FEATURES
Alcohol Pricing
Discovering the Past

FEATURES
Restoring Soils
Wind Energy

SPOTLIGHT
Energy & Sustainability
Discover opens the door to a world of innovation and invention, where researchers at the University of Sheffield and their partners in the private, public and third sectors are collaborating to find real world solutions to real world problems. From the local to the global, these partnerships are where the energy, enterprise and drive of the wider community is harnessed to the cutting edge talents of the University’s academic teams: discovering solutions together.
Welcome to the seventh edition of Discover, a magazine that celebrates how the University of Sheffield collaborates and engages with the private, public and community sectors to enhance the lives of people in our city, the wider region and across the world. The University is determined not only to pursue cutting edge research but to do so in a way that translates this knowledge into real world solutions to real world problems.

With more than 190 countries gathered in Paris to thrash out a successor agreement to the Kyoto Protocol on climate change, it is fitting that this issue of Discover should showcase the contribution our researchers are making to the development of a more sustainable future for the place we call home, planet Earth.

The ultimate aim of the 21st Conference of Parties (COP21) is to fashion an international deal on the climate that keeps global warming below 2°C. Achieving that goal is beyond the gift of even the most powerful nations: global warming knows no boundaries.

The only way to meet that challenge is through collaboration and cooperation. And that is just how we work in Sheffield. Our Grantham Centre for Sustainable Futures was created specifically to bring together researchers from every discipline within the university. Its aim is to help to save the planet, it is also saving the consumer money. Perhaps that is why we remain optimistic about the future.

As you will see in this issue, at Sheffield we are optimistic about the development of a sustainable future. We relish challenges because they provide us with the opportunities to discover solutions.”

Professor Tony Ryan
QUALITY OF LIFE
Understanding Spinal Muscular Atrophy

Sheffield’s reputation as a world leading centre for research into the devastating effects of Motor Neurone Disease (MND) continues to grow with its researchers being invited to play a key role in combating Spinal Muscular Atrophy (SMA) – the leading genetic cause of death in babies and toddlers.

As part of a newly established UK research consortium, led and funded by the SMA Trust, Sheffield’s researchers will help further the development of existing drug targets and identify new neuroprotective therapies to help people living with SMA.

Professor Mimoun Azzouz, Chair of Translational Neuroscience at SITrAN, said: “This is a great initiative for SMA researchers using microscopic analysis to compare the bacterial erosion of skeletons from sites across the UK with the bones of the mummified bodies from Yemen have concluded that mummification may have been commonplace in Bronze Age Britain.

Archaeologists widely agree that the damp British climate is not favourable to organic materials and all prehistoric mummified bodies that may be located in the UK will have lost their preserved tissue if buried outside of a preservative environment such as a bog.

Sheffield researcher, Dr Tom Booth, who is now based at the Department of Earth Sciences at London’s Natural History Museum, said: “The problem archaeologists face is finding a consistent method of identifying skeletons that were mummified in the past – especially when they discover a skeleton that is buried outside of a protective environment.

“Research has shown that smoking over a fire and purposeful burial within a peat bog are among some of the techniques ancient Britons may have used to mummify their dead. Other techniques could have included evisceration, in which organs were removed shortly after death. “The idea that British and potentially European Bronze Age communities invested resources in mummifying and curating a proportion of their dead fundamentally alters our perceptions of funerary ritual and belief in this period.”

Sheffield’s reputation as a world leading centre for research into the devastating effects of Motor Neurone Disease (MND) continues to grow with its researchers being invited to play a key role in combating Spinal Muscular Atrophy (SMA) – the leading genetic cause of death in babies and toddlers.

As part of a newly established UK research consortium, led and funded by the SMA Trust, Sheffield’s researchers will help further the development of existing drug targets and identify new neuroprotective therapies to help people living with SMA.

Professor Mimoun Azzouz, Chair of Translational Neuroscience at SITrAN, said: “This is a great initiative for SMA researchers using microscopic analysis to compare the bacterial erosion of skeletons from sites across the UK with the bones of the mummified bodies from Yemen have concluded that mummification may have been commonplace in Bronze Age Britain.

