

**battling the sleepy killer on
Britain's roads**

Sleep Research Centre puts driver
tiredness on the national agenda

nurturing the seeds of innovation

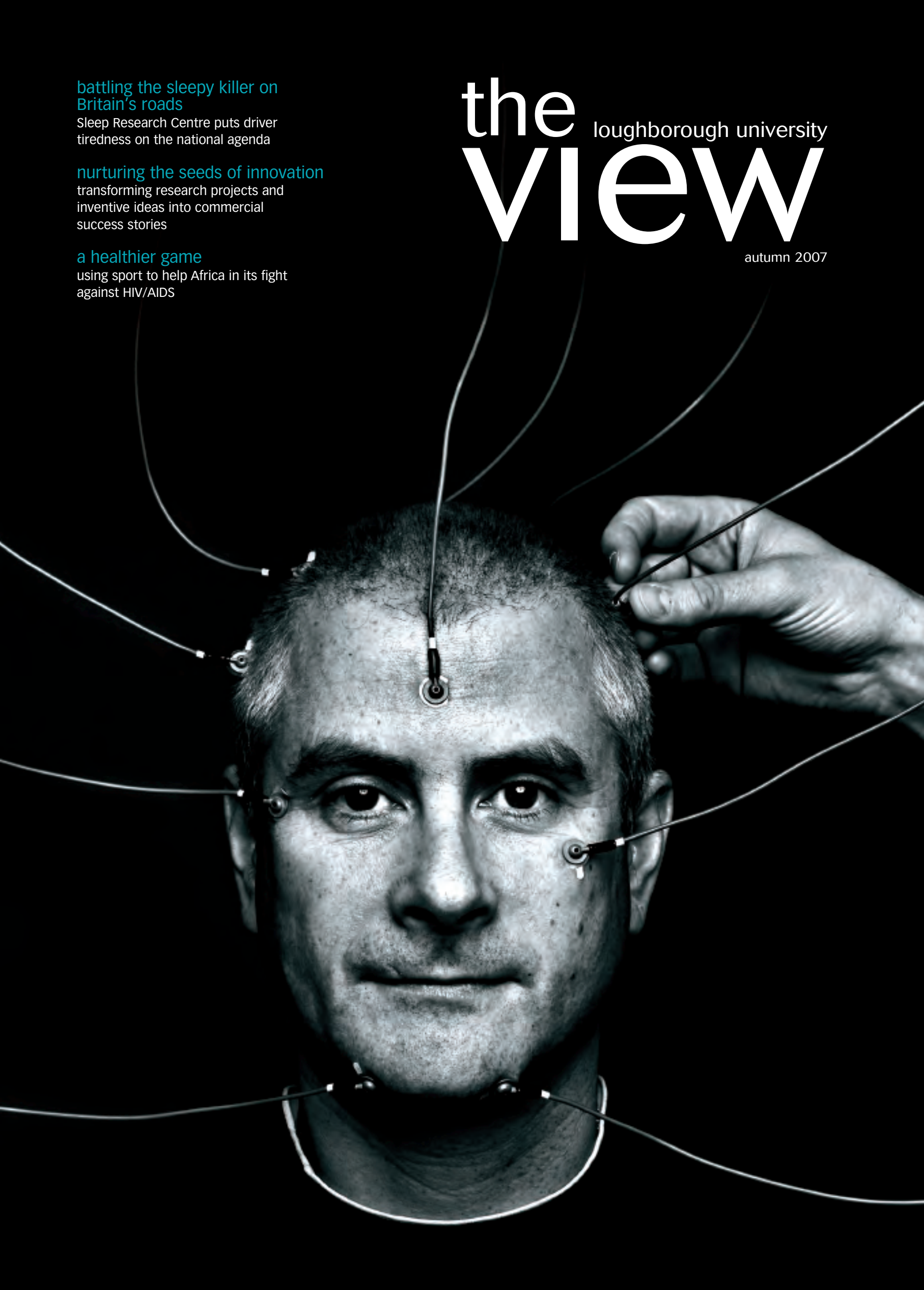
transforming research projects and
inventive ideas into commercial
success stories

a healthier game

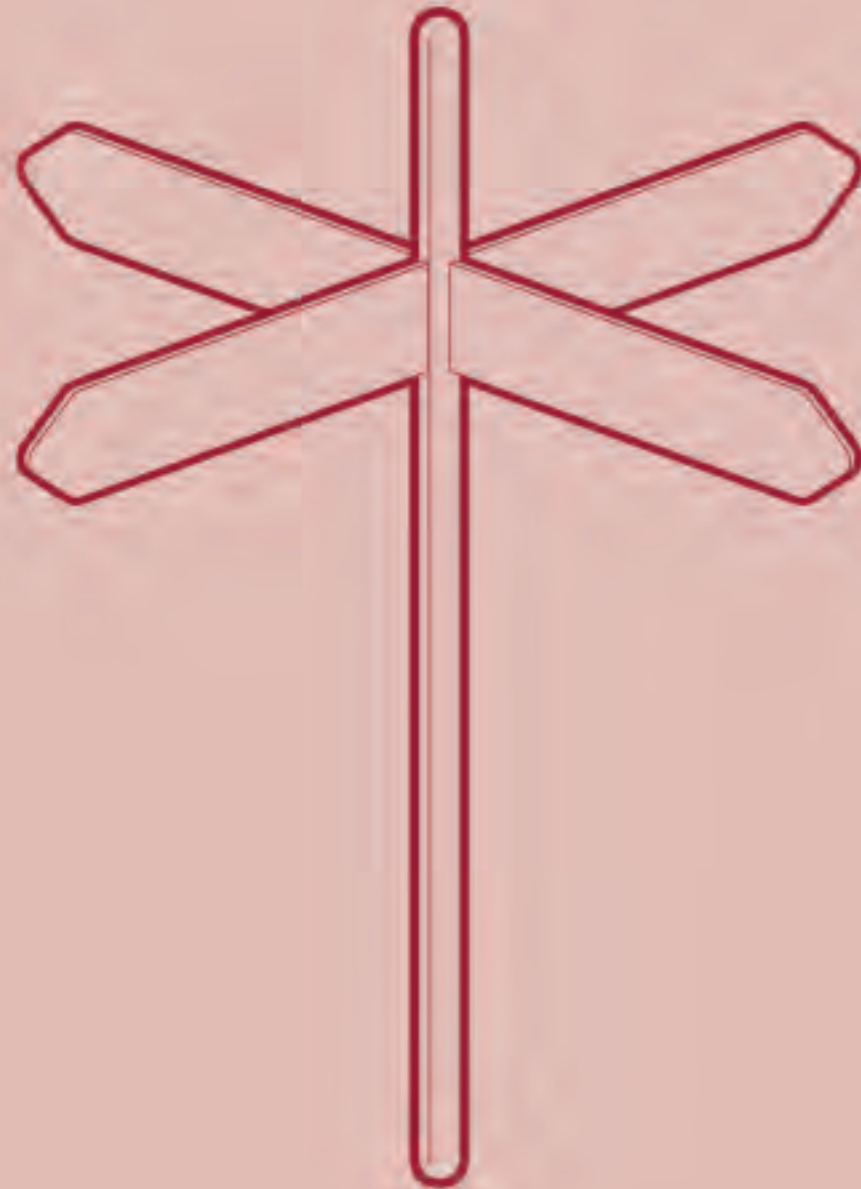
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autumn 2007



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Over the years we have built up strong relationships with government, research councils, international bodies, commerce and industry, working in partnership to produce research that matters. Our campus is a thriving academic community where students form part of a vibrant centre for the production and consumption of new and critical ideas. The very best researchers and scholars of today work hand in hand with those who will be the leaders for tomorrow.

In this issue of 'The View', we hope you get just a flavour of the important and original work that takes place at Loughborough, and the many talented staff and students behind the headlines.

The cover story focuses on our internationally acclaimed Loughborough Sleep Research Centre. The Centre has played a major role in reducing sleep-related road traffic accidents in the UK. Its campaign to raise the profile of this issue has resulted in significant changes in attitudes and policy towards driving whilst tired.

The plight of young carers, who provide round the clock support for their families, is also highlighted in the magazine. The inspiring work of the University's Young Carers Research Group, which formed part of the range of social policy research that earned the University its fifth Queen's Anniversary Prize, is giving these children a voice and helping the Government make decisions about how best to support them.

Other features in this edition of 'The View' include an insight into the startlingly novel possibilities of 'Rapid Manufacturing' and its impact on construction; the use of sport in Africa to help educate young people about HIV/AIDS; and the regulation of sex work in Britain.

All of these arise from the outstanding work of Loughborough University researchers.

I hope you enjoy reading 'The View'. Look out for future editions, with more exciting news about research that matters from Loughborough University.

Professor Peter Golding
Pro Vice Chancellor for Research

the loughborough university
VIEW
research that matters

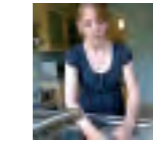
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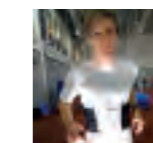
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A man is seated in the driver's seat of a car, wearing a dark long-sleeved shirt and blue jeans. He has several red EEG sensors attached to his forehead and temples, with thin wires extending from them. The car's interior is visible, including the steering wheel, dashboard, and rearview mirror. The lighting is dim, suggesting a nighttime or low-light environment. The text is overlaid on the left side of the image.

battling the sleepy killer on Britain's roads

It is something experienced by all motorists. That wave of tiredness which sweeps over you as you make the familiar journey home or travel to the early morning meeting you simply can't miss. For some it is the last journey they make. Tiredness kills and Loughborough University's Sleep Research Centre is trying to reduce the hundreds of needless deaths that occur every year, simply because people ignore the signs and refuse to take a break.

Twenty years ago there were no road traffic accidents caused by drivers falling asleep behind the wheel – or so the statistics would have you believe. Prior to the 1990s sleep simply was not recorded as a contributory factor to collisions.

