

Welding Engineering and Laser Processing Centre

The Welding Engineering and Laser Processing Centre, provides fundamental, strategic and applied research as well as related postgraduate studies in welding science and engineering.

Established in 1961, our Centre is the only specialist welding research centre in UK academia dedicated to welding and welding automation with a portfolio of research programmes supported by an international group of clients. Facilities at the Welding Engineering and Laser Processing Centre include a fully equipped welding laboratory with state-of-the-art equipment for arc welding process development, welding metallurgy and welding process automation.



Head of the Centre:
Professor Stewart Williams

"Here at the Welding and Laser Processing Centre we are able to provide a wide range of solutions to your joining problems. These solutions range from state of the art arc welding, through pulsed and high power laser processes, to friction based joining.

They are complemented by FE modelling, residual stress engineering and the latest high deposition rate additive manufacture technology".

Enhanced Composites and Structures Centre

Based within Cranfield's Materials Department, the Enhanced Composites and Structures Centre works closely with industry, non-government organisations and government agencies. Our clients include Airbus, BAE Systems, BASF, Bombardier, Boeing, Ford, GKN, Hexcel, Lola and Scott Bader. An extensive range of facilities underpins the work of the Centre including our state-of-the-art laboratory where we undertake composites' manufacturing related research. The Centre supports Masters' level teaching, short courses, consultancy and research for our clients. Working alongside our academic and technical support staff, we offer an excellent environment for research students to participate in exciting projects associated with polymers and polymer composites.



Head of the Centre:
Professor Peter Foote

"The Composites Centre at Cranfield specialises particularly in advanced process monitoring in composites manufacture and in shape forming technologies in composites and power-filled systems. Areas of special expertise include,

Thermosetting resins, Material behaviour, Dielectric cure and fibre optic monitoring, Micro-moulding, Powder moulding for ceramic and metallic components".

Pan University Centres hosted by the department:

Centre for Competitive Creative Design

The Centre for Competitive Creative Design (C4D) at Cranfield University aims to embed state-of-the-art design-led innovation practice, developed through research and industry collaboration, within business and education to improve commercial performance and develop future innovation leaders. Through its postgraduate programme, C4D is named one of the world's best designed schools by BusinessWeek.

Director of C4D: Professor Simon Bolton

Integrated Vehicle Health Management (IVHM) Centre

Cranfield University and The Boeing Company launched the Integrated Vehicle Health Management (IVHM) Centre in 2008. The increasingly important area of IVHM technology informs existing concepts of vehicle maintenance, repair and overhaul by offering a total health check for high-tech, high-value vehicles such as aircraft, ships, high-speed trains and high performance cars. Additionally it is expected that there will be significant opportunity for application of this technology in the energy and health sectors.

The Centre has dedicated areas for research and development of IVHM, and capability for online communication between the Centre partners. Direct high-speed communication links the testing and hardware laboratories at Cranfield with those of partner organisations and industry test partners across the globe.

Director of IVHM: Professor Ian Jennions



Contact Details

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Manufacturing and Materials Department

World class and niche manufacturing research, education, training and consultancy is the main focus of the department. We innovate and offer complete solutions to the high value manufacturers, government organisations and their supply chain to improve their competitiveness and long-term sustainability. Manufacturing at Cranfield University is unique in its multi-disciplinary approach that brings together expertise in the areas of design, technology and management. We link fundamental materials research with manufacturing to develop novel technologies and improve the science base of the manufacturing research. Our world-class research facilities are near industry scale and are available for exploring novel technologies and processes.

The Manufacturing and Materials Department hosts four EPSRC Centres for Innovative Manufacturing (leading two of them), the Integrated Knowledge Centre on Ultra-Precision Structured Surfaces and two pan-university Centres of Excellence - the Integrated Vehicle Health Management (IVHM) Centre and the Centre for Competitive Creative Design (C4D). The department also leads our Doctoral Training Centre in Manufacturing and Materials and has the following internationally recognised Institutes and Centres to lead our research excellence, postgraduate teaching and consultancy.



Lead by Professor Rajkumar Roy, the department is proud of its collaboration and long-term partnership with manufacturing industry across multiple sectors: from aerospace, automotive, defence to process manufacturing. We have developed a unique comprehensive approach to industry collaboration.

Our Professional Masters Programmes are designed mostly for employees of our industrial partners and are well recognised within the companies for their leadership development. Our postgraduate courses have also been designed and developed in collaboration with industry to ensure they provide the skills and knowledge organisations require. Our excellence in manufacturing and materials education and training is recognised by a number of professional institutions within the manufacturing sector including

the Institution of Mechanical Engineers (IMechE), the Institution of Engineering & Technology (IET), Institute of Materials (IoM) and the Royal Aeronautical Society (RAeS). Our Fellowship in Operations Leadership brings a unique approach to industrial problem solving through leadership development. Our short courses are world-renowned for its unique knowledge and relevance. The courses are part of our comprehensive service offer to industry.

