WMG
Innovative Solutions

Welcome to

NMI
Automotive Electronic Systems Event

26th September 2012

Mark Pickering
Director of Development

The Queen's Anniversary Prizes 2009

THE UNIVERSITY OF WARWICK

The University of Warwick

WMG Innovative Solutions

Facts

- Established 1965
- League table positions
  - RAE 2008 – 7th overall
  - QS* World University Ranking (2011) - 50th
  - We aimed to be in the top 50 by 2015
- International working includes
  - Boston University
  - Monash University
  - IIT Kharagpur
  - Jawaharlal Nehru University
  - Nanyang Technological University

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WMG – Facts and Figures

WMG Innovative Solutions

- Established in 1980 by Professor Lord Bhattacharyya
- 280 staff in four main buildings
- £32m annual income, £100 million annual programme
- Less than 10% funding from central government
- 20% of University's research activity
- Effective relationships with over 500 companies
- 1,500 individuals from industry on postgraduate and post experience education
- Teaching and research centres in Hong Kong, India, Singapore, Malaysia and Thailand
- Co-located with Tata Steel, Jaguar LandRover and Tata Motors European Technical Centre
- In February 2010, The Queen formally presented the University of Warwick and WMG with a Queen's Anniversary Prize for Higher and Further Education

The Queen's Anniversary Prizes
For Higher and Further Education
2009
The University of Warwick

UK Research and Development Centres

WMG Innovative Solutions

International Manufacturing Centre

International Automotive Research Centre

International Digital Laboratory (IDL)

Engineering Management Building

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New Facilities

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International Institute for Product and Service Innovation (IIPSI)

investing in your future
European Regional Development Fund
European Union

- £12 million programme
- Midlands Small or Medium-sized Enterprises (SMEs)
- Leading product and service design technology

Visit: www2.warwick.ac.uk/fac/sci/wmg/iipsi/

WMG Academy for Young Engineers
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- Close to campus
- Designed for young people aged 15 to 19
- Release their ambitions
- A unique study programme

Visit: www.abetterwayoflearning.co.uk/

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Global Partners

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WMG Research Capability

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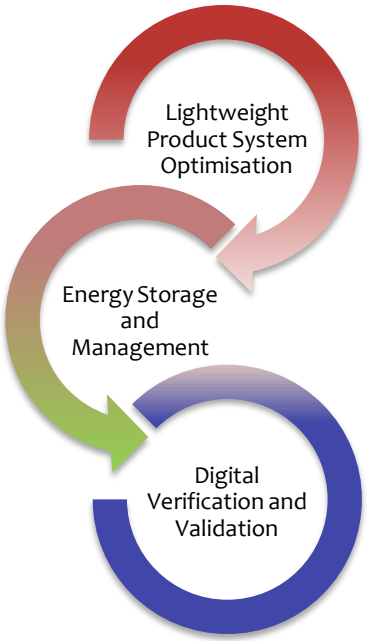
High Value Manufacturing Catapult

- A consortia of 7 world-class research centres coming together to form the first High Value Manufacturing Catapult
  - £350m public and private investment in member Centres in past 5 years
  - Over 160 industrial and other partners
- HVM Catapult funding of at least £75m per annum (50/50 public/private)
  - Enhanced infrastructure and innovation capability
  - Focused on economic growth
- WMG engaging with Automotive, Commercial, Construction, Off-Road, Rail and Marine sectors.



WMG's focus will be around these topic areas: -

- Lightweight Product and System Optimisation
- Energy Storage and Management
- Digital Validation and Verification

Major Research Projects

WMG Innovative Solutions

WMG centre High Value Manufacturing Catapult

£10m per year + Collaborative R&D projects funded jointly by the public and private sector 2011 - 2016

Premium Automotive R&D (PARD) Facility

- Premium Vehicle Lightweight Technologies (PVLT):

  £6m 2008 - 2013

- Premium Vehicle Customer Interface Technologies (PVCIT):

  £5m 2008 - 2013

- Low Carbon Vehicle Technology Project (LCVTP):

  £19m + £10m Private Match 2009 - 2014

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European Regional Development Fund
European Union
Project part-funded by Advantage West Midlands
www.advantagewm.co.uk