Today it is a different story with falling asleep at the wheel now recognised as a key cause in many crashes. Motorists and employers can be held legally responsible for injuries or deaths that result from an accident where they, or their staff, are found to be driving whilst tired. High profile incidents, such as the Selby train crash, have helped reinforce this message.

The University's Sleep Research Centre, which is led by Professor Jim Horne, has played a key part in this step change in attitude and law. Established in 1993, the Centre is world renowned for its studies on sleep and its impact on everyday life. Its state-of-the-art facilities are used to conduct detailed and precise research into a wide variety of sleep-related issues and its findings help guide national and international policy in this area.



Dr Louise Reyner is head of the University's Driver Sleepiness Research Group.

Dr Louise Reyner is head of the Driver Sleepiness Research Group, based within the Centre, and has been studying sleep for more than 15 years. In 1992 the research group approached several police forces across the country to try and establish how many traffic accidents they believed were being caused by driver tiredness. The police agreed to collect data for the team, and began examining evidence and asking people at crash scenes to see if sleep was a factor. Once enough data had been collected it was analysed – the results were startling.

"It was clear that up to 20 percent of traffic accidents on monotonous roads across the UK were sleep related, and that these fall asleep crashes tended to have more serious outcomes, in terms of injuries and fatalities, than a typical road accident," Dr Reyner said. "We also found that there were key times of the day when more sleep-related collisions were occurring – in the evening and the middle of the afternoon. From our previous work on sleep patterns we knew that these were the times of the day when the body was more tired."

This was a major breakthrough for the research group, as it provided hard evidence to support their belief that sleep was a major cause of road accidents. It also helped them to secure funding from the Department for Transport (DfT) to build an interactive car simulator to conduct further tests. Using the simulator and several sleep deprived volunteers they undertook a major study into what happens when people drive whilst tired, to see if there were any consistencies in behaviour and to assess the impact of tiredness on driving ability.

"The first thing we noticed was that there were no consistencies," Dr Reyner explains. "It wasn't the case that all the volunteers closed their eyes first, or that they all drift across the road in a particular direction. Each individual we tested reacted in a different way, but what was consistent was the dangerous impact it had on their driving. It was quite scary to see how having six hours sleep a night, which many people regularly do, can leave your driving severely impaired.

"We knew that all motorists at one time or another find themselves feeling sleepy when driving. So we wanted to look at the best advice we could give on what to do if this occurs. At the time there was no clear guidance on this – in fact the only advice given in the Highway Code was to 'stop driving and stretch your legs'. It was clear to us all that this advice wasn't adequate so we used our car simulator to test out all the methods employed by drivers to keep awake and alert. These included caffeine drinks, cold air, music and stopping for short naps.

"From these tests we immediately discovered that the age old method of opening a window works for about three minutes and then you get used to the cold air and return to a state of sleepiness. Listening to music is even worse as you actually feel better and more alert, but your driving is still severely impaired. We concluded that the best and only effective action to take was a combination treatment – to take a break, have some caffeine and then take a 15-minute nap, as the caffeine takes around 30 minutes to work."

Following this groundbreaking research the advice put together by the Sleep Research Centre was incorporated into the Highway Code, for the first time ever providing laboratory tried and tested guidelines on tackling sleepiness for motorists.

The Centre then continued its campaign to get driver tiredness on the public agenda by placing 'Tiredness can kill – take a break' warning signs at the Leicester Forest East service station on the M1, with funding from the service station and the AA. These were the first signs of their kind in the country and have since been introduced by the DfT across the UK. They were later changed to 'Tiredness kills – take a break' to give an even stronger warning to motorists.

"It was a major breakthrough for us to get the advice in the Highway Code changed and the road signs introduced," Dr Reyner explains. "We felt that the Government was really starting to listen to what we were saying and to accept the full extent of the problem. Our research had brought us into contact with many people who had lost a loved one in a sleep-related road accident and it was incredibly rewarding to know that our work was helping to prevent other families from going through such heartbreak."

But are we all just as likely as each other to be involved in sleep-related road accidents or are some groups in society more at risk than others? "From our research it is clear that driving whilst tired is dangerous for everyone, but there is one group where you find a much greater number of sleep-related crashes – young men aged between 18 and 30," Dr Reyner said. "Young men are more at risk as they need more sleep than older people and are more likely to drive when sleep deprived. The risk is also partly linked to lifestyle as they more frequently drive at night, go to bed late and then get up early to drive to work or college.

"It is really hard to get the message across to them just how dangerous driving whilst tired can be, as young people do tend to think they are

It was clear that up to **20 percent** of traffic accidents on monotonous roads across the UK **were sleep related**, and that these **fall asleep crashes** tended to have **more serious outcomes**, in terms of injuries and fatalities, than a typical road accident.

invincible. My simple advice to them is don't drive at a time of day when you are normally sleepy, such as late at night and early in the morning."

The next phase in the Centre's research in this area is to look at company policy towards driving. Thousands of people across the UK drive for a living or have to drive as part of their job, but few companies have a clear policy on driver tiredness or provide advice to staff on the best action to take.

"The latest figures show that around 30 percent of road accidents involve people driving for work and we are regularly contacted by people who have experienced difficulties in this area. A prime example is where a member of staff is expected to attend an early morning meeting in another part of the country but isn't offered overnight accommodation to enable them to travel up the previous day. Instead they are forced to leave their home at 4am to get to the meeting for 7.30am.

"Those three hours between 4am and 7am are dangerous as you would normally be asleep and therefore you are liable to fall asleep rapidly when driving. And of course there is the issue of lorry drivers who regularly work throughout the early hours, and shift workers who finish their 12-hour night shift at 6am and then hop in their car completely exhausted and drive home. If an accident occurs in a factory then the Health and Safety Executive are called in to investigate – but what if your office is the cab of a lorry and you have an accident?

"This area of our research is about developing the best possible advice to give to industry about how to tackle the issue of driver tiredness. It is about changing the culture of work to make businesses take responsibility for the safety of their staff, not only in the office environment but also when they are on the road. They need to ask themselves if the hours and the times of day that they are expecting their staff to drive are acceptable and above all safe, and what alternatives they can offer. We know this isn't going to happen over night but we are already working closely with some large organisations who have asked us to help them develop their company policies in this area."

The Loughborough Sleep Research Centre would welcome contact from businesses interested in this area of research. Its modern facilities for sleep study, including equipment for the home recording of sleep electroencephalograms (EEGs); actimetry (body movement-monitoring during sleep); state-of-the-art computer-based systems, shiftwork safety analysis programs and driving simulator are all available for consultancy projects with external clients.

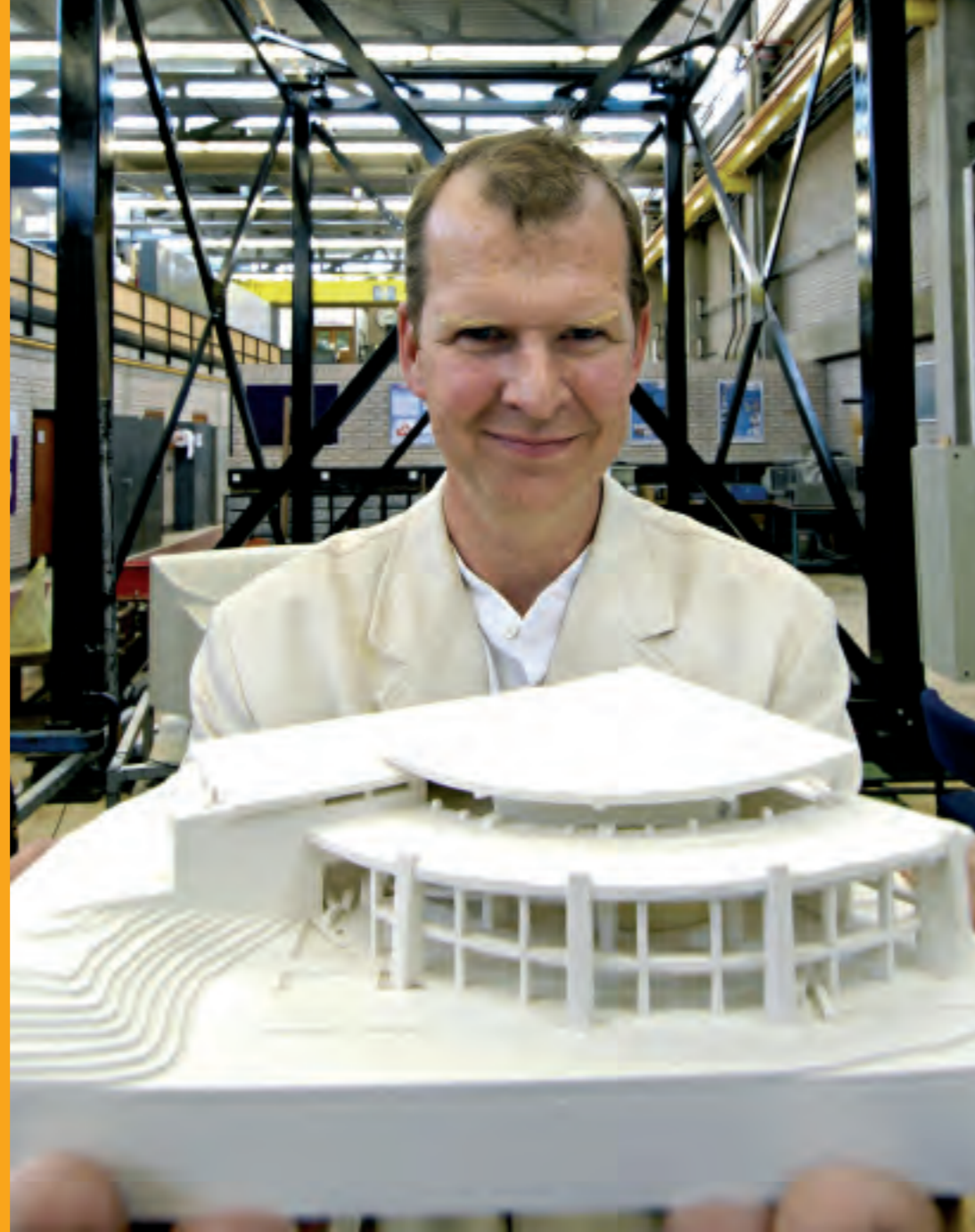
Dr Reyner said: "We have heard several instances where businesses have been offered completely inaccurate and dangerous advice on driver tiredness by people with no expertise in this area. We would urge companies to come to us so we can scientifically examine their issues and help them to come up with scientifically validated solutions."