Archaeologists widely agree that the damp British climate is not favourable to organic materials and all prehistoric mummified bodies that may be located in the UK will have lost their preserved tissue if buried outside of a preservative environment such as a bog.

Sheffield researcher, Dr Tom Booth, who is now based at the Department of Earth Sciences at London’s Natural History Museum, said: “The problem archaeologists face is finding a consistent method of identifying skeletons that were mummified in the past – especially when they discover a skeleton that is buried outside of a protective environment.

“Research has shown that smoking over a fire and purposeful burial within a peat bog are among some of the techniques ancient Britons may have used to mummify their dead. Other techniques could have included evisceration, in which organs were removed shortly after death. “The idea that British and potentially European Bronze Age communities invested resources in mummifying and curating a proportion of their dead fundamentally alters our perceptions of funerary ritual and belief in this period.”

The SMA Trust has spent nearly £3 million since it was founded and now funds 75 per cent of all UK charity funded research into the condition.

sitran.org
@neuroshef

Source: The University of Sheffield Media Centre
sheffield.ac.uk/news

BRONZE AGE
Dead Rituals of the Past

Researchers using microscopic analysis to compare the bacterial erosion of skeletons from sites across the UK with the bones of the mummified bodies from Yemen have concluded that mummification may have been commonplace in Bronze Age Britain.

Archaeologists widely agree that the damp British climate is not favourable to organic materials and all prehistoric mummified bodies that may be located in the UK will have lost their preserved tissue if buried outside of a preservative environment such as a bog.

Sheffield researcher, Dr Tom Booth, who is now based at the Department of Earth Sciences at London’s Natural History Museum, said: “The problem archaeologists face is finding a consistent method of identifying skeletons that were mummified in the past – especially when they discover a skeleton that is buried outside of a protective environment.

“Research has shown that smoking over a fire and purposeful burial within a peat bog are among some of the techniques ancient Britons may have used to mummify their dead. Other techniques could have included evisceration, in which organs were removed shortly after death. “The idea that British and potentially European Bronze Age communities invested resources in mummifying and curating a proportion of their dead fundamentally alters our perceptions of funerary ritual and belief in this period.”

Researchers using microscopic analysis to compare the bacterial erosion of skeletons from sites across the UK with the bones of the mummified bodies from Yemen have concluded that mummification may have been commonplace in Bronze Age Britain.

Archaeologists widely agree that the damp British climate is not favourable to organic materials and all prehistoric mummified bodies that may be located in the UK will have lost their preserved tissue if buried outside of a preservative environment such as a bog.

Sheffield researcher, Dr Tom Booth, who is now based at the Department of Earth Sciences at London’s Natural History Museum, said: “The problem archaeologists face is finding a consistent method of identifying skeletons that were mummified in the past – especially when they discover a skeleton that is buried outside of a protective environment.

“Research has shown that smoking over a fire and purposeful burial within a peat bog are among some of the techniques ancient Britons may have used to mummify their dead. Other techniques could have included evisceration, in which organs were removed shortly after death. “The idea that British and potentially European Bronze Age communities invested resources in mummifying and curating a proportion of their dead fundamentally alters our perceptions of funerary ritual and belief in this period.”

The SMA Trust has spent nearly £3 million since it was founded and now funds 75 per cent of all UK charity funded research into the condition.

sitran.org
@neuroshef

Source: The University of Sheffield Media Centre
sheffield.ac.uk/news

THE PRICE OF INERTIA
‘Lazy’ Consumers Lose £7.6 Billion

Researchers at the University of Sheffield have got off their bottoms and set up the Institute of Inertia to investigate the truth behind the idea that lazy consumer behaviour might be costing shoppers an extra £7.6 billion a year.

