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Highlights from 2010

Front cover image: The Water Engineering and Development Centre (WEDC) at Loughborough University has been involved with emergency water supply and sanitation for low- and middle-income countries for almost 40 years. Read more about their work in this publication.
Welcome to Making a Difference, our review of 2010, which highlights a selection of the University’s work that is having a real impact on society.

Universities have the potential to influence the most pressing issues facing the world today. Through world-leading research and enterprise and first-rate teaching, they help to drive forward our understanding of the world and the many issues we all face.

At Loughborough, the impact of our activity – on our students’ development, our local community, and on national and even international matters – is at the heart of all we do. We have a proud reputation for the relevance of our work, which has led to changes in industry practice, brought about improvements to the quality of people’s lives, and is at the forefront of the sustainability agenda.

Today, universities are operating in a changing environment. Like many other sectors in the UK, we are faced with substantial cuts in our funding. Loughborough is operating from a strong foundation, however, and is well placed to respond to these changes. Our strengths are those that matter to students, our partners and industry, and they give us confidence as we enter the new funding regime.

In this printed publication we are able to feature only a few of our activities and achievements. I hope you will visit our website, however, to see the true breadth of Loughborough’s impact and to see how we really are ‘Making a Difference’.

Professor Shirley Pearce
Vice Chancellor and President

www.lboro.ac.uk/makingadifference
Influencing business and industry

Innovation for sustainability

Nottinghamshire-based Hardstaff Haulage has worked in partnership with Loughborough to bring a dual fuel injection system into the heavy goods vehicle (HGV) marketplace. Through this new system, 70 percent of diesel fuel used by a conventional HGV engine is substituted with natural gas.

The Hardstaff Group design, develop and supply low carbon dual fuel vehicle technologies that significantly reduce the carbon footprint in the road transport sector. Their Oil-Ignition Gas-Injection (OIGI®) system is a patented combustion technology that simultaneously burns two fuels – fossil or renewable natural gas (Biomethane) and diesel. Diesel is required as the ignition source and gas injection commences when speed increases from idle.

Hardstaff worked closely with the University’s School of Mechanical and Manufacturing Engineering on modelling gas flow and the simulation of dual fuel operation.

Further collaboration with the University, partly funded by emda (East Midlands Development Agency), has led to a state-of-the-art engine test cell being built at the Hardstaff headquarters. This will enable tests on multiple fuel and alternative fuel engines of the future and will validate engine performance, fuel economy and tail pipe emissions.

The pioneering work by Hardstaff Haulage and the University on the dual fuel injection system for HGVs was recognised with a prestigious Lord Stafford Award for Innovation for Sustainability. The awards celebrate innovative collaborations between business and universities.

impacts

The technology has reduced CO₂ emissions by up to 20% and brought significant reductions in all other tail-pipe pollutants, compared to a conventional HGV engine.

Although the Hardstaff OIGI® system is currently being fitted to heavy goods vehicles, the technology is designed for a much wider range of application, with current sales through appointed distributors as far afield as Brazil.

As well as retrofitting the system, Hardstaff Haulage has been appointed as a specialist dealer by Mercedes Benz, which is supplying new vehicles to be fitted with the OIGI®.
Fuelling a revolution

Two vehicles, powered by fuel cell technology from Loughborough spin-out company Intelligent Energy, were revealed in 2010.

In February the company launched its zero-emissions Suzuki Burgman Fuel Cell Scooter, developed in partnership with the Suzuki Motor Corporation. Then in London, just four months later, a full performance, zero-emissions Fuel Cell Hybrid London taxi was unveiled, which was produced in partnership with Lotus Engineering, LTI Vehicles and TRW Conekt, with funding from the Technology Strategy Board.

The Suzuki Burgman Fuel Cell Scooter is equipped with the latest version of Intelligent Energy’s unique and proprietary air-cooled, clean fuel cell power systems and is fuelled from a cylinder of hydrogen. Its development takes steps towards offering cleaner, more efficient motorcycles in a practical and accessible form with the potential to significantly reduce emissions around the world.

The new Fuel Cell Black Cab looks and drives like an iconic London taxi, but is powered by an Intelligent Energy hydrogen fuel cell system hybridised with lithium polymer batteries, which allows the vehicle to operate for a full day without the need for refuelling.

The cab underwent a period of road and track testing and was awarded Road Legal status early in 2011 by the UK Vehicle Certification Authority.

Impact

Capable of achieving a top speed of over 80 mph, the Fuel Cell Black Cab has a range of more than 250 miles on a full tank of hydrogen, refuels in about five minutes and produces no emissions other than water vapour.

A fleet of at least 20 of the cabs will be on the streets of London in time for the 2012 Olympic and Paralympic Games. The Mayor of London, Boris Johnson, has committed to working with manufacturers to make all taxis operating in London zero tail-pipe emissions by 2020.

The Scooter has now obtained Whole Vehicle Type Approval (WVTA), which qualifies its design as safe to use on public roads without having to be inspected and tested individually, and brings zero emission motorcycles a step closer to becoming commercially available.

