

Welcome to WMG

July 2019



Who are we?

- ▶ Founded in 1980
- ▶ Academic department within the University of Warwick
- ▶ A unique mix of academics and industry-experienced engineers, guided by professional project managers
- ▶ Working with over 1,000 regional, national and international industry partners
- ▶ 650+ staff working in 9 buildings
- ▶ 350+ technical staff from Jaguar Land Rover and Tata Motors European Technical Centre co-located



What do we do?

- ▶ We work in multi-disciplinary teams with businesses and organisations across the globe, large and small, to help solve their challenges
- ▶ We provide education, research and knowledge transfer
- ▶ We help in a variety of ways:
 - ▶ Research
 - ▶ Develop
 - ▶ Advise
 - ▶ Educate
 - ▶ Collaborate

Education – workforce of the future

WMG Academy for Young Engineers

University Technical College (UTC)
Caters for 14-19 year olds
Business-like and business-led (supported
by industry)

Degree Apprenticeship Centre

Opening Sept 2019:

Multidisciplinary engineering-related
degree apprenticeships
Academic study with practical experience

Undergraduate

Full-Time Degrees
in all Engineering
disciplines and
Business
Management

Full-Time Postgraduate

Intensive one-year
MSc programmes
in Business,
Management and
Engineering






Research Degrees

Industry
sponsored PhD
and Engineering
doctorate (EngD)
programmes

Professional and Executive

Bespoke modules
developed with
industry

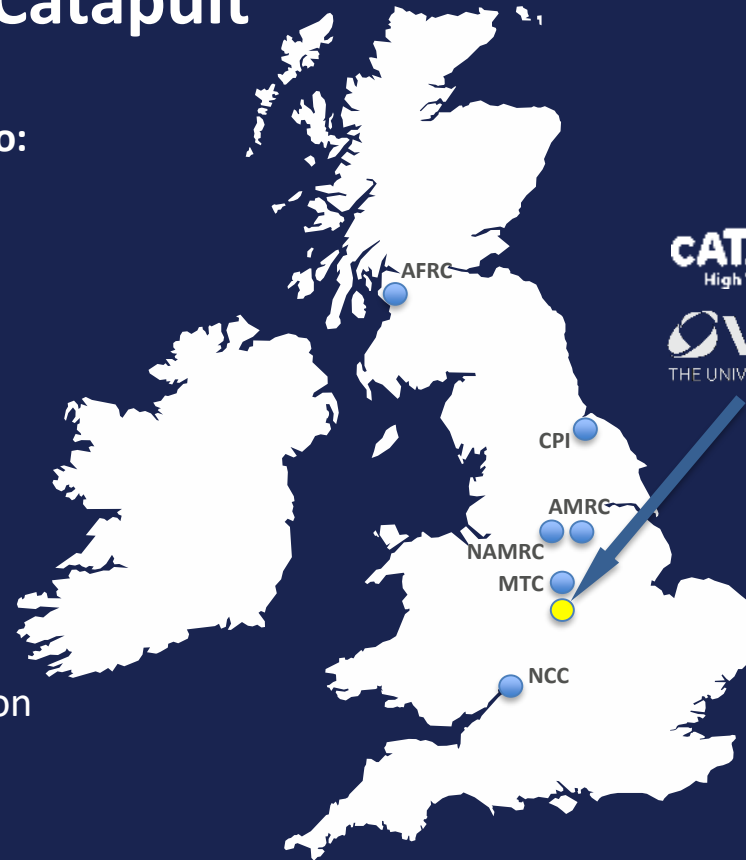
Our research teams

▶ Design 	Experiential Engineering
	Visualisation
▶ Materials 	Engineering Materials and Manufacturing
	Science and Technology of Steel Products and Processing
	Nanocomposites
	Sustainable Materials and Manufacturing
	Electrochemical Engineering
▶ Manufacturing 	Net-shape Manufacturing
	Metrology
	Automation Systems
	Digital Lifecycle Management
▶ Systems 	Energy and Electrical Systems
	Advanced Propulsion Systems
	Biomedical Informatics, Imaging, and Healthcare Technology
	Cyber Security
▶ Business transformation 	Service Systems
	Supply Chain
	E-Business
	Digital Media and Innovation