The institute, commissioned by comparethemarket.com, will be led by Dr Thomas Webb, a social psychologist who specialises in understanding how people achieve their goals and make changes to their behaviour. “The fact that people could save money is widely documented, but we know less about what causes people to spend more than they need to,” said Dr Webb.

“One reason that people might struggle to change is that they prefer not to think about their current behaviour – a phenomena referred to as the ostrich problem. The Institute will investigate this idea – and other possible reasons for inertia – across a number of areas affecting people’s finances.”

A report commissioned by comparethemarket.com, questioned 2,052 people to understand their attitudes towards household bills. Almost a quarter (24 per cent) of respondents reported that they ‘worry’ about their household finances at least once a week, rising to more than a third (40 per cent) on a monthly basis.

Dr Webb added: “One of the most significant challenges facing science and society is how to promote lasting changes in people’s behaviour. What kinds of interventions influence the behaviours that lead to obesity or persuade people to use less energy in their homes?”

Paul Galligan, Managing Director at comparethemarket.com said: “Our ambition is for the Institute to develop real, achievable and simple ways to tackle behavioural barriers and inspire people into action.”

comparethemarket.com
/inertia/quiz
In the time it will have taken for the European Courts to rule on the legality of fixing a minimum unit price (MUP) for alcohol, more than 2,000 people will have died prematurely from drink related health problems in Britain.

This is the stark conclusion drawn by researchers at Sheffield’s School of Health and Related Research (ScHARR), whose economic model is at the very heart of one of the major public health issues of our time.

Legislation for MUP was passed by the Scottish Government in 2012, but a legal challenge by the Scotch Whisky Association led to the new law being brought before the European Courts of Justice to see whether it was in breach of free market rules.

“If our research helps to show this policy is compliant with EU law, it could open the floodgates for any other country that wants to introduce a similar policy to do so,” says social policy expert Dr John Holmes, a member of the ScHARR team.

“Our model is absolutely central to the case, as it clearly demonstrates the potential public health benefits that come from introducing a minimum unit price for alcohol.”

Dr John Holmes

Initial work on the model began seven years ago when the Department of Health asked ScHARR for a rigorous assessment of how price increases might affect alcohol consumption. “That identified a clear gap in the research, and the quest for a robust and reliable model was on,” said Dr Holmes.

With over one million pounds of funding from, among others, the Department of Health, the National Institute for Health and Care Excellence (NICE), the Scottish Government, the Medical Research Council (MRC) and the Economic and Social Research Council (ESRC), ScHARR has created a diverse, multidisciplinary team that is setting the pace on research into alcohol harm reduction policy.

“We are headed up by professors with backgrounds in mathematics and psychology,” says Dr Holmes, of a team that includes systems engineers, social policy wonks, economists and physicists. “This means we have people with a strong social science background – who understand the way policy is made and the impact it could have on people – working alongside mathematicians and statisticians to develop sophisticated predictive models.”

By building a close working relationship with civil servants and health professionals at the highest level, the team has ensured that the Sheffield Alcohol Policy Model has real impact. “By collaborating with policy makers from a very early stage we have been able to focus our research in the areas that are most relevant to them.”

ScHARR is also working with the Department of Health to determine how much investment would be needed to bring the patchy nationwide network of specialist alcohol treatment centres around the country up to an acceptable level of provision.

“These centres are vital to reducing alcohol-related harm, but have been seen as something of a Cinderella service,” says Dr Holmes. “The findings from our research will be published in the New Year and are likely to have a significant impact.”

This latest research reflects the team’s growing expertise across the life cycle of alcohol misuse and harm, from the formation of central government policy and early prevention through to the treatment of chronic cases of severe dependency.

“Increasingly we are interested in a more holistic approach to modeling. The government is very interested in the way one public health policy impacts upon another,” says Dr Holmes. As a member of the UK Centre for Tobacco and Alcohol Studies – a network of 13 UK universities and a university in New Zealand – the Sheffield team is widening its research to explore how to more effectively change other health-related behaviours.

