

SETsquared Scale-Up University Expertise Connected to the Transport Sector

University of Bath

Part of the APC Spoke Community – Bath is the APC lead on TPS System Efficiency.

Bath's Faculty of Engineering and Design has an impressive reputation for excellence in research with leadership in automotive research.

IAAPS

The University of Bath has a strong track record of delivering automotive propulsion research with impact in collaboration with industry. For the last 40 years, our approach has been to align research conducted by some of the world's best engineers with specific industrial challenges. Working collaboratively with industry, our researchers have devised innovative solutions that address key challenges such as engine downsizing, more cost effective electric motors, better simulation tools, improved fuel consumption and lower vehicle emissions.

Our ability to support the automotive industry will accelerate with the creation of IAAPS which opens in 2021. Our new R&I institute has been designed for the future, enabling deep insights into the complex nature of transitioning to ultra-low and zero emission vehicles. This will include more electrification propulsion as well as unique layouts and configurations for use in fully autonomous vehicles. IAAPS will house experimental research platforms that enable precise systems level investigations to be conducted including whole vehicle assessments, specifically under real world driving conditions. Through its open access model, academics, automotive industry partners and SMEs will work on transformational research with access to world-class infrastructure and people.

We will continue to work with industry, inventors, researchers and academics to deliver rapid R&D that will accelerate the transition from low carbon to zero carbon vehicles. [Find out more](#)

University of Bristol

Bristol has a depth of research that has the potential to support a wide variety of automotive technology challenges.

School of Civil, Aerospace and Mechanical Engineering has research is organised into school-wide research groups which include: **Dynamics and Control**, encompassing structural and nonlinear dynamics, aerodynamics, robust control, and the BLADE experimental testing facilities; **Composite Materials (ACCIS)**, including leadership of the National Composites Centre; **Applied Mechanics**, which involves design, structural integrity evaluation and process engineering; **Systems Engineering**, including the collaborative Systems Centre and Robotics, including the collaborative Bristol Robotics Laboratory. Major strategic industrial partnerships exist with companies such as Rolls-Royce, AgustaWestland Helicopters, Airbus, GE Aviation, EdF Energy and Vestas.

Department of Electrical & Electronic Engineering

The Electrical Energy Management Group has over 40 researchers who undertake research into low carbon electrical systems that are enabled by advanced, compact and highly efficient electrical machines and power electronic conversion. The group is a core member of the [UK Centre for Power Electronics](#).

Department of Mechanical Engineering

Concentrating in four main research areas:

- Solid Mechanics
- Ultrasonics and non-destructive testing
- Dynamics and Control
- Design and Process Engineering

Department of Aerospace Engineering

The Department benefits from the concentration of aerospace industry in the south-west of England and a key feature of the Department's research is its close links with the industry - including Airbus, Rolls-Royce, AgustaWestland, BAE Systems and others further afield. Research links have led to the establishment of formal technology partnerships; the Rolls-Royce University Technology Centre in Composites, the AgustaWestland Helicopters University Technology Centre in Vibration, and a composites technology partnership with Vestas Wind Systems.

Dynamics and Control

The Dynamics and Control Group addresses research problems relating to modelling, simulation and control of civil, mechanical and aerospace engineering systems.

Fluid and Aerodynamics

The Fluid and Aerodynamics Research Group continues the University's long history of major contributions to computational fluid dynamics and experimental aerodynamics.

Cardiff University

Cardiff University is home to world class facilities and multidisciplinary research which focus on today's most challenging and exciting automotive issues:

[**Electric Vehicle Centre of Excellence \(EVCE\)**](#) offers a collective approach to understanding the impact of electrification on the future of mobility and industry, bringing together staff from Engineering, Business, Psychology, Geography and Transport to address barriers to the widespread introduction of electric vehicles.

EVCE is a core component of the [**Transport Futures Research Network**](#) which brings in expertise in key transformative technologies such as vehicle autonomous control, user and traveller behaviours, and the modelling of transport systems.

[**Centre for Automotive Industry Research \(CAIR\)**](#) focuses on the broader business, strategic, social, environmental and economic impacts of global automobility, and is recognised worldwide by academics, policy makers, industry and other stakeholders as a source of insight and objective analysis with a uniquely cross-disciplinary perspective.

[**Sustainable Transport**](#) research addresses a range of low-carbon transport modes (road, rail and air) alongside associated infrastructures, supporting existing and delivering future mobility needs to decarbonise the transport sector across the supply system, future charging infrastructure and associated vehicle technologies.

[**Centre for Integrated Renewable Energy Generation & Supply \(CIREGS\)**](#) has international expertise in both the generation and transmission of energy, including the development of the necessary infrastructure for charging of electric vehicles.