High Value Manufacturing Catapult

7 world class research centres working together to:

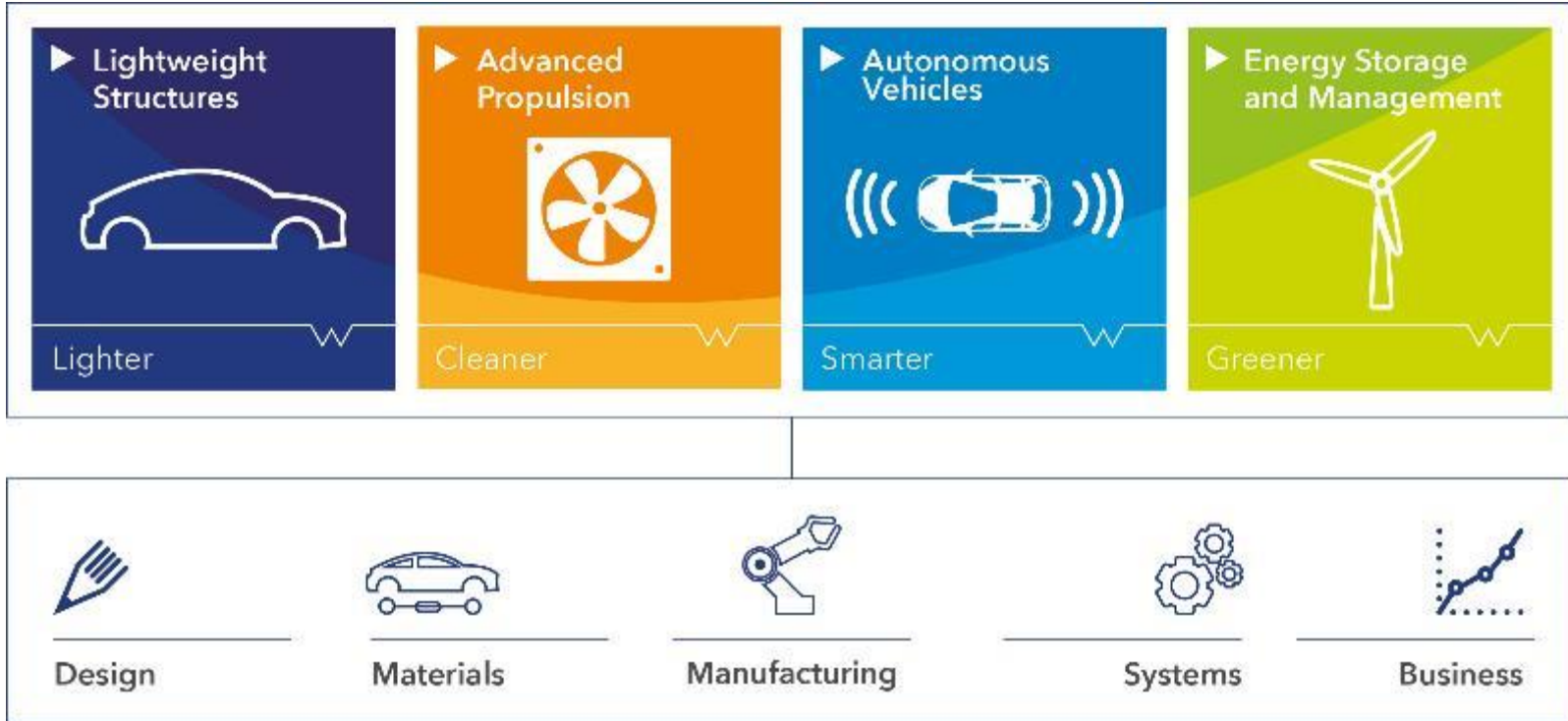
- ▶ **Drive growth in manufacturing**
 - ▶ Helping companies of all sizes take new technologies to the market
- ▶ **Accelerate and de-risk innovation**
- ▶ **Provide access to:**
 - ▶ World class equipment
 - ▶ The UK's best research knowledge
 - ▶ Unique mix of highly experienced engineers, scientists & technicians
 - ▶ A collaborative environment for innovation – cross-sector; cross-technology; and across the whole supply base
- ▶ **c£130mpa of core funding, 5 year plan**



CATAPULT
High Value Manufacturing

WMG
THE UNIVERSITY OF WARWICK

Our focus on Low Carbon Mobility



Our target sectors

Extensive experience in the automotive industry is being successfully transferred to other sectors



Underpinned by broad range of digital capabilities

Our SME support

Dynamic team, dedicated to supporting small and medium-sized enterprises in the West Midlands and beyond.

