Shaping the Future

Research, Skills and Innovation Driven Rejuvenation

Professor David Mullins
The University of Warwick

From green fields in 1965

To 51st ranked in World and 3rd fastest rising university
Established in 1980 by Lord Kumar Bhattacharyya
Founded on - ‘academic excellence with industrial relevance’

World class research, improving skills and delivering impact

R&D with companies

Education - school to boardroom

Enable products and services exploiting the latest technologies
WMG and China

• A 30 Year Relationship

• Over 1,500 senior managers on SAFEA programmes to UK e.g. AVIC, BJAST, Liaoning University, SINOPEC and Zhejiang Provincial Government

• Over 2,000 professionals from 650 companies on programmes in China

• Research projects in China e.g. Shougang Group
The Role of Collaboration and Impact

• Manufacturing, engineering, technology and business are applied subjects – collaboration and impact at their heart

• University role to put knowledge in form that can be used

• Create tailored mechanisms ‘pathways to impact’ to enable exploitation - can’t leave to chance

• Focus on how a ‘customer’ can most easily absorb

• Research, unique facilities, demonstrators, education and skills, knowledge transfer and partnerships
Advanced Propulsion Centre

• An RMB 9bn. commitment between UK Government and the automotive industry

• To Position the UK as a global centre of excellence in Advanced Propulsion

• Technology Roadmap to 2050

• WMG hosts Hub - University based technology spokes

• Industry led collaborative research programmes
Research Landscape

Technology Readiness Level

- Basic Technology Research
- Feasibility Study
- Technology Development
- Technology Demonstration
- System Development
- System Test

TRL 1  TRL 3  TRL 5  TRL 7  TRL 9

WMG Activity

- University Driven
  - 0-50% Industry Funding
  - 10+ years to Implementation

- Collaborative R&D Driven
  - 50% Industry Funding
  - 5-10 Years to Implementation

- Industry Driven
  - 50-100% Industry Funding
  - 0-5 Years to Implementation

WMG Staffing

- Academic Led
  - Research Fellow
  - EngD/PhD

- Project Manager Led
  - Project Engineer
  - Research Fellow
Unique R&D Facilities include

Energy Innovation Centre

Autonomous Systems Simulator
Automotive Research

• Premium Automotive R&D Programme (PARD)
• Four year strategic programme including 170 supplier companies
• 17 research projects with wide dissemination through 2 skills projects
• Numerous implementations in vehicles
  – 295 New Products and Processes
  – 5,439 Learning Opportunities
  – RMB 900M Additional R&D investment
  – RMB 1.3bn Value Added
  – RMB 300M Private Sector Leverage
Demonstrator Programmes

“Welcome to the sustainable racing car of the future”

- Engine Cover
  - Recycled Graphite Fibre, Mixed Carbon and Luda
- Wiring Loom
  - Polyester, sugarcane fibre, and biobased biodegradable materials, Tepex
- Barge Board
  - Anti-corrosive woven natural fibre composites, University of Limerick
- Engine
  - 3 litre race diesel, Boosted utilisation by Avondale Racing
- Brakes
  - Non-carbon discs with low embossed orange, stainless steel cockpit discs in development
- Side Pod Closing Panel
  - Polypropylene, Cross Kevlar and Aramid fibre, Andy Fox and Gray Valley
- Side Pod
  - Glass fibre with wax from Michelin, Andy Fox and Gray Valley
- Push Rods
  - Developed with a stainless steel tube, 3D printed by oxygen, SAGE PlusAir
- Seat
  - Fiat Form shell, eco-fibre seat, recycled polymer foam, Upholstered
- Steering Wheel
  - Recycled plastic handle and other natural materials, Vegetable
- Wing Mirrors
  - Pedals made from wood and Hansel master, Bayliff Engineering
- Damper Hatch
  - Recycled carbon fibre, Mixed Carbon and Luda
- Front Wing End Plate
  - Pedals made from wood and Hansel master, Bayliff Engineering
- Glass
  - Woven non-woven prepreg material, Luda and Hansel
- Tyres
  - Directional polyurethane, Arain
- Lubricants
  - Plant oil based, Castrol
- Brand Strategy
  - Team naming, identity and design, Luda
Skills Innovations

• WMG Academy for Young Engineers
  Business-focused, business-led innovative schools

• 640 students (14-18), studying Engineering
  with Digital Technology at Warwick

• Second WMG Academy for
  1,000 students opened in
  Solihull in September
JLR Academy

- Applied Engineering Programme - undergraduate degree apprentices – 10 companies, 3 sectors

- Technical Accreditation Scheme - 6,500 technology Masters modules to date

- Engineering Doctorates – in company PhD

www.wmg.warwick.ac.uk
Masters Level with Industry

- Pioneering innovative, modular industry skills programmes internationally - 35,000 awards to date

- Tailored programmes e.g.
  - AstraZeneca
  - BAE Systems,
  - China Aerospace
  - Network Rail,
  - Rolls-Royce,
  - UTC Aerospace

- Open programmes

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Hands On Education
Industry Programmes

• Relationships with over 1,000 global companies
• Supporting 1,800 smaller companies through small company programme
• Training banks on investment decisions in manufacturing e.g. Barclays, Lloyds, RBS and Santander
• Dedicated leadership programme for SME owner / managers and graduate internships into SMEs
Working with SMEs

- **20% - Late adopters**
  Awareness briefing, case studies, demonstrators

- **45% - Mainstream SMEs**
  Intensive company projects – prototyping, identifying markets, internships, product/service evaluation

- **25% - Leading edge SMEs**
  In-depth workshops, advanced demonstrations, horizon scanning, hands-on

- **10% - Feasibility to full R&D**
  Feasibility studies, collaborative projects assistance with funding / grant applications

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Mentoring SMEs

I2M

start-up Additive Layer Manufacturing business

Automotive Insulations

noise & thermal reduction systems
WMG: Further Information

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