[**The High Value Manufacturing \(HVM\) Group**](#) conducts world class research across: Additive Layer Manufacturing, Autonomous Systems and Robotics, Design & Manufacturing, Intelligent and Knowledge-based Systems, Smart Systems, Systems Engineering,

Sustainable Manufacturing, the Renishaw Metrology Laboratory, and Micro/Nano manufacturing

Mechanical & Structural Performance Group specialises in development of advanced materials, structures and non-destructive monitoring techniques. Equipped with world leading facilities, the group have conducted world leading research with industrial collaborators from high-end motorsport, tier one automotive and aerospace companies.

Centre for Research in Energy, Waste & the Environment focuses on combustion of both traditional and alternative fuels, including automotive biofuels, synthetic gas-to-liquid blends and ammonia. Recent international collaborations include the development of emissions standards, measurement of the impact of GDI systems and the performance of liquid biofuels under elevated pressure and temperature conditions.

School of Psychology has considerable experience in user behaviours and perceptions of conventional and electric vehicles, undertaking research projects including trust in autonomous vehicles, low carbon transport, and relevant customer behaviours such as behaviour change (adoption of eco-driving), adoption of electric vehicles fleets.

Cardiff Catalysis Institute (CCI) is recognised as a global leader with a successful track record working with a range of businesses, including leading automotive companies. Works across industry, academia and government to provide a focus for cyber security analytics in the UK. The centre is the first of its kind in Europe and aims to strategically position the UK as a leader in cyber security analytics.

Data Innovation Research Institute (DII) conducts fundamental research into the aspects of managing, storing, analysing and interpreting massive volumes of textual and numerical information.

National Software Academy (NSA) is a centre of excellence for software engineering producing work-ready graduates with industrial experience. NSA applies cloud, mobile and web technologies to real world projects.

Please note: This list is not exhaustive

University of Exeter

Exeter Advanced Technologies (X-AT) boasts a multi-talented team dedicated to commercially oriented research in the core themes of advanced manufacturing and materials development that has a strong strategic fit with a wide variety of automotive technology challenges.

Established in 1997 as the Polymer Centre of the South West, X-AT provides a dedicated link between academia and industry. With expertise that includes:

- Additive Manufacturing - High Temperature Affordable Polymer Composites for Aerospace and automotive applications
- Novel high performance polymeric composite materials for additive manufacturing of multi-functional components
- Light weight and cost effective composite structural core from recycle
- Brake-Thru - A lightweight automotive brake rotor for the emerging LCV market
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University of Southampton

With more than 240 different research groups at the University of Southampton has a depth of research that has the potential to support a wide variety of automotive technology challenges. Highlights include:

Engineering and Physical Sciences

Acoustics, Aerodynamics and Flight Mechanics, Computational Engineering and Design, Fluid Dynamics, Materials and Surface Engineering, Mechatronics, Signal Processing and Control

Structures and Solid Mechanics, Transportation

Electronics and Computer Science

Academic Centre of Excellence in Cyber Security Research, Electronics and Electrical Engineering Research Group (EEE), Energy Harvesting Network, The IT Innovation Centre, Nanoelectronics and Nanotechnology Research Group, Pervasive Systems Centre, Southampton Nanofabrication Centre, Tony Davies High Voltage Laboratory, Vision, Learning and Control Research Group (VLC), Web and Internet Science Research Group (WAIS), Web Science Institute

Advanced Composite Materials Facility, Characterisation and Analytics, Computational Systems, Electrochemistry, Functional Inorganic, Materials and Supramolecular Chemistry, Magnetic Resonance, Organic Chemistry: Synthesis, Catalysis and Flow Education

Photonics and Nanoelectronics (incorporating the Optoelectronics Research Centre)

The Optoelectronics Research Centre (ORC) is one of the world's leading institutes for photonics research, which has been fundamental to the development of critical global technologies, including the optical fibres and amplifiers that power the Internet, and the fibre lasers that are used in applications ranging from medicine to defence and from renewable energy to manufacturing.

Chemistry

Advanced Composite Materials Facility, Characterisation and Analytics, Computational Systems, Electrochemistry, Functional Inorganic, Materials and Supramolecular Chemistry, Magnetic Resonance

Institute of Sound and Vibration Research - The ISVR is renowned for its contributions to reducing noise and vibration in engineering applications.

University of Surrey

The University of Surrey has a deep research base that can support a wide variety of automotive technology challenges. The University has a dedicated Centre For Automotive Engineering (CAE) that provides technical research for:

- Vehicle analysis for electric and hybrid powertrains
- Vehicle dynamics simulation
- Tyre dynamics simulation
- Design and simulation of vehicle subsystems
- Design of experimental test benches
- Lightweight chassis design and vehicle aerodynamics.
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Surrey has strong relationships with automotive OEMs and their supply chains. With a range of centre that support automotive technology challenges:

- Centre for Environment and Sustainability
- Department of Civil and Environmental Engineering
- Department of Chemical and Process Engineering
- Department of Mechanical Engineering Sciences
- Department of Computer Science
- Department of Chemistry
- Advanced Technology Institute
- Institute for Communication Systems