Want to know more?

Visit: <http://www.lboro.ac.uk/departments/hu/groups/sleep/>

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Picture the scene – an army of robotic termites are released onto Mars to create a space station. Using the red planet’s own soil they will build a structure so complex that it will be able to sustain human life in one of the most inhospitable environments. A work of science fiction? Not according to **Dr Rupert Soar**, a Rapid Manufacturing (RM) pioneer based in Loughborough University’s Wolfson School of Mechanical and Manufacturing Engineering.



“We can achieve this because RM simply replicates what we design on a computer. If we include in our computer model services for heating and electricity, then the RM machines will create these. This also opens up endless possibilities for the design of buildings. In the past we have been limited by time, costs and what the human hand could physically build – with a computer you do not have these constraints. If you want a house that includes gothic carvings, with turrets and elaborate staircases, no problem. If you want an exact copy of Posh and Becks’ palace, scan it and print it.”

Dr Soar’s work does not stop at aesthetics. He has also conducted extensive research into the sustainability of construction and how to reduce waste and electricity use in buildings by employing RM techniques. Three years ago he travelled to Namibia to learn from some of nature’s most talented builders – African termites. During his visit he scanned a *Macrotermes michealseni* termite mound, capturing the world’s first images of inside these spectacular structures.

The termite-built towers, standing as high as five metres, epitomise buildings that have been optimised for the harsh surroundings they are located in, displaying incredible feats of self-regulation to provide a constant living environment in which the termites can thrive. The mounds incorporate a complicated network of tunnels and air conduits designed to channel airflow for the control of internal air quality, temperature and

“When you are trying to build massive structures it gets increasingly difficult to create a robotic ‘printer’ that is big enough,” Rupert comments. “The next step in developing RM techniques is to look at other ways of ‘printing’. One possibility is to create an army of hundreds of thousands of small robotic termites, which use the exact same behavioural algorithms as real termites to create a structure of any size and complexity. This army of robots would not only build the habitat, but then maintain it from the inside of the structure, in accordance to the constant changing requirements of the occupants within. In this way we imagine the building as sustaining itself and its occupants, by having a level of self-awareness.

“As we start to look at the habitation of other planets it is simply not practical to send bricklayers onto Mars, nor is it practical to send a giant robotic ‘printer’. But an army of miniscule robots that can work in the most hostile of environments – that is a real option.”

The development of RM may seem like a distant dream to many people, yet Rupert believes the widespread introduction and use of this technology is not light years away.

“If you look at this on a 25-year time scale we are very much in the initial stages,” he said. “At Loughborough over the next two to four years we will be demonstrating the capabilities of this technology by creating a

constructing a revolution

Twelve years ago Rupert Soar had a ‘eureka’ moment – he was introduced to the amazing capabilities of RM and, in his own words, ‘everything changed’.

“It was as if someone had set off a rocket inside me – I felt inspired by the endless possibilities this technology could bring to the world and have dedicated the last 12 years of my professional life making them a reality.”

But what is RM and why is it so important? “Put simply RM allows you to print physical parts – just as you would print words onto a piece of paper,” Rupert explains. “It works by breaking down a 3D computer-aided-design (CAD) model into 2D sections, which are then built up layer by layer by high tech robotic machines.

“Traditionally products have been made up of a number of separate components which are then put together by factory tools or by hand – the more complex the product the more difficult and time consuming the manufacture of it is. The beauty of RM is that it can create the most complex of structures in one single process, simply by transforming a 3D computer design into a physical part.”

Loughborough University and its Rapid Manufacturing Research Group is recognised as a world leader in the field of RM – helping to put this amazing technology in the global spotlight. It is currently developing RM techniques for use in a number of different areas, from the aerospace and automotive industries, to sports clothing and medical implants.

Rupert’s expertise is in RM and construction. His reputation in this field, and that of the University, has helped him to secure a £2.5 million grant to enable him to build a RM machine that can, quite literally, print a house.

The project is being supported by the University’s Innovative Manufacturing and Construction Research Centre (IMCRC) and other industry partners. The IMCRC, which is funded by the Engineering and Physical Sciences Research Council (EPSRC), undertakes cutting-edge research to enhance the processes, products, and competitiveness of the UK’s manufacturing and construction industries. Dr Soar’s latest project will also bring together experts from across the University, including specialists in civil and building engineering.

“A barrier to unleashing the full potential of RM in the construction sector is the creation of a ‘printer’ capable of working on such a large scale and ‘printing’ in an appropriate material,” Rupert said. “At Loughborough University we already have several machines capable of printing smaller physical parts from CAD models, but nothing on a big enough scale to print a house. Now we are ready to take RM to the next level.”

The Loughborough research team have started constructing a giant rig, which will support the high tech equipment needed to rapidly manufacture buildings and other large-scale projects.

Over the next four years they will create a machine that will revolutionise the construction industry.

“Initially we are developing a rig that can ‘print’ a room, using a cement or gypsum-based solution – clearly if you have the technology in place to do this, then you have the technology to ‘print’ an entire house,” Rupert added. “But the most important aspect of this research is not the four walls we will create, but what is contained within these walls.

“Using traditional construction techniques you erect a shell and then the electrician comes in, and then the plumber and so on. We are not going to build a shell, but a complete unit that includes all the services you would need already built into the walls. In one single process your house would be complete.

Rupert’s **expertise** is in RM and construction. His **reputation** in this field, and that of the **University**, has helped him to secure a **£2.5 million grant** to enable him to build a **RM machine** that can, quite literally, **print a house**.

moisture levels. The human equivalent of these ‘smart’ mounds would be buildings that meet all energy, waste management and other needs on site.

“From the work we carried out in Namibia we have already learnt a great deal about how the termites build these complex mounds and regulate their own environment,” Rupert explains. “However to mimic some of their techniques, for example by incorporating intricate underground tunnels in buildings to create natural ventilation, is not possible or practical using traditional construction methods. With RM we can create immensely complex structures so the time is now right to learn from nature and make the most of passive energy sources, including wind and solar power, in human structures.”

The Namibia research has also given new insights into how termites work together as a team to create the mounds necessary for their survival. This has opened up further avenues for the Loughborough team to explore in relation to the creation of extremely large rapidly manufactured structures for off-world habitats.

working prototype. By the 10-year mark we would be looking to have this prototype ready for commercialisation, working with more industry partners to see this technology perfected for use in the construction sector. At 15 years in we would hope to see other processes using RM developed and at 20 years buildings being created by RM machines. Ultimately, within 25 years I would expect the use of this technology to be widespread.”

The work being carried out by Rupert and Loughborough University’s construction and building services experts will have an immense impact on the global construction industry. International leaders in architecture, house building and general construction are working with the University to ensure the UK, and the world, benefit from this amazing technology. From resolving the issue of affordable housing in England, addressing the accommodation needs of third-world countries and creating more environmentally friendly structures, RM may have the capability to overcome these problems.

Want to know more?

Visit: <http://www.lboro.ac.uk/departments/mm/research/rapid-manufacturing/>

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Posed by model



pictures of caring

Washing, tidying up and vacuuming – all in a day's work for 15 year old Emma, one of thousands of children and young people in the UK who are helping to look after a relative at home. Now a new study by Loughborough University's **Young Carers Research Group** is helping more of Britain's hidden carers to emerge from the shadows.

Emma likes listening to music. Her favourites are Pink, Christina Aguilera and Avril Lavigne. In many respects she's like every other teenager who loves going into town or to the park with her friends and reading magazines. But unlike most of her contemporaries, Emma spends much of her time at home looking after her mum.

"She's got epilepsy, schizophrenia and arthritis – and gall stones too at the moment," Emma says matter-of-factly. "In the mornings, before I go to school I give her her medication or sometimes I make her breakfast. Then when I get home I'll help out with the housework, doing the washing up, vacuuming, tidying up, that sort of thing."

Emma is just one of an estimated 175,000 young carers in the UK – children or young people helping to provide care in the family home for a relative, usually a parent, who is sick or disabled. In reality that figure could be much higher however. Evidence shows that many more families don't receive formal support services and as a result aren't captured in official statistics. Some just don't want to ask for help, preferring to keep it within the family. Others fear intervention from social services and that their children may be taken into care if the family is seen to be struggling.

Since the early nineties there has been increasing Government and public attention focused on the needs of young carers. Several research studies have highlighted the nature and extent of children's caring duties for parents with physical disabilities or chronic health problems. But until recently little was known about young carers' experiences of looking after parents with mental health problems.

A study in 2003 by the Young Carers Research Group (YCRG) was the first to examine the issue, from the perspectives of the children themselves, their mentally ill parents and the key professionals involved in the delivery of services. Now the group has completed a new study that is helping to provide fresh insight into the lives of these youngsters, who are estimated to number anywhere between 6,000 and 17,000.

"For the first study four years ago we interviewed young carers, which gave us a good idea of the types of tasks they carry out, the impact caring has on their lives and how they cope," says Jo Aldridge, Director of the YCRG. "But we realised that that way of gathering information wasn't adequate or appropriate for every child, particularly those who felt unable or unwilling to talk about their situation in interviews. We were potentially missing the voices of those most in need of recognition, help and support."