- ▶ Raising awareness of new tools, techniques, and industry best practice through demonstrations, workshops, and collaboration networks
- ▶ Collaborative, fixed-term, challenge-specific projects
- ▶ Collaborative R&D within a consortium

Impact 2012:2017

240

Created or saved jobs



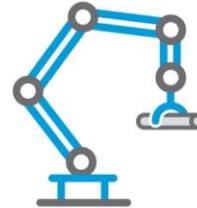
789

SME interventions



230

New products and processes



110

SME internships



15,000

SMEs in WMG networks



5

Start ups



For almost four decades, we have history working with industry on the challenges they identify

“Academic excellence with industrial relevance has always been at the heart of what we do...it’s what makes us unique.”

**Professor Lord Kumar
Bhattacharyya, *Chairman and
Founder (1941-2019)***



Thank you!

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Advanced Propulsion Systems

Our expertise

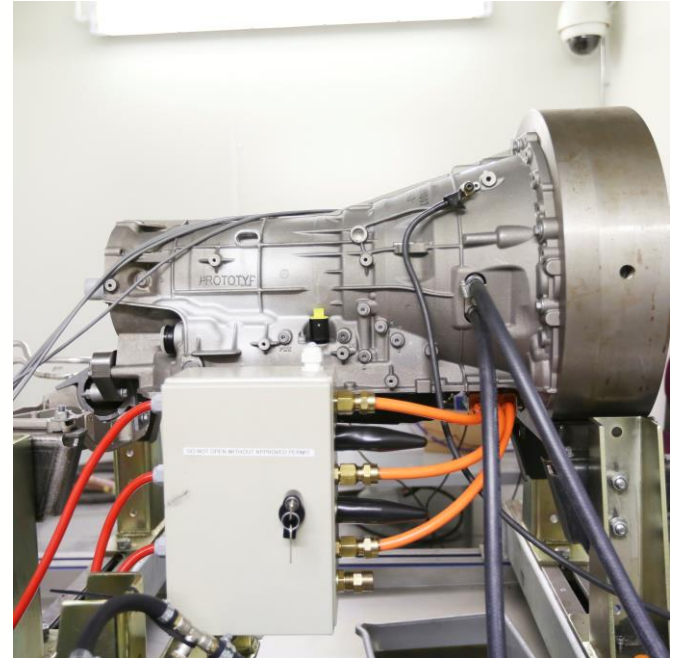
- ▶ Electric machines
- ▶ Power electronics



Vehicle Energy Facility

Research and test facility capable of testing whole hybrid vehicle powertrains, components and subsystems.

- ▶ Collaborative Birmingham Science City Energy Efficiency and Demand ERDF project
- ▶ Provides OEMs, suppliers and researchers accurate and repeatable assessment of existing and emerging technologies
- ▶ Objective assessment of driveability using hardware-in-loop (HiL) methodology



Energy Storage and Management

Unique to UK facilities cover from raw materials/powder right through to characterisation and recycling/second life of battery packs

