LIU
PHD STUDENT, UNIVERSITY OF BATH

Dian Liu received an MSc degree in automotive engineering from the University of Bath. He currently pursues his full-time PhD in the Powertrain and Vehicle Research Centre (PVRC) with funding from the university and the Chinese Scholarship Council. His work focuses on the control of IPM generators coupled with low-cylinder-count IC engines.

DR PRATAP RAMA
MANAGER, PLATFORM ARCHITECTURE & SUB-SYSTEMS ENGINEERING, INTELLIGENT ENERGY

Pratap Rama gained his BEng Hons in Aeronautical Engineering in 2003 and his PhD in Polymer Electrolyte Fuel Cells at Loughborough University in 2010. Pratap joined Intelligent Energy in 2010 and has performed the role of Platform Architecture & Sub-Systems Engineering Manager since 2012. His team's remit covers all major sub-systems as well as control strategy development and system simulation.

ALESSANDRO RENNA
CAE ENGINEER, AVL POWERTRAIN

Alessandro Renna worked as a research fellow at the University of Salento until April 2014, being involved in 1D and CFD engine simulations in order to optimise the charging system of a 2-stroke diesel engine for aircraft applications. Since May 2014, he has been working for AVL Powertrain as a CAE Engineer in the Electronics and Controls Department, involved in automotive simulations, controls and calibration.

MARK SEALY
ENGINEERING DIRECTOR, COMMERCIAL VEHICLE SECTOR

Mark Sealy joined IMI Vision in 2005 as Senior Programme Manager, working on truck emissions technology. He went on to lead Norgren's advanced engineering team in the introduction of electric actuation for Euro 6. Mark is now Engineering Director for the CV sector, responsible for product strategy, interdivisional programmes, and is also leading a new venture into waste heat recovery solutions for trucks.

JONATHAN SEED
CHIEF ENGINEER DESIGN & CAE, RICARDO

Jonathan Seed has 18 years of experience in design, development and manufacturing of transmissions and hydraulic systems. Jonathan graduated from the University of Leeds with a BEng (Hons) in Manufacturing Systems Engineering. After university he went to work for AGCO as a Manufacturing Project Engineer and in 2000 was made Senior Design Engineer. In 2007 Jonathan joined Ricardo as Principal Engineer.

DR KATHRYN TAYLOR
R&D PROJECT ENGINEER, ROMAX TECHNOLOGY

Kathryn Taylor is responsible for managing and delivering R&D projects mostly focused on efficiency improvements in automotive drivetrains. Kathryn graduated in Physics from the University of Oxford, and completed a Physics PhD at the University of Nottingham in 2008. She joined Romax in 2010 as a software developer, and has since worked on various software and R&D projects.

NIGEL TAYLOR
SENIOR MANAGER ADVANCED ENERGY STORAGE & CONSUMPTION, LOW-CARBON VEHICLES RESEARCH, JAGUAR LAND ROVER

Nigel Taylor is a physicist with a passion for engineering and spent 18 years working on vehicle NVH projects, developing a number of measurement processes. Since 2008 Nigel has worked on Low Carbon Vehicles and has been involved in a number of projects including: Limo Green, a range-extended electric Jaguar XJ, the C-X75 concept car, a gas turbine range extender and the development of a very high-performance battery pack. He leads the JLR-WMG-TMETC Energy Storage Catapult and has successfully developed this from the ground up to become a research group. Nigel's scope has now widened with a senior management role looking after advanced energy storage and energy consumption.

EUR ING ROBERT WATSON
CHIEF ENGINEER, TEVA MOTORS

Robert Watson has a 30-year career in automotive engineering, with particular expertise in designing and developing lithium-ion battery packs for EVs. Robert managed EV projects at THINK Global AS in Oslo, as well as working for Rolls-Royce and Aston Martin Lagonda.

ROBERT WINSTANLEY
LEAD TECHNICAL SERVICES ENGINEER, ANSYS

Robert Winstanley graduated from the University of Sheffield with a Masters in Mechanical Engineering and has spent the last 13 years working extensively with computer-aided engineering and analysis, leading design in a variety of industries from nuclear safety to the energy industry, via automotive powertrain and turbomachinery. Robert is a Chartered Engineer with the Institution of Mechanical Engineers and Lead Technical Services Engineer in the Aerospace, Automotive & Turbomachinery Group at ANSYS UK.

BOOKING FORM

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16-17 June 2015
University of Warwick

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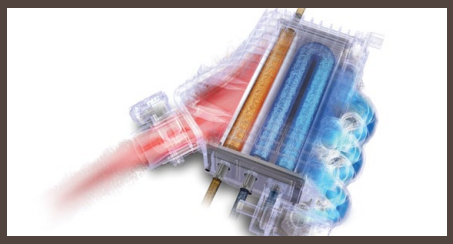

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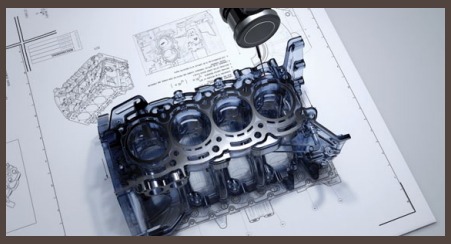

2-3 December 2015
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