Posed by model

"We'd used photographic methods in another study at the University, which had proved very successful and so we decided to try using it for this, and it worked extremely well. It's allowed the children involved to give us a visual insight into their lives and has enabled us to uncover aspects of young caring that previous studies haven't been able to identify."

Founded in 1992, the YCRG is the country's foremost research group on the subject of young carers. Its work is widely recognised both in the UK and internationally and was integral to the award of the University's fifth Queen's Anniversary Prize for Higher and Further Education in 2005.

For this latest study, which was funded by the Economic and Social Research Council (ESRC), the researchers gave disposable cameras to 16 young carers to allow them to create their own photo diaries and show pictorially what it's like to live with, and care for, a parent with a mental illness.

Washing up, preparing food and family pets all feature in the photos, which, Jo says, the children enjoyed taking. "They loved being able to show us their lives rather than just talk about them."

The researchers also found the children liked having an active role in the research process and being in charge of collecting their own data – an approach that is much more in line with recent Government thinking and policy on children's inclusion, participation and consulting with them.

"The study shows that children are competent social agents, not just as carers but as children with stories to tell about their lives. They've been able to give us a more detailed personal insight, through their own eyes, showing us the ways in which they cope with their lives as carers and how they negotiate caring with school and friends, for example," says Jo.

Research has revealed that young carers carry out a variety of jobs. Washing up, cleaning, paying the bills and shopping are all common responsibilities. But some also have to undertake more intimate tasks, such as administering medicines, bathing and toileting their parents. Although the vast majority of young carers want to look after their parent or relative, it undoubtedly has an impact on their lives. Health, well-being, even employment prospects can all be affected. Their social lives are another obvious sacrifice. Hours a week devoted to caring means there's less time to do the things other children and teenagers do. Their childhood is often cut short as they are forced to mature before their time and step into the world of adult responsibility.

A large proportion of Emma's time in the evenings and at weekends, around ten hours a week, is spent looking after her mum, but she doesn't mind.

"I'm used to it," she says. "I've been looking after my mum since I was six or seven. My brother looks after her as well."

Time constraints are often only partly the issue though. Some carers feel guilty about going out and leaving their mum or dad, or sometimes the parent doesn't want their child to leave them alone at home. Friends can be problematic too, as they often have no concept of what being a carer involves and don't appreciate the amount of time it takes to look after someone. For some young carers making and keeping friends can be hard, but Emma's one of the luckier ones.

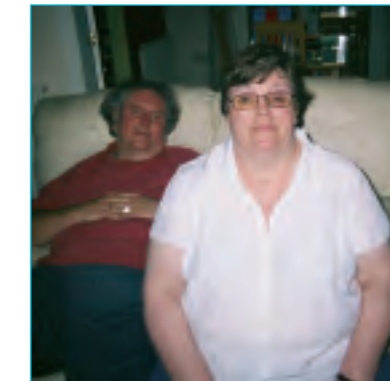
"All my friends know that I look after my mum, and my close friends understand about it, which is good. My other friends don't really understand it, but they do know."

Caring often has a significant impact on the children's education too. Poor attendance, lateness, difficulties in doing homework and lack of concentration are some of the common problems that have been revealed by other studies. Teachers and school staff are often unaware that a child has caring responsibilities, and it's only after persistent absence or regular lateness that the child's difficulties are brought to their attention. Even then support isn't always forthcoming. Earlier this year, the Department for Education and Skills issued updated guidance suggesting schools develop a policy on young carers and have a designated member of staff to look after their needs.

"Young carers don't necessarily want to let their teachers know about their responsibilities at home," explains Jo. "We need to make sure that staff and education professionals are able to pick up on noticeable stresses and strains on children who care, that they can recognise young carers and offer the necessary help and support."

This latest YCRG study shows that the children have developed a variety of ways of coping with difficult and painful circumstances in their lives. Listening to music, painting and caring for family pets are among the diversionary tactics used. The carers also develop two-tier friendships, with 'inner circle' friends being those who know about their caring responsibilities, and friends in the 'outer circle' being those who aren't aware. They carefully negotiate their friendships and other relationships based on their perceptions of trustworthiness, which often equates with how long they've known the person.

"It's true that these children's lives are often more constrained than their peers who don't have to care for an ill parent. But the role of friends, close parent-child relationships, home based activities, faith and even family pets all need careful consideration when addressing their needs and helping them to cope with parental illness."



...the researchers gave disposable cameras to 16 young carers to allow them to create their own photo diaries and show pictorially what it's like to live with, and care for, a parent with a mental illness...

Previous studies by the YCRG have identified having someone to talk to as one of the key requirements for young carers.

"These children can find it difficult to talk about their situation, but the relative ease with which they've opened up during our interviews with them for previous studies would suggest that few people had ever asked them or encouraged them to talk about their experiences or their needs," Jo says.

"In the past, support and information has been directed at the care receiver, which can reinforce a child's reluctance to talk about their role as a carer or about their needs. But these children need information as well, about the illness or disability the person they're looking after has, about practical aspects of caring such as lifting techniques, and also about the formal support services available to them. They need reassurance that their skills are effective."

When Emma needs advice she's able to call on Action for Young Carers, a support project established in 1996 by the Carers Federation charity. The project offers one-to-one or group support, as well as activity breaks, which enable the carers to meet others in similar situations and, importantly, allow them to be children and young people again.

"There's a number I can call if I ever need help or advice," says Emma. "And sometimes they write to us, asking if I want to go for a respite break. In the past we've been to farms and nature parks. This year we're going on a PGL adventure holiday – there'll be loads of activities there, like wall climbing. It's great because I make new friends."

So what are the key messages to emerge from the study? First and foremost, that children can and do cope with parental mental illness and caring, and that they want recognition for it.

"One of the main battles young carers face is lack of awareness," Jo explains. "They just want people to take notice, and for the Government and policy makers in particular to see what it's like to be a young carer and how they cope with their lives."

Want to know more?

Visit: <http://www.lboro.ac.uk/departments/ss/centres/YCRG/index.html>

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The situation has improved over the years, thanks largely to the research being undertaken by the YCRG and campaign work by organisations such as the Children's Society and the Princess Royal Trust for Carers. Working together they have been able to influence directly the development of law, policy and good practice in this country, with YCRG researchers often asked to sit on Government committees to help inform policy.

"When we first started, young carers weren't included in Government policy – they are now. And there were just two young carers projects, now there are around 150, all of which do fantastic work, not just with the carers but with the families as a whole, befriending, providing respite care, for example. But there still aren't enough of these projects and, as you'd expect, funding is always a problem."

Despite their success, the YCRG suggest that more still needs to be done, particularly about the issue of children administering medication to parents.

"It really does need to be addressed as a matter of some urgency. It's never really been tackled or remedied by appropriate health or social care interventions. There are clearly serious implications for both children and parents when children take responsibility for giving medication to adults who have serious mental health problems."

Now the YCRG are turning their attention abroad, with the team having been asked to advise authorities in North America and Australia about the young carers issue.

"It's really just getting started over there," explains Jo, "and they're using our work to help raise the profile of young carers, what they do and what they need. We have a lot of research evidence, case studies and examples of best practice we can share with them."

"It's just good to see when our research has a really positive outcome."

driving down the country's carbon footprint

With declining natural resources, an insecure oil supply and the global impact of climate change there has never been a greater need to invest in alternative fuel and renewable energy technologies. Loughborough University is leading the way in a green revolution and hopes others will follow its lead.



Pictured front to back: Professor Dennis Loveday, Roy Hill and Professor Rob Thring.

At Loughborough sustainability is key. Through its cutting edge research it is helping the world to tackle global warming by developing new technologies that reduce carbon emissions and provide clean energy for all.

The University is home to the internationally acclaimed CREST (the Centre for Renewable Energy Systems Technology) and in 2006 it launched a Research School in Sustainability. Sustainability is about living and working in such a way that resources are maintained, the Earth's environment is preserved and economic viability is upheld. The School brings together a multi-talented team of experts in sustainability-related research from across the University, and promotes collaboration with other academic institutions and industry.

"It has never been more important to tackle head on the massive dangers posed by carbon emissions, and to address the desperate need for enhanced energy efficiency combined with increased uptake of renewable energy," says Professor Dennis Loveday, Director of the School. "Loughborough has significant expertise in the area of sustainability, together with the vision to make a real difference on a regional, national and international level."

Just one of the University's current 'green' research projects is the development of non-polluting fuel cells for use in motor vehicles. Professor Rob Thring, who heads up the University's Department of Aeronautical and Automotive Engineering, has been researching alternative ways of powering the UK's motor fleet since the early 1990s. His vision for the future is a transport network that is powered by Polymer Electrolyte Membrane (PEM) fuel cells and other renewable technologies.

Fuel cells generate electricity from a simple electrochemical reaction in which oxygen and hydrogen combine to form water. There are several different types of fuel cell but they are all based around a central design which consists of two electrodes, a negative anode and a positive cathode. These are separated by a solid or liquid electrolyte that carries electrically charged particles between the two electrodes. A catalyst, such as platinum, is often used to speed up the reactions at the electrodes. One of the main benefits of fuel cells is that they emit no carbon dioxide into the atmosphere.

PEM fuel cells are the fuel cell type most favoured by auto companies as a replacement for the internal combustion engine. They have a number of attributes that make them ideal candidates for use in automotive applications. They operate at relatively low temperatures, which allows them to start up rapidly from cold, and have a high power density that makes them relatively compact.

"The main barrier to the mass introduction of PEM fuel cells at present is cost, as the membrane materials and catalysts used in them are expensive," Professor Thring said. "There are also performance issues with fuel cell vehicles, in terms of mileage – a fuel cell powered car could only achieve half the range of the average petroleum car per tank. At present this technology is simply not economical and does not provide a desirable alternative to existing vehicles for the buying public."