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Major Research Projects

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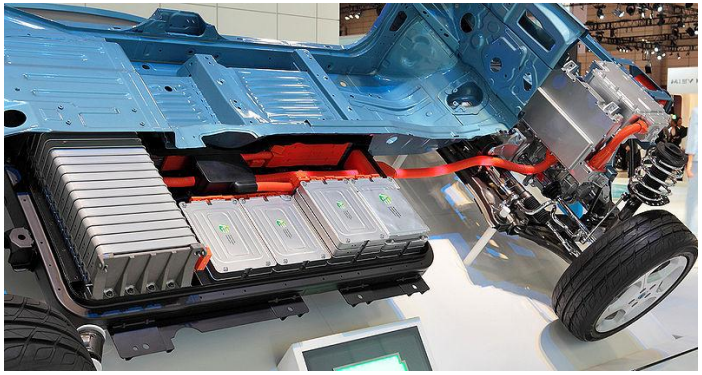
Vehicle Electrical Systems Integration (VESI)

Vehicle Electrical Systems Integration

EPSRC Pioneering research and skills

- Aim: Reduce the cost, size and improve reliability of the electrical power systems by integration of functionality in automotive applications
- £3.5m multi-partner project funded by EPSRC (led by Professor Phil Mawby, School of Engineering at the University of Warwick)
- 6 themes which include semiconductors, design tools, packaging, motors, converters and passives



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Project part-funded by Advantage West Midlands
www.advantagewm.co.uk

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Major Research Projects

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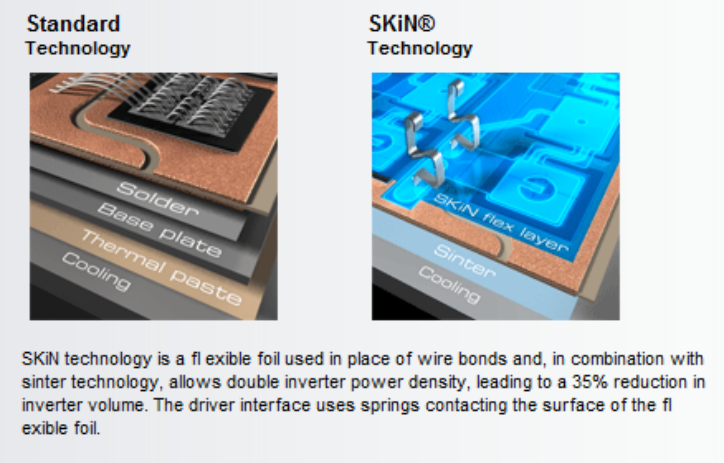
High Temperature Converters

- Aim: To eliminate or reduce the need for an active cooling system in automotive power electronics systems whilst increasing power density and developing high temperature reliability

- Multi-partner project funded by the Technology Strategy Board (led by Prodrive; academic partner Professor Phil Mawby, School of Engineering at the University of Warwick)

- 8 work packages which include research on:
  - high temperature materials and processes
  - internal and external interconnects
  - semiconductor devices
  - high temperature cycling fatigue modelling
  - power control interface and
  - high temperature power module prototypes



Technology Strategy Board
Driving Innovation

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Project part-funded by
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Embedded Systems Research Group

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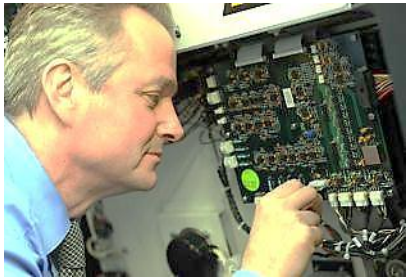
- Modelling and Simulation
  - Thermal Management
  - Re-Gen Braking
  - Systems of Systems
  - High Voltage Systems
  - Batteries
  - Mechatronics
- Diagnostics and Prognostics
  - Self Healing Vehicle
  - Bayesian Diagnostics
- Validation
  - Robustness Validation
  - Automated Infotainment Validation
  - Vehicle Energy Facility (Advanced Hybrid Research)
- Robustness
  - Design for Robustness Framework



Education: 1 Day Short Courses

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The courses are aimed at Electrical/ Mechanical and Automotive engineers

Hybrid Vehicle Technology

Automotive Electrical and Electronics

The timetable covers key technologies including;

- Hybrid Powertrain Architectures
- Energy Storage Technologies
- Electric Machine Technologies
- Power Electronics
- Architectures Syndicate Exercise
- Supervisor Control
- Regenerative Braking
- Role of Powertrain Simulation