Surface Engineering and Nanotechnology Institute

The Surface Engineering & Nanotechnology Institute, SENTi, works closely with industry, non-government organisations and government agencies operating across a range of sectors including aero, energy, environment and automotive.

SENTi fosters and accelerates development of emerging high value products through bespoke process research and internationally leading research programmes. We have extensive facilities which include the National High Temperature Surface Engineering Facility and Cranfield Nano.

We provide masters' level teaching, CPD short courses, consultancy and research for our clients, and offer an excellent environment for researchers and students to work in areas associated with surface science, engineering and nanotechnology.



Head of the Institute:
Professor John Nicholls

"The Surface Engineering and Nanotechnology Institute conducts world leading research into smart coating systems and advanced, functional surface engineering".

Precision Engineering Institute

Having a strong emphasis on "practicing what we preach" we differentiate our activity by engagement in "large scale" science programmes where we act as world class engineering providers for complex machine systems and components. Such highly demanding projects provide a mechanism and stimulus for unique research, training and learning opportunities.

Our significant industrial supported research includes significant contracts with aerospace, space, medical and optoelectronics orientated companies.



Head of the Institute:
Professor Paul Shore

"Precision Engineering at Cranfield is uniquely able to design, develop and build next generation machine tools. Our facilities are truly world class they are not simply bought they are designed and developed at Cranfield. Using them we supply systems to numerous blue chips as well as NASA,

ESO and NPL programmes. Our metrology facilities are also unique and enjoy sponsorship from the Hexagon metrology group. Our short course training in machine tools is internationally recognised and indeed provided across the globe by our own machine tool specialists who are clearly identified as practitioners".

Through-life Engineering Services Institute

The Institute aims to shape the future of 'system sustainment' for business and environmental benefit. The cost and environmental impact of keeping complex, long-life equipment, infrastructure and capital systems operating efficiently is significant. The high value products and infrastructure are typically technology intensive, expensive and reliability critical requiring engineering services, such as maintenance support throughout the life cycle (i.e. continuous maintenance). High value manufacturers are looking for additional revenue through performance-based service contracts and by taking responsibilities for their product performance through-life. The ability of owners and service providers to deploy best-in-class maintenance capability will be increasingly critical to meeting shareholder and public demands in tomorrow's world. This requires a new and integrated focus on research, industrial capability development, training and education in maintenance within the high value manufacturing companies and their supply chains.



Head of the Institute:
Professor Andrew Starr

"The Institute performs world-class research, technology development, education and training to improve the maintenance, repair and overhaul and inform the design and manufacturing processes.

The research excellence is supported by significant research facilities within three Centres of Excellence of the Institute".

Product and Service Innovation Centre

The Product and Service Innovation Centre, builds on Cranfield's international reputation in the areas of decision engineering and competitive creative design. The Centre conducts multidisciplinary research in decision engineering providing the facts, techniques and infrastructure required for product and service engineering. The main areas of research in decision engineering focus on cost engineering, manufacturing informatics, engineering optimisation and design information management. The Centre hosts the Centre for Competitive Creative Design (C4D), that aims to embed state-of-the-art design-led innovation practice within business and education to improve commercial performance and develop future innovation leaders. C4D is a joint initiative between Cranfield University and the University of the Arts London. Through its postgraduate programme, C4D is named one of the world's best design schools by BusinessWeek.



Research is sponsored by a number of leading manufacturing organisations such as BAE Systems, Rolls-Royce, EADS, Airbus, Proctor and Gamble, Edwards, Ford Motor Company, Nissan Technology Centre Europe, Toyota, Honda, Fiat Research Centre, Lotus Cars, Bentley, Arup and BT.



Head of the Centre:
Professor Ashutosh Tiwari

"The Product and Service Innovation Centre builds on Cranfield's international reputation in the areas of cost engineering, manufacturing informatics, product development and competitive creative design. The Centre hosts the Centre for Competitive Creative Design (C4D) that aims to embed state-of-the-art design-led innovation practice within business and education."

Sustainable Manufacturing Systems Centre

Manufacturing Systems Centre is one of the UK's strongest research and teaching groups in this field. The Centre supports in the region of 100 postgraduate students. Our students are registered on a range of Masters courses, including the prestigious Operations Excellence MSc which was established in partnership with Rolls-Royce and in collaboration with the University of Cambridge. We also have a highly active community of students undertaking research programmes in the Centre. Manufacturing at Cranfield is concerned with developing sustainable solutions to real-world industry problems. We do this by adopting a systems approach to identifying and tackling root causes in an evidence based manner.

The Manufacturing Systems Centre has a constant track record of EPSRC support. It is internationally renowned for its publication record. The Centre is the principal contributor to the Cranfield Innovative Manufacturing Research Centre, the 2nd largest in the UK. The Centre benefits from extensive industrial support which underpins student project and research work.



Head of the Centre:
Professor Mark Jolly

"Cranfield's Sustainable Manufacturing Systems Centre's mission is to improve the practice of competitive sustainable manufacture to support improved business performance".