"To show the world what a difference using renewable energy systems alongside fuel cells can make we need to lead by example," Professor Thring explains. "To do this we are going to try and drastically reduce the University's carbon footprint, generating our own green energy on the campus and using this to power our University vehicles, as well as supply power to our buildings."

Plans are already underway to create a hydrogen vehicle-refuelling centre at the campus and investigations are also taking place into the possibility of installing a wind turbine.

Roy Hill, Director of the University's Estates Service, said: "Loughborough University always strives to be as environmentally friendly as possible. All the energy we currently use on campus is green energy, which we

"At Loughborough we are trying to overcome these barriers. We are carrying out research into perfecting the technology, investigating the use of cheaper materials in fuel cells and how to apply them to vehicles to get the best possible performance."

A leader in the development of fuel cell technologies, Loughborough University has built up close links with industry. Its research has a major impact on the automotive sector and it is now hoping to lead the way in convincing car manufacturers and governments across the world to invest more in the development of this technology.

"There are three main reasons why it is of vital importance that we develop petroleum free vehicles," Professor Thring said. "Firstly, the UK has no home supply of petroleum – we rely on the Middle East which raises serious issues over security of supply as this is a very unstable part of the world. Secondly, the petroleum pool is not unlimited, and in about 100 years we have depleted what took millions of years for nature to generate. Some time soon, and predictions vary from three years to 20 years, petroleum production will peak and start to decline. At that point, the price will skyrocket. Finally, climate change. Vehicles churn out masses of CO₂ into the atmosphere and this is having a devastating impact on our planet. If we were able to transform the UK motor fleet – and eventually the world's – to PEM fuel cells we would see a staggering reduction in carbon dioxide levels."

To demonstrate its commitment to the environment and illustrate the combined benefits of applying renewable energy to the generation of hydrogen for PEM fuel cells, the University is embarking on a new project to significantly reduce its carbon footprint. CREST, the Research School in Sustainability, the University's Estates Service and the Department of Aeronautical and Automotive Engineering are all involved in the project.

purchase from a national supplier. Earlier this year we also launched a new scheme that offers staff the chance to offset the pollution they create during the course of their work by planting new trees. This new project provides the perfect platform to take our commitment to the environment to the next level."

Professor Loveday added: "High quality research combined with effective demonstration plays a crucial part in advancing the development of new technologies, raising their profile as potential solutions, and thereby leading the way towards a more sustainable society."

Professor Thring has calculated that to power all the cars in the country using hydrogen fuel cells with green energy around 20,000 wind turbines would need to be installed across the country – which is roughly the same amount as existing electricity pylons. But to do this and further develop other renewable energy technologies, he argues that the UK Government needs to allocate significantly more funding to this area of research.

"To transform the UK's motor fleet from petroleum to renewable energy is going to take years – but we have to commit to this if we want to protect the planet for future generations and prepare ourselves for the end of petroleum," he said. "Investment is needed now to perfect these technologies and create a new green infrastructure. At Loughborough University we will continue with our mission to make a difference, through research in fuel cells, renewable energy systems and energy efficiency technologies, and in illustrating to the world the true capabilities of these technologies."

Want to know more?

Visit: <http://www.lboro.ac.uk/departments/tt/>

<http://www.lboro.ac.uk/departments/el/research/power-crest.html>

<http://www.lboro.ac.uk/service/estates/pages/environment/environment.html>

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nurturing the seeds of innovation

The step from university research to commercial business can be a hazardous one, with many failing to make the transition. At Loughborough University those wanting to take the leap from academia to the cutthroat world of business are given a helping hand. **Judy Smyth** visits Loughborough Innovation Centre, where research projects and inventive ideas are transformed into commercial success stories.

Four years ago the University became home to Loughborough Innovation Centre, a facility dedicated to helping early stage companies reach their full potential. Today it is one of the region's largest and most successful high tech business incubators, providing a home to 38 young companies. It provides tenants with low-cost office space, reception and meeting room facilities and a wealth of free expert business advice.

One of the centre's main priorities is to help University academics, students and alumni turn their groundbreaking research or pioneering ideas into successful business ventures. It is also open to outside early-stage companies, who have an innovative product or service to sell and are drawn to the centre by its reputation, and that of the University.

"When Loughborough Innovation Centre first opened we were unsure how quickly it would fill up," explains Centre Manager Tim Bacon. "But since then we have really flourished, with a long and growing list of tenants."

To meet increasing demand the centre has expanded the service it offers to include virtual tenancy agreements. This provides new businesses, not yet at the point where they require premises, access to the reception and meeting room facilities, postal service and expert advice that is available to full tenants at the centre. Alongside this is a 'hot desk' system, where a desk and phone line can be rented out. The innovation centre is also looking to physically expand its facilities and is currently searching for additional premises off campus. In the medium term the centre is hoping to have further units at the University's proposed Science and Enterprise Park.

"The virtual tenancy and hot desk system are working really well as they bridge the gap between a business that is literally just getting off the ground and one that is ready and financially able to rent premises from us," added Tim. "The expansion of the Centre will also enable us to help even more young companies reach their full potential – there is already a waiting list of businesses wanting to join us."

But what is the secret to Loughborough Innovation Centre's success? "What attracts many new companies to us is that the centre significantly reduces the extensive start-up costs that often stop a business from getting off the ground," Tim explains. "It enables a company to develop in a low-cost and supportive environment until it is financially ready to take on a full commercial lease elsewhere. By reducing the monetary risks associated with setting up a new business it gives people the confidence to try and take their idea to the next level."



Respivest, developed by Progressive Sports Technologies, helps athletes train their breathing muscles.

“Another main draw for outsiders is the reputation of the University. Loughborough is known throughout the world for being at the forefront of research in a number of areas, research that new businesses can tap into. But above all, what brings new businesses to our facility is our impressive list of current tenants. The companies we have here encapsulate what we are all about – innovation. Their products and services are at the cutting edge of technology and illustrate the high calibre of expertise we have at the University and are able to attract from outside.”

To find out more about some of the pioneering businesses Loughborough Innovation Centre has helped to nurture, Judy Smyth went to meet three of its most successful tenants:

Intelligent Energy

Intelligent Energy was formed in 2001 following the acquisition of Advanced Power Sources Ltd, a company established in 1995 by four Loughborough University staff – Dr Phil Mitchell, Dr Jon Moore, Dr Paul Adcock and Tony Newbold. Intelligent Energy was launched with the aim of commercialising fuel cell technologies and became one of the first tenants at the Innovation Centre when it opened in 2003.

Over the years the company has attracted a substantial amount of investment and today it employs 85 people, 55 based at its Loughborough headquarters. It also has staff in London, the USA and Johannesburg.

A leading hydrogen fuel cell company, Intelligent Energy is focused on the provision of cleaner power and carbon reduction via a range of world-class fuel cell, fuel processing, desulphurisation and hydrogen generation technologies. It is the inventor of the multi-award winning ENV – the world’s first purpose built hydrogen fuel cell motorbike – and has also developed and demonstrated its fuel cell systems for power generation applications in developing countries.

Its current partners and customers include: Boeing, on the development of the first manned fuel cell powered light aircraft; PSA Peugeot Citroën, providing automotive fuel cell systems; and The Suzuki Motor Corporation on the provision of fuel cells for prototype hydrogen fuel cell motorcycles.

“The innovation centre has been our home since it was established four years ago and we have a strong and mutually supportive relationship,” Dr Jon Moore, the company’s Director of Communications, explains. “It is an excellent incubator for a wide variety of businesses and has helped our company to develop. Our links to the University are also very important to us and we are proud of our Loughborough roots. A large number of our staff are either former employees of the University and/or alumni and we enjoy being part of its thriving campus.”

Want to know more?

Visit: <http://www.intelligent-energy.com>
Contact: Dr Jon Moore E: unitedkingdom@intelligent-energy.com

Progressive Sports Technologies

Progressive Sports Technologies was formed in 2001 by Dr Mike Caine, from the University’s Wolfson School of Mechanical and Manufacturing Engineering, and Ross Weir, a Loughborough graduate. The company designs and develops cutting edge exercise equipment and sporting goods, working with some of the biggest names in the industry. This includes Canterbury, Nike, Reebok, Spalding and Umbro. It also offers a design-focused sports innovation consultancy service, providing clients with expert guidance on product innovation and development.

Today Progressive Sports Technologies employs more than 10 people, the majority of which are current University staff or Loughborough graduates.

Spun out from the University’s world-leading Sports Technology Research Group, the company boasts an impressive list of marketed products and has several others on the brink of commercialisation. Its biggest success to date is the Reebok Deck, a versatile exercise platform that is on sale across the world and used in exercise classes in 150 Fitness First leisure clubs throughout the UK.

Another high profile product it has developed is Respivest, a garment for training breathing muscles, which has been featured on the BBC’s ‘Tomorrow’s World’ and ‘Dragon’s Den’ programmes. Respivest is currently being trialled by Manchester United Football Club and GB Triathlon, and following very positive initial results looks set to be the company’s next big success story.

Dr Caine, who still works for the University as Director of the Sports Technology Institute, says he is delighted with how Progressive is developing. He added: “We have enjoyed many big successes over the years, thanks to the pioneering products the company has developed and the relationships it has built up with industry.

“But we wouldn’t be where we are today without the support in our early years from the innovation centre. We were one of the first tenants to join the centre and it provided us with low cost office space and excellent facilities. It has also been able to accommodate our growing business by offering us a larger unit.

“Our close relationship with the University is also incredibly important to us. Loughborough University is synonymous with sporting excellence and engineering – which is what Progressive is all about. Our links to the University have played a crucial part in our success, and continue to do so. We regularly recruit graduates from the University to work for our company – why wouldn’t we? In our field they are the best in the country.”

Want to know more?