- Embedded Electronic Control Systems
- Automotive Networking
- Design and Testing of Complex Control System
- Automotive Diagnostics
- Future Challenges

Vehicle Energy Facility

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- Dual dynamometers (570kW, 320kW)
- Gaseous and particulate emissions measurement
- Multi-fuel support
- 250kW battery cycling and simulation
- Real-time simulation platform
- Multiple DUT cooling circuits

Energy Storage and Management Capabilities

- Battery Cyclers
- Battery Abuse Testing Chambers
- Li-ion Battery Testing and Characterisation
- Powertrain Testing and Characterisation
- Thermal Chambers

New £13m Battery Lab

BIRMINGHAM POST

11°C – 11 kph wind

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£13m funding for vehicle battery base in West Midlands

by Graeme Brown, Birmingham Post | Sep 6 2012

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Business Support – Technical Equipment and Capabilities

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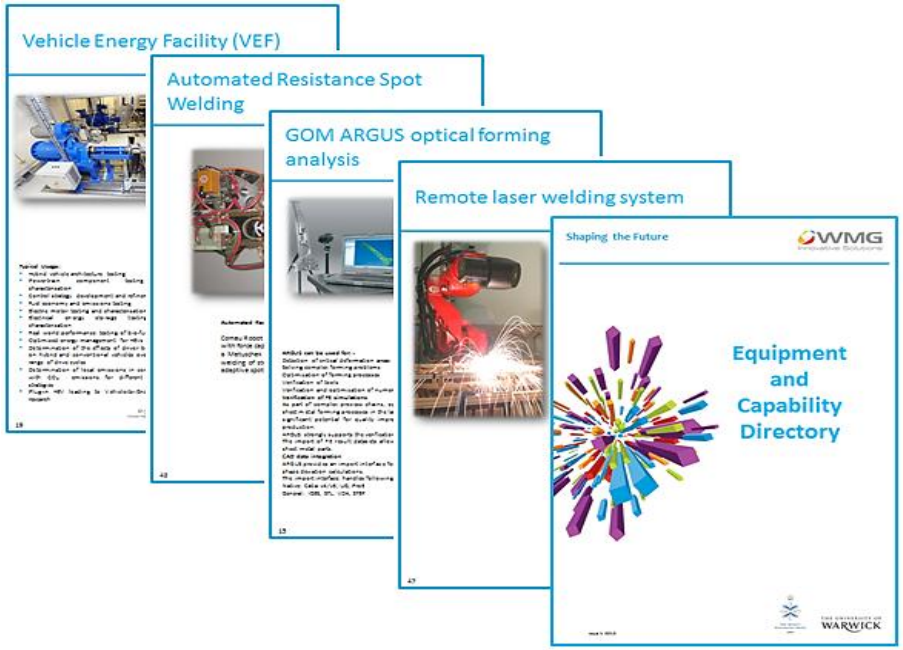
Benefits of Engagement

- Access for competitive advantage
- Multiply research and development by collaborating in one of our research consortium
- Bring projects to an earlier conclusion by leveraging research expertise
- Build business networks with OEM's and SME's



- E-Directory: http://www2.warwick.ac.uk/fac/sci/wmg/business/capabilities/
- Request a booklet: Contact Steph Williams – s.williams@warwick.ac.uk

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Working with WMG

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Many options for working with WMG

- Joint collaborative R&D in one of our research consortia
- Company specific R&D projects
- Knowledge Transfer Partnerships
- Open courses and specially tailored postgraduate education programmes
- Education of staff - identify staff to attend relevant postgraduate or post experience modules
- Graduate recruitment - access to Engineering Doctorate and Masters students
- Showcasing in conjunction with key academics

Potential partner benefits

- Unique proposition within Europe
- Increased marketing reach
- Early access to IPR
- Extended network in multiple sectors

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Opportunities

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- Internships
- Post module assignments
- Projects
- Dissertations
- Case studies (for inclusion in modules)
- Visiting lecturers/speakers
- Membership of module steering group
- Hosting site visits
- Providing equipment
- Sponsorship – e.g. unmanned search vehicle, formula student racing car and World First Formula 3 eco car
- Digital lab and research projects
- Seminars
- Careers service – graduate recruitment & science fairs
- Alumni
- Newsletters
- PhD, EngD and KTP

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Contact Details

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