The Scooter’s design has also now met with specified EU performance standards, meaning that the vehicle and its components are approved for production and sale within Europe.
Impact

With the help of the University’s Enterprise Office, the project has now been rolled out commercially through assistive technology specialist iansyst Ltd and public sector service provider Tribal.

The product is now helping adults all over the UK to identify why they are struggling with numeracy and is enabling them to seek further assistance.

Benefiting society

Helping to diagnose dyscalculia

Developed at Loughborough, the UK’s first online screener to identify adults displaying signs of dyscalculia was made commercially available in 2010.

Only recognised in recent years, dyscalculia is a hidden condition, with those affected struggling with poor numeracy skills. An estimated three to six percent of adults could have dyscalculia, but many remain unidentified as screening was previously only available in children. Dyscalculics face challenges each day with tasks such as household budgeting, checking change or helping children with homework.

Clare Trott from the University’s Mathematics Education Centre has been working on the new tool, known as DysCalculiUM, in conjunction with her colleague Nigel Beacham. Through a website and manual, DysCalculiUM creates a profile of each user using 11 categories – six focus on the user’s understanding of figures, while the remaining five categories cover their application of numbers, such as telling the time.

DysCalculiUM offers a quick and effective method of profiling numeracy difficulties, allowing a suitable support regime or formal assessment to then be put in place.
Improving people’s health and wellbeing

The future of sinus surgery

A team led by Dr Russell Harris from the School of Mechanical and Manufacturing Engineering is working with surgeons from the Nottingham University Hospitals NHS Trust to help drive forward new techniques for sinus surgery training.

The researchers have produced realistic ‘operable’ physical models of the sinus complex that are helping to lessen the risk of accidental damage during endoscopic surgery and ultimately increase patient safety.

Precision surgery is essential in sinus operations due to the vulnerability of the relevant anatomy and the locality, and the severe potential consequences of interfering with eye muscles, the optical nerve, the brain and the internal carotid artery.

Until now junior doctors and other clinicians have primarily been trained using cadavers, with simulation techniques limited and costly. However, the Loughborough researchers have been investigating design and production techniques which will enable them to rapidly and economically create realistic physical surgery models of the sinus.

Using data from MRI and CT scans, the researchers have produced bespoke simulation models using additive manufacturing techniques, which allow parts to be ‘printed’ in 3D, by building them layer by layer. The resultant models replicate the appearance and physicality of the human sinus in surgery.

The team is also developing software that clinicians can use to simulate specific disorders, by reproducing tumours or inflammation.

Impact

The project is impacting on the teaching methods used in sinus surgery, having been incorporated in national and international surgical training courses. The work has been demonstrated at several NHS and international events. The project team has recently secured additional funding to pursue further development and exploitation.
Meeting employers’ expectations

Even in today's challenging economic environment, a very high proportion of Loughborough's graduates find jobs in their chosen career area.

Loughborough’s outstanding record in graduate employment is boosted by its links with business. Many of the University’s degrees are designed and sponsored by industry, meaning its students develop the knowledge, skills and qualities companies require and Loughborough’s graduates are consistently targeted by the UK’s top recruiters.

The high calibre of its students is rooted in the quality of the University’s courses, which are consistently rated among the very best in the UK.

This excellence was evidenced again this year, when Loughborough's secondary initial teacher training (ITT) provision was graded as ‘outstanding’ – the highest possible grade achievable from the Office for Standards in Education (Ofsted) – for the third consecutive time since 2005.

Loughborough was awarded a Grade 1 for both ‘overall effectiveness’ and ‘capacity to improve’. Grade 1 represents ‘outstanding provision’ and means that Loughborough maintains its Category A status as an outstanding provider of ITT.

Loughborough University trains secondary school teachers in Design and Technology, Physical Education and Science through a one year full-time Postgraduate Certificate in Education (PGCE) and an optional follow-on MSc in Education.

Such high educational quality has ensured a continued strong and successful employment profile for the PGCE course.

Impact

In 2010, 85.2% of Loughborough’s first degree graduates gained employment and/or undertook further study. Of those working full-time, 82% were in graduate-level employment.

Over 96% of graduates from the PGCE went into teaching or coaching.
Helping athletes compete with the world’s best

Over eighty past and present students and campus-based athletes helped to underline Loughborough’s status as the country’s premier university for sport at the 2010 Commonwealth Games in Delhi.

Over the course of the event, they picked up 44 medals – six gold, 19 silver and 19 bronze – across a range of five sports.

Swimmers from the Loughborough programme brought home 20 medals in total. Fran Halsall returned with a haul of five, including gold in the 50m Butterfly, and Liam Tancock claimed four, including two golds, in the 50m and 100m backstroke.

In athletics Loughborough picked up 15 medals, with sprinter Leon Baptiste securing double gold, in the 200m and the 4x100m relay.

Loughborough’s other medals came in badminton, hockey and netball.

Confirmation that Loughborough offers the best possible preparation environment for many elite sports came with its selection by the British Olympic Association (BOA) as The Official Preparation Camp Headquarters for Team GB prior to the London 2012 Olympic Games.

Under the agreement many of Team GB’s sports disciplines are expected to use Loughborough’s facilities for their pre-Games training and all members of Team GB are scheduled to pass through the University for the official ‘fitting out’ process.