Visit: <http://www.progressivesports.co.uk>
Contact: Dr Mike Caine T: 01509 227650 E: M.P.Caine@lboro.ac.uk

Dialog Devices

Dialog Devices was established in September 2002 by Dr Vincent Crabtree and Professor Peter Smith, both former members of staff in the University’s Department of Electronic and Electrical Engineering. It started trading in 2003, supplying its core biomedical technology and expertise to other early stage companies in the sector, and in 2004 it began work on its first product, Padd.

Padd is a device for the non-invasive early diagnosis of peripheral arterial disease. The disease is an under diagnosed condition where fatty build-up restricts blood flow in the arteries of the legs. This directly causes pain and cramp when taking exercise and if blockages become severe people risk amputation. Early identification of the disease can prevent amputation and means patients can be followed up for blocked and narrowed arteries in the heart or neck. Around four out of five people with peripheral arterial disease also have blockages elsewhere which can cause heart attacks and strokes.

A working prototype of Padd has already been successfully used in a top London hospital. The company is now developing a portable version, which could be used by nurses in local GP surgeries as part of a patient’s general health check up. Over the next three years Dialog Devices is aiming to complete and roll out the portable Padd across Europe and the USA. It is also continuing the development of a follow up product, which assesses blood flow after surgery for peripheral arterial disease.

“Setting up the company has been hard work but extremely rewarding,” explains Dr Crabtree. “Padd will help people live a longer healthier life and, along with our other products, enable us to become a worldwide player in the development of innovative and convenient medical devices.

“The innovation centre has played a vital part in helping us to reach our goals. It has provided us with suitable facilities at an affordable cost, which is just what early stage technology companies need. Unlike many new businesses, we are not selling in the market yet as medical devices take a long time to develop and prove due to very strict regulations. Therefore costs are critical and the tenancy scheme the innovation centre offers is perfect to incubate companies like ours, giving us time to develop products or expand our client base.

“Being based at the innovation centre also means that we can work closely with any University departments that are relevant, maintaining the innovation that is key for successful technology companies.”

Want to know more?

Visit: <http://www.dialogdevices.com>
Contact: Jody Brown E: jody.brown@dialogdevices.co.uk



Vincent Crabtree of Dialog Devices.



"We are split into tribes in Zambia, about 73 with different cultures, but when you come to sport you forget about your background – you discover with sport all children are African."

helping Africa to play a healthier game



Africa is in the grip of an HIV and AIDS epidemic that threatens to destroy the very heart of the country. Academics from the University's School of Sport and Exercise Sciences have been investigating how sport is playing a crucial role in helping people beat this killer disease.



By the end of 2005, more than 1.1 million people in the central African country of Zambia were infected by the HIV or AIDS virus. The World Health Organisation estimates that 250,000 of those living with HIV/AIDS in the country are aged under 14 and an estimated 710,000 children aged under 17 have been orphaned by the disease. One-in-six deaths amongst children under five are caused by HIV/AIDS transmitted by infected mothers.

As Africa battles against this devastating epidemic a group of Loughborough researchers from the Institute of Youth Sport, in collaboration with UK Sport and the Wallace Group (a partnership of six UK 'sports' universities), have been investigating how sport is being used as a valuable weapon. In 2006 they travelled to Zambia to carry out initial research on behalf of local organisations that are using sport to help educate young people about the disease.

"The impact of HIV/AIDS goes far beyond the individual tragedies of those infected," said Dr Kay, the research team leader. "It is a structural problem that threatens to overwhelm African countries.

"When we went to Zambia we were able to begin examining the effectiveness of sport as a communication tool, and the role it can play in teaching people in Zambia about HIV/AIDS. Zambians are particularly concerned about the spread of HIV/AIDS among young people, and local sports organisations are using sport as a means of engaging and empowering local youth, giving them the confidence and strength to build a better future for themselves and their families."

Zambia has been hit hard by the HIV/AIDS pandemic. The average life expectancy for Zambians at birth is 39, about 10 years less than the average for Africa. In 2002, HIV/AIDS accounted for 43 percent of all the deaths recorded for the year. Women and girls are particularly affected, with women accounting for 54 percent of all people living with HIV/AIDS in the country. Among younger groups there is an even greater imbalance – the prevalence of the virus amongst young women aged between 14 and 19 is almost six times higher than that of males of the same age, while orphans and women aged between 20 and 29 also face higher rates of prevalence.



“Sport is something that has come to be the light of the day,”
 said one local coach for Sport in Action. “We know that sport
 is something that can make our youths all over the country
 come through and see what they can do in life.”

“The devastating human and developmental impacts of the AIDS pandemic remain among the most formidable challenges impeding the realisation of Zambia’s development aspirations,” according to a statement on the United Nations’ UNAIDS organisation web site. “However, Zambia is striving to gain control over the spread of HIV and to treat and care and support those infected and affected.”

During their trip to Zambia Dr Kay’s research team worked alongside student sports leaders from the UK who were assisting local coaches to run sports sessions in many of the poorest neighbourhoods in Lusaka, Zambia’s capital city.

The student leaders were supporting Sport in Action and Edusport, local community organisations which are using sport to deliver HIV/AIDS education to local children, as well as a wider, ambitious programme of life skills through which young people may fundamentally improve their lives.

Working alongside the student leaders and local coaches allowed the research team to examine firsthand the effectiveness of sport in communicating with young people:

“Sport is something that has come to be the light of the day,” said one local coach for Sport in Action. “We know that sport is something that can make our youths all over the country come through and see what they can do in life.”

Dr Kay’s pilot research found that school staff and community workers believed the sports programmes raised aspirations, encouraged children to go to school, enhanced learning within school and brought communities together.

“What we saw in Zambia was that sport really could bring young people together,” Dr Kay explains. “It brought them together in a positive environment where those involved actually started to believe that they could achieve something. This had a knock-on effect with other aspects of their life, such as school and home, where they also began to believe that a better future was possible.”

The research group also found indications the programmes were helping to lower barriers between the different age and social groups.

“We discovered that when we use sport it has no barrier, sport has no age, no race, no tribe,” one Edusport official told the researchers. “We are split into tribes in Zambia, about 73 with different cultures, but when you come to sport you forget about your background – you discover with sport all children are African.”

There were additional positive outcomes by incorporating HIV/AIDS education into sports programmes, with the sessions offering a unique opportunity for learning, providing an open and secure environment for discussing HIV/AIDS and other social issues affecting their lives. Teachers spoke about the advantages that sport held compared to classroom based subjects.

“Here in PE I can break it up,” said one teacher. “We talk about using a condom and safe sex. They are more relaxed in PE and are more likely to listen.”

Another teacher explained how during sport sessions, pupils felt actively involved and engaged in education, whereas in the classroom there could be a feeling of being preached to by adults making it easy to dismiss and ignore the messages provided.

Dr Kay’s group also found that the Zambian young people themselves found learning through sport was a more effective way of getting the message across.

“Other people, they don’t learn in class so in the sports or the games, they will come and listen to the coach, so when the coach tells you about HIV, they will listen to the coach,” remarked one boy.

The fundamental problem facing Zambia is that it is poor. According to latest World Bank figures, the gross national income per capita is US\$500 per annum. Children are sent out to work to support their families, while poverty also affects the ability of children to attend school – one of the key areas where HIV/AIDS education is disseminated to young people. If a family cannot afford the fees, children do not go to school. If they can afford the fees for only one of their children, preference is given to male children.

With more than 700,000 children now orphaned because of the virus, the idea of a conventional nuclear family has also disappeared. As such, teenagers have been forced to become heads of households raising younger siblings – a situation that forces them to leave school and seek employment. Again, it is young girls who are expected to give up their education and adopt homemaker responsibilities.

Girls’ lack of schooling contributes to great gender inequalities, and one of the aims of the sports programmes is to empower girls and teach them to express and assert themselves as a first step towards equalising

gender relations. Workshops on reproductive health are conducted and being able to talk openly about HIV/AIDS is encouraged. Girls are also taught the importance of staying in school to achieve an education.

“Sport makes people listen,” added a 17-year-old girl from Lusaka. “I say no to sex because I want to finish my education. That is the only thing I really want in my life.”

Dr Kay concluded: “We were invited to work with sport organisations in Zambia to help them develop their sports programmes in the most effective ways. What they are already achieving is invaluable: they really do use sport to unite, educate and empower young people without patronising them. Sport allows them to communicate on an even playing field and the messages they get across to the young people are crucial to helping them to make positive decisions in their own lives.

“But there are enormous challenges in providing sport in such a poverty-stricken nation where facilities and equipment are scarce to non-existent and everyday life so fraught. We are returning to Zambia this year to learn more and hopefully to provide a little more guidance about how sport can be used to best effect.”

The other Loughborough research team members who visited Lusaka were Shane Collins, Ruth Jeanes and Iain Lindsey.

Want to know more?

Visit: <http://www.lboro.ac.uk/departments/sses/institutes/iys/index.html>

Contact: Dr Tess Kay E: T.A.Kay@lboro.ac.uk

It may be the oldest profession, but prostitution remains shrouded in myths and images that stigmatise and marginalise sex workers. Are current Government tactics to address the issue working? Can lessons be learnt from other European countries? Loughborough researchers Dr Maggie O'Neill and Professor Phil Hubbard are finding out.

sex in the city

In December 2006 the country watched aghast as news unfolded of the murders of five Ipswich prostitutes, propelling into the media spotlight the issue of sex workers' safety, and reopening the debate on whether, and how, sex work should be regulated.

The significance of street sex markets in Britain is hard to gauge, although sex work is a fact of life in many of our cities. As there have been no national, multi-site studies of street sex work previously undertaken it's extremely difficult to estimate with any reliability or accuracy the numbers of women who sell sex on the streets of British cities. Official figures are derived from Home Office statistics, which relate to cautions and convictions for soliciting offences in England and Wales. These show a reduction in convictions from nearly 10,000 in 1985 to less than 1,000 in 2005.