Our expertise

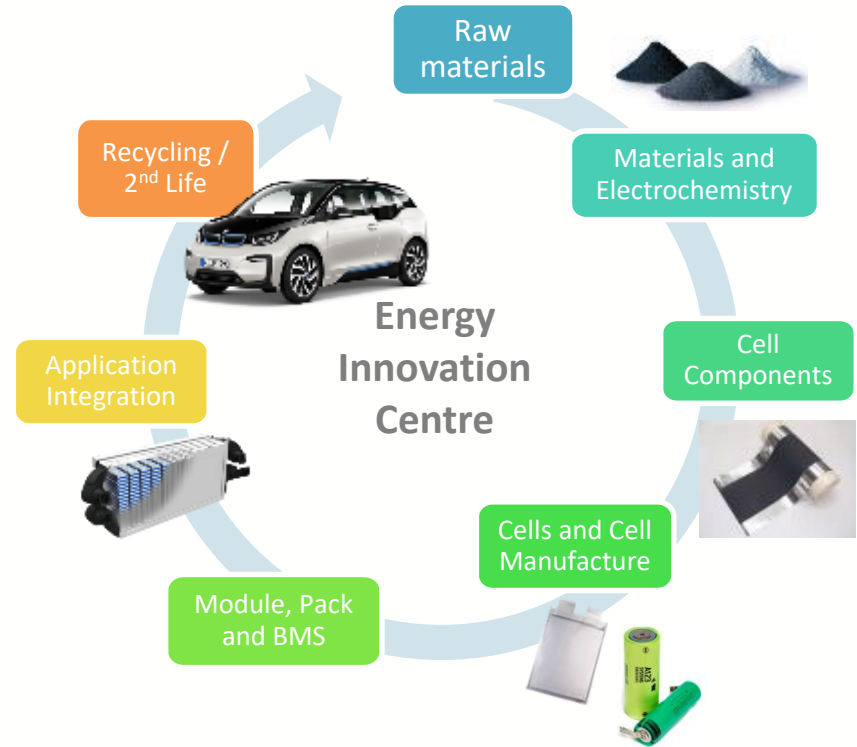
- ▶ Fundamental Chemistry
- ▶ Process Scale-Up
- ▶ Battery Characterisation
- ▶ Cell to Module to Pack
- ▶ System Performance
- ▶ Re-use and Recycling



Energy Innovation Centre

The leading UK facility for battery research and development

- ▶ Over £60m investment, unrivalled breadth and depth of capability for battery innovation and energy storage research
- ▶ WMG research covers all parts of the battery manufacturing R&D process
- ▶ A key focus is enabling scale-up from research at fundamental lab scale (g) through to industrial scale (kg) manufacturing
- ▶ Full systems development: BMS / HIL advanced modelling and simulation



Connected and Autonomous Vehicles

We take a multi-disciplinary approach to autonomous vehicles in order to understand the full research and practical implications.

Our expertise

- ▶ Human-machine interfaces and driver-in-the-loop
- ▶ Security, robustness, validation and verification of complex systems and software
- ▶ Direct and indirect sensing
- ▶ Data analysis
- ▶ Legal and ethical frameworks
- ▶ New business opportunities



Advanced Materials for Lightweight Structures

Our expertise:

- ▶ Advanced joining and machining techniques
- ▶ High fidelity multi-material / process characterisation
- ▶ Next-generation high-strength steels
- ▶ Injection-moulded polymers reinforced by nano materials
- ▶ Additive layer manufacturing solutions
- ▶ Complex whole systems modelling, metrology and simulation

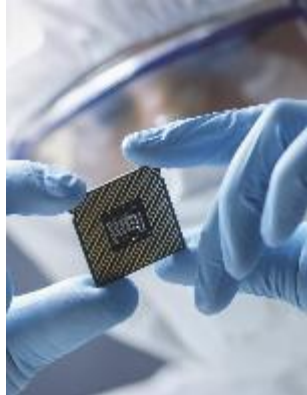


Automotive Composites Research Centre

- ▶ Dedicated facility within WMG's Materials Engineering Centre
- ▶ Developing carbon fibre reinforced composite manufacturing technologies for high volume automotive applications
- ▶ State-of-the-art, industrial scale equipment to carry out process development and demonstrations
 - ▶ 1700 tonne Engel V-Duo press facility:
 - ▶ Hennecke Streamline 65 resin injection
 - ▶ CNC 2 dimensional cutting table
 - ▶ Robotic pick and place cell for ply assembly
 - ▶ Automated fibre preforming facility



Digital industry at WMG



**Intelligent
Devices & Machines**



**Effective & Efficient
Manufacturing**



**Dynamic
Supply Chains**



**Connected
Products & Services**



**Innovative
Business Models**

Our competencies



Manufacturing
performance



Protecting
intellectual
property



Systems
security



Data
analytics



Modelling
and simulation



Design



Visualisation



Automation



Autonomous
systems



Process
workflow



Manufacturing
processes



System
integration



Product
verification

Sustainable results



Leadership



Education
and skills



Industrial
impact

Our industry partners



Organisations we work with