As well as the BOA, Loughborough University will also host the Japanese Olympic team in the weeks prior to the 2012 Olympic Games. The co-location of two major teams will create a unique environment, with Loughborough likely to have the highest concentration of Olympic activity outside the capital.
Making houses SHINE

Experts from Loughborough's Centre for Renewable Energy Systems Technology (CREST) have helped Charnwood Borough Council and industrial partners begin rolling out a pioneering sustainable social housing project in Leicestershire.

Nine sustainable homes are being built and staff and students at CREST are working closely with the Council, Mabers architects and the main contractor, Morgan Sindall, to ensure that the new homes deliver real low carbon performance in practice.

The project is designed to support the local authority in attaining high energy efficiency standards for new homes, making them compliant with Code 4 of the Government’s ‘Code for Sustainable Homes’ standard.

By integrating analysis of the building fabric performance, renewable energy equipment and occupancy data, the researchers are able to see how residents interact with their home and its energy-efficient services. Consequently they can examine the effectiveness of renewable energy technologies in delivering carbon reductions and whether these technologies meet the comfort needs of the homes’ occupants.

The initiative is part of an East Midlands Development Agency-funded project called SHINE (Sustainable Homes Innovation Network of Excellence). Loughborough has led the project since 2008, in conjunction with partners in the construction industry, local government and academia, namely Nottingham and Northampton universities, to deliver high quality, sustainable homes across the East Midlands.

The project picked up the award for Best SME University Collaboration at the 2010 Sustainable Construction Innovation awards, and has led to a further £0.5million funding award to Loughborough to deliver SHINE-ZC, a zero carbon community housing development in Derby in conjunction with industrial co-funding partner EMRE Ltd.

impact
The approach has been applied to a number of new affordable homes across Charnwood. CO₂ levels, humidity, temperature and energy equipment performance will be measured over a period of time to give an holistic picture of how these sustainable properties actually perform in everyday life. The project has also resulted in £1million leveraged funding to deliver sustainable brownfield regeneration in Derby.
Helping Haiti to get back on its feet

Bob Reed from the University’s Water, Engineering and Development Centre (WEDC) travelled to the Caribbean island of Haiti in 2010 to support the major relief effort taking place across the country in the aftermath of the devastating earthquake that hit at the start of the year.

When Bob arrived in Haiti, conditions in the thousands of settlements, which had been set up to house survivors, were very basic and sanitation had quickly become a major concern. Sixty percent of settlements had no sanitation at all and in those that did, each toilet was shared by up to 1,000 survivors.

Supported by colleagues back at WEDC, he worked with UNICEF and the Haiti Government to assist with the provision of emergency sanitation systems in Port au Prince. Bob advised non-government organisations on their work with water and sanitation and ensured that the work carried out met the requirements of the Humanitarian Charter, which aims to ‘achieve defined levels of service for people affected by calamity or armed conflict and to promote the observance of fundamental humanitarian principles.’

Impact

WEDC, which is part of the University’s Department of Civil and Building Engineering, has been involved with emergency water supply and sanitation for almost 40 years and is internationally renowned for its work. Many of the senior staff in the support agencies working in Haiti are former WEDC students who trained at Loughborough.
Loughborough was ranked in the top twenty in the UK in every national newspaper university league table.

For the fifth year in succession, Loughborough students voted their university experience to be the very best in the country, in the latest student experience poll published in the Times Higher Education magazine.

Work began on the University’s new Design Centre, the first project in a wider master plan for the East Park area of the campus. The building will provide state-of-the-art facilities for the various design disciplines at the University. The building is expected to be occupied by autumn 2011.

BAA Chairman Sir Nigel Rudd was appointed as the new Chancellor of the University.

Loughborough students again voted the University one of the best in the UK for overall satisfaction in the latest National Student Survey.

SportPark, a bespoke central hub for some of the country’s leading sports bodies, welcomed its first resident partners. The £15 million landmark building allows diverse organisations to share best practice and innovation, helping to improve the integration of the UK’s sporting structure.

Loughborough Students’ Rag raised a record-breaking £1,042,125 in 2009-10 for local and national charities.

The University purchased The Link at Loughborough hotel, adding to its facilities for visitors and conference guests.

Loughborough was selected to host the Engineering and Physical Sciences Research Council Centre for Innovative Manufacturing in Regenerative Medicine, one of three pilot Centres announced in 2010.

The University won three major awards in recognition of its activities to cut carbon emissions and manage its carbon footprint.

Loughborough was awarded funding to host a shared information security service for schools, colleges and universities across the UK until at least July 2013.

Honorary degrees were awarded to fifteen distinguished men and women, including Sir Christopher Frayling (former Chair of the Arts Council, England), Sir Robin Gill (Founder Chair of The Royal Anniversary Trust), Sir David Jones (former Chair of Next plc) and Luol Deng (basketball player with the Chicago Bulls).

Loughborough’s sports teams claimed their 30th consecutive British Universities and Colleges (BUCS) Championship overall points title.

www.lboro.ac.uk/news

Highlights from 2010
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