But given that these relate only to illegal activities, they're not a true reflection of the extent of street sex work. Individual project statistics and studies in specific locations suggest that the figure is likely to be much higher. It is generally agreed, however, that the street sex market is diminishing in importance as mobile phones and the internet provide new ways of making contact with clients. Nonetheless, street sex markets are well-established in many UK towns and cities, providing perhaps the most visible manifestation of sex work, and one that continues to attract significant numbers of clients.



Posed by models

In a recent collaborative project, Loughborough researchers Professor Phil Hubbard and Dr Maggie O'Neill – together with co-investigators Jane Pitcher, Jane Scoular from the University of Strathclyde and Rosie Campbell of the UK Network of Sex Work Projects – completed an in-depth study of the lives of street sex workers in British cities. Their research, undertaken for the Joseph Rowntree Foundation, examined how six areas of female street sex work are used and shared. In all the instances, prostitution had been a part of the local scene for many years, but was attracting more opposition from local communities concerned about anti-sociality and the effect on the reputation of the area. The project assessed the range of community responses to street sex work, identifying why and how groups in some areas have sought to 'reclaim' the streets by excluding prostitutes, while others exhibit greater tolerance.

the research also suggests that recent reform of prostitution laws across the EU are strongly connected to beliefs that sex workers are exploited and would not choose to become prostitutes.

"Through interviews and focus groups with sex workers, local residents, police and agency workers, our research showed that in cities where lines of communication had been opened up between residents and sex workers, issues of concern could be effectively dealt with so that prostitutes could work safely without causing offence or annoyance to those in the vicinity. In cities where no mediation had occurred, conflict between residents and workers was more pronounced, and often based on misconceptions about the nature of prostitution," explains Professor Hubbard.

The research also revealed that community patrols, vigilantism and harassment have been commonplace in some communities, adding to the difficulties sex workers have in negotiating with clients and dealing with the police. These factors, combined with the use of ASBOs and community injunctions, appear to have been significant in reducing the numbers of street sex workers in Britain: numbers in all the case study locations were low, with just 5 to 10 women working per night, whereas 10 years ago the numbers were double or triple that. However, given that few believe sex work is declining, the assumption is that many women who might have previously worked the street are now working off-street.

Part of a Joseph Rowntree programme on the social value of public spaces, the research into street sex work coincided with the Home Office's most thorough review of sex work legislation since the Wolfenden committee's exploration of prostitution and homosexuality in the 1950s. Contrary to the research team's findings, the clear message of the emerging Government strategy, issued in January 2006, was that street prostitution is incompatible with residential and business life, and that priority needs to be given to helping street workers 'exit'.

The tragic events in Ipswich last December appear to vindicate the Home Office's stance, and though legislation to allow mini-brothels to exist has been mooted, the police are currently following the Home Office line, displaying a less tolerant attitude towards street soliciting and kerb crawling.

However major concerns remain that this might simply result in a spatial shifting of sex work, with more and more prostitution occurring in off-street spaces that are beyond the gaze of the state and law, and where exploitation by managers, pimps, and clients may be rife. Such concerns would appear to be borne out by the murders last summer of two women who were bludgeoned to death when working in a massage parlour in Shrewsbury, and by Operation Pentameter which uncovered significant numbers of smuggled women working in off-street premises, often in poor working conditions and for little money.

"The assumption that off-street prostitution is safer and provokes less conflict than street sex work is a massive generalisation," says Dr Maggie O'Neill. "What matters is the way that spaces are regulated by the state and the law through its various agencies. In a context where sex workers remain stigmatised and outside the formal economy, turning a blind eye to prostitution cannot be regarded as a sufficient response to the issues of exploitation and violence that are often associated with it."

The abolitionist stance currently advocated by the Home Office, and the Scottish Executive, places prostitutes in a legal 'grey' zone – it's not illegal to sell sex, but selling sex on the streets, or off-street where there is more than one worker present, is illegal. This legal ambiguity is not a uniquely British problem, but does make a major case for legal reform. While sex worker unions argue for outright decriminalisation – a stance which has been adopted in New Zealand and parts of Australia – the Home Office has dismissed the idea of partial or full decriminalisation, giving more serious consideration instead to the systems of brothel licensing which exist in the Netherlands and Germany. In Scotland, the Swedish laws that prohibit the purchase of sexual services have also been influential, with the 2007 Prostitution (Public Places) Act introducing new laws to prohibit kerb-crawling.

In a study funded by the Economic and Social Research Council (ESRC), Professor Hubbard – with co-investigators Jane Scoular from the University of Strathclyde and Roger Matthews from London South Bank – has been exploring the way that prostitution is regulated in different European jurisdictions. His conclusions, based on interviews with over fifty regulators in Amsterdam, Stockholm, London and Edinburgh, are that sex work laws may be profoundly different across Europe, but their enactment often produces similar outcomes.

"For example, the gradual disappearance of street sex work, facilitated by the availability of mobile phones and internet contact sites, is evident across all case study sites, encouraged by police who have targeted street work as a visible and unacceptable manifestation of the sex industry," he explains. "Off-street work thus represents the most important form of sex work, whether entirely 'hidden' as it is in Stockholm, licensed – as in Amsterdam or Edinburgh – or informally tolerated, as it is in London."

The research also suggests that recent reform of prostitution laws across the EU are strongly connected to beliefs that sex workers are exploited and would not choose to become prostitutes.

"The 'trafficking' panic is significant here, with trafficking and prostitution often conflated in policy debates," says Professor Hubbard. "The idea of the prostitute as victim justifies laws that make the task of selling sex more difficult. Even though the aim of prostitution laws is to punish exploitative and violent clients, pimps and traffickers, the impacts are often felt most acutely by women sex workers."

It is also remarkable that despite prostitution laws across Europe being gender neutral, they are only enforced when they involve men buying sex from women. In all the research case study locations, the police devoted little time to the surveillance of male sex work. This lack of attention is extraordinary given that it's a widely-noted phenomena, with studies of male sex work revealing that issues of drug-dependency, exploitation and destitution are not uncommon.

Yet perhaps the most interesting dimension of European prostitution laws is their inability to develop a statutory definition of prostitution that differentiates it from other forms of sex work, such as stripping or exotic dancing. Indeed, the distinction between 'adult entertainment' and prostitution is highly problematic given both involve forms of 'bodywork' designed to provide sexual gratification. Moreover, the assumption that prostitution is exploitative and damaging, while adult entertainment is not, is not borne out empirically.

"The fact that stripclubs like Spearmint Rhino or For Your Eyes Only are opening in city centres at the same time that street prostitution is disappearing is interesting, as it suggests that the state and law makes distinctions between acceptable and unacceptable forms of sex work which are based on highly stereotyped views of prostitutes and their clientele," says Professor Hubbard.

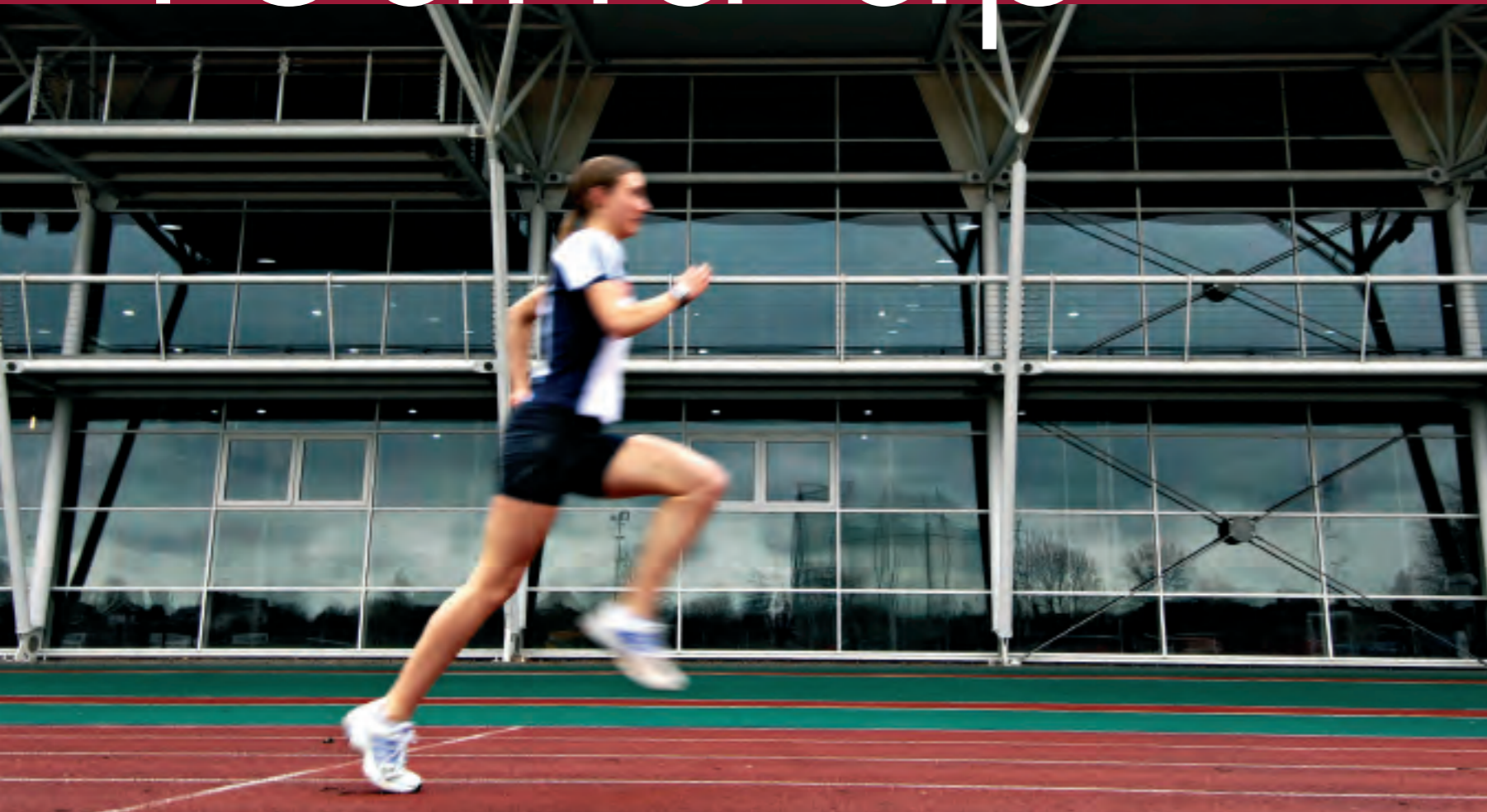
All of this indicates that sex work now takes a variety of forms, with policy-makers enacting ways of control which never succeed in eradicating sex work, but transform where – and how – sex is sold. So as the sex industry remodels itself will legislation have to change too? Professor Hubbard thinks it may well do. But whatever happens, the 'oldest profession', and all its related activities, are sure to continue generating debate for many years to come.

Want to know more?

Visit: <http://www.safetysoapbox.com> for a report on a consultation about street sex work in Walsall.

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the view round up



Loughborough in running to host Team GB for 2012 Olympics

The University has been shortlisted as one of three possible training camps for Team Great Britain ahead of the London 2012 Olympics.

Representatives from the British Olympic Association, whose director of elite performance is Loughborough graduate and former England rugby coach Sir Clive Woodward, have already visited the campus to inspect facilities. They will make a number of return visits throughout the year before a decision is made in December.

"If we are successful this will be a very big deal indeed," said the University's Director of Sport Chris Earle. "It will effectively mean the eyes of the world will be on Loughborough, Leicestershire and the East Midlands in the 10 to 12 weeks before the games when the British athletes will be here."

"Loughborough probably has the best facilities in one square mile anywhere in the world. We would hope to work with the BOA to make additional improvements to help our Olympic team perform at its very best."

Andy Borrie, Head of Performance Sport at Loughborough, said many of the British athletes who are likely to feature next year in Beijing and at

London in 2012 are either already studying at Loughborough or using its world-class facilities and support services.

"Loughborough would be a known and very comfortable environment for them in the weeks leading up to London 2012," Andy added. "The key for the next few years is to attract those student athletes who will be looking to compete at London in 2012, and who will be well acquainted with the facilities and coaching at the University."

Chris Earle added that there had been considerable interest from other countries that are already scouting possible venues for training bases ahead of London 2012. However Team GB remains Loughborough's main priority.

As well as leading the way on the sporting field, the University is also at the forefront in sports science research. The campus is home to the Centre for Olympic Studies and Research, a joint initiative between Loughborough and the British Olympic Foundation, and boasts a wealth of internationally acclaimed academic experts in this area.

helping children to cope with cancer

Research by a Loughborough PhD student into the information needs of children of cancer patients could help young people learn how to cope with the emotional turmoil of having a sick parent.

Suzanie Adlina Mat Saat, who is based in the Department of Information Science, was inspired to conduct the research after joining the National Cancer Society Malaysia (NCSM) as Marketing Manager.

While working at the NCSM, Suzanie noticed that many cancer patients who visited its Resource and Wellness Centre in Kuala Lumpur would bring their children along. She soon discovered that there was a lack of support material for children of cancer patients, and that they were often the least informed when it came to sickness in the family – particularly when it concerned their parents.

She said: "Many parents are so concerned about their own health needs that they unknowingly push their children aside. Many also want to shield their loved ones from fear or hurt, but this can be very harmful to children.

"Children can begin to blame themselves about their parent's illness, or feel resentment towards their mother or father for pushing them away. In some cases children can develop a dislike of hospitals or doctors because they associate them with their parent becoming sick."

To try and bridge the information gap Suzanie is carrying out a survey of cancer patients with young children in Malaysia. This will involve working with both the parents and the children to explore a number of innovative information solutions.

It is hoped the findings of the survey will help her to develop more material for children that can be used to explain to them about cancer, both in Malaysia and across the world.

taking mobile phone health monitoring to India

Loughborough University engineers have forged a partnership with experts in India to develop their unique mobile phone health monitoring system.

The device, which was first unveiled in 2005, uses a mobile phone to transmit a person's vital signs, including the complex electrocardiogram (ECG) heart signal, to a hospital or clinic anywhere in the world.

Created by Professor Bryan Woodward and Dr Fadlee Rasid from the Department of Electronic and Electrical Engineering, the system enables a doctor to observe remotely up to four different medical signals from a freely moving patient. Signals that can be transmitted include the ECG, blood pressure, oxygen saturation and blood glucose level.

Now Professor Woodward has been awarded a grant by the UK-India Education and Research Initiative (UKIERI), enabling him to join forces with experts in India on the project. Working with the Indian Institute of Technology Delhi (IIT Delhi), the All India Institute of Medical Sciences, Aligarh Muslim University and London's Kingston University, he is hoping to miniaturise the system, designing 'smart' sensors and mini-processors that are small enough to be carried by patients and able to acquire biomedical data from them.

The network of sensors will be linked via a modem to mobile networks and the internet, and to a hospital computer. The device would then be used by doctors to remotely monitor patients suffering from chronic diseases, such as heart disease and diabetes, which affect millions of people across the world.

"Such a 'Mobile Disease Management System' is long overdue," says Professor Woodward. "In the UK it will allow a more patient-driven health service, as promoted by the Government to improve the efficiency of health care delivery. In India, the project will link clinics and regional hospitals in remote areas to centres of excellence. As in the UK, the Indian Government is encouraging the integration of new and existing networks, much needed because of a large population spread over a vast area.

Clinical trials of the system will take place in the UK and India over the next three years.



calculating the cost of children's services

The Centre for Child and Family Research (CCFR) has developed a new computer application, designed to help local authorities monitor the costs of providing services and placements for children in care.

The application, called the Cost Calculator for Children's Services (CCfCS), allows agencies to make use of the information already available in their system to accurately compare the value and benefits of different types of care. It offers a variety of report options and analyses that produce annual costs, costs for specific placements or individuals, and costs for different groups of children.

Developed in collaboration with seven local authorities and funded by the Department for Education and Skills, the flexible system is easy to implement by purchasing a user licence, which also includes the software, user guides and a consultancy service.

The CCfCS has already received a great deal of interest, both in the UK and overseas.

Loughborough's Jean Soper, lead developer of the application, said:

"Our aim is to equip local authorities with this tool which will enable them to commission better and more effective care services and improve decision making processes. It's a very exciting time for this project and we've been encouraged by the positive response received so far."

For further information about the CCfCS visit the website: <http://www.ccfcs.org.uk>

students' inventive ideas win top design awards

The imaginative designs of three Loughborough Industrial Design and Technology students have claimed top awards at this year's RSA (Royal Society for the encouragement of Arts, Manufactures and Commerce) Design Direction Awards.

Richard Andrews received the National Patient Safety Agency Award of £1,500 in the 'Design for Patient Safety' category, for his self-service food catering system for hospitals, developed to give nurses more time to care for those who most need it.

Lauren Brooking's design, 'Sleepz' – a system designed to maintain personal wellbeing through improved knowledge and understanding of sleep patterns – won her the GlaxoSmithKline cash award of £1,875 in the 'Designing Wellbeing' category.

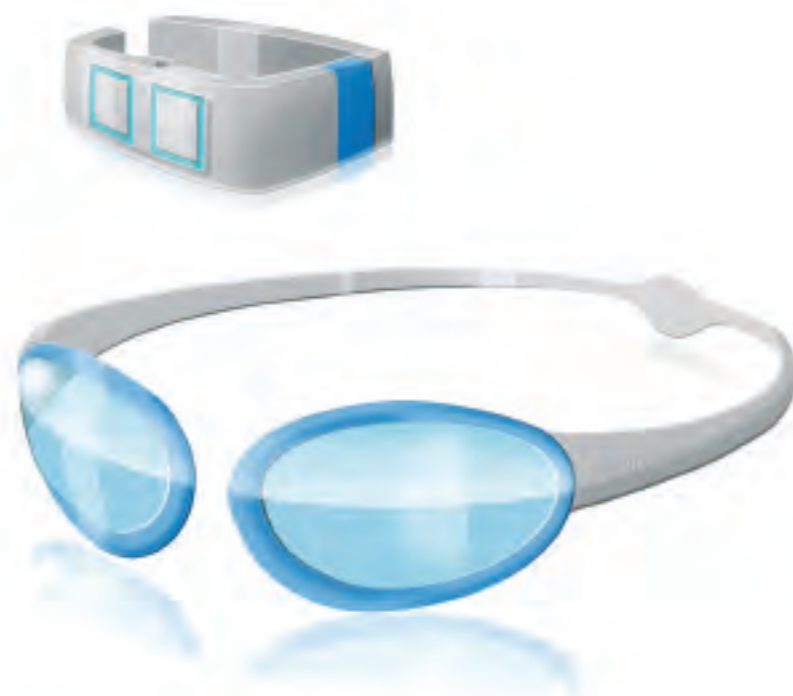
Richard Linford was presented with the BT Award worth £1,000 in the 'Inclusive Worlds' Category, for his alert system for hearing impaired swimmers, which notifies athletes of race starts and alerts them to their coach's instructions during training.

Another student, Nikita Golovlev, was awarded 'highly commended' in the 'Inclusive Worlds' section, and a further six Loughborough University students were shortlisted in their chosen categories.

Paul Wormald, a lecturer in the University's Department of Design and Technology, said of the students' success:

"Our Design and Technology students performed excellently in the RSA competition. It is a significant achievement to have so many students do so well in this prestigious international design competition, and we've even improved on last year when we had seven students shortlisted and won two awards."

The RSA highlights the best of British and European design. The Design Directions Awards, launched in 2003, are the RSA's student awards scheme that challenges young designers to respond to projects with a strong social context and intend for them to question the role of the designer in the modern world.



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