“Governments are looking at how best to tackle a broad range of problems that cause premature mortality and morbidity,” Dr Holmes said. “A very long-term goal would be to bring in things like obesity, exercise and diet into a big, overarching vision of what public health policy should look like in the future. By working with other researchers here in the UK and around the world, Sheffield will be able to play an important part in shaping that vision for the future.”

sheffield.ac.uk/scharr
@SARG_SCHARR
RESTORATIVE JUSTICE

Delivering Best Practice

Three of the biggest police forces in the north of England have asked researchers at the University of Sheffield to help them improve the way restorative justice is delivered by frontline officers to the victims of crime and their offenders.

With funding from the College of Policing, Sheffield Law School’s Professor Joanna Shapland and Professor Adam Crawford of the University of Leeds, are investigating how restorative justice is currently delivered and what needs to be done to improve it.

“This is an action research project across three forces – West Yorkshire, South Yorkshire, and Humberside Police – which has to be carried out in just 18 months,” said Professor Shapland, whose longitudinal research into the effectiveness of restorative justice has set the national and international political and legislative agenda on this groundbreaking approach over the last decade.

“We know what best practice looks like and we know what victims find helpful. But sometimes police officers, who are under immense pressure in the work they do, find this difficult to implement. Our goal will be to create tools that officers, going out to incidents and working in communities, will find helpful and easy to use to deliver best practice,” she added.

In designing these tools Professor Shapland and her team will be able to draw on more than a decade of research into restorative justice. Her seven-year research project for the Ministry of Justice, for instance, provided robust evidence for the effectiveness of the first restorative justice pilot schemes in the UK.

This groundbreaking longitudinal research, which also investigated the scheme’s impact on reoffending rates and its beneficial effect on the victims of crime, played a major part in the Ministry of Justice’s commissioning of sentencing options in England and Wales, and has directly informed legislation, including the Crime and Courts Act 2013.

A documentary film made by researchers at Sheffield has won an Economic and Social Research Council (ESRC) impact award for its portrayal of how young offenders move away from crime.

Downloaded more than 10,000 times, Road from Crime, was made by Professors Stephen Farrall, Shadd Maruna and Fergus McNeill. Their ‘desistance framework model’ has helped shape government policy on offender rehabilitation in England and Wales.

Ian Poree, Director of the Ministry of Justice’s Rehabilitation Programme, agrees: “I can say with confidence that research into desistance from crime has significantly impacted on both policy and operational practice, and is shaping the culture and service delivery models of providers across all aspects of offender services.”

Such is Sheffield’s reputation in this field that it hosted the first international conference on desistance – the output from which will be published in book form in 2016 – drawing thought leaders from across the United States and Europe to the city to explore the future direction of research and policy.

“Our outlook is international,” says Professor Farrall. “We are bringing some of the best brains from around the world to collaborate on developing a deeper understanding of this vitally important aspect of crime reduction policy. By learning from one another, we will be better able to inform policy makers on which desistance approaches work best.”

sheffield.ac.uk/law/research/clusters/crc

VOCA TIONAL TRAINING

Adding Value to the UK Economy

Economists at the University of Sheffield are playing a pivotal role in discovering which vocational training courses add the biggest value to the UK economy and offer the best opportunities for young people looking for high value jobs with high earning potential.

Led by the economics of education specialist, Steve McIntosh, the Sheffield team is part of a nationwide research consortium that includes the London School of Economics and Political Science (LSE)’s Centre for Economic Performance, London Economics and the Institute for Employment Studies.

The consortium beat stiff competition to establish a new government-funded Centre for Vocational Education Research, which will provide policy makers with the evidence they need when deciding the future of vocational education in England.

With unprecedented access to information on the six million people who go on training courses every year, the team has been set the difficult challenge of cleaning a vast amount of administrative data. “Our goal is to go beyond correlations by developing innovative, statistical techniques that will allow us to determine whether the training experience is the causal effect,” said Steve.

“By matching this data to tax and benefit records, we will be able to observe what people are doing, whether they are working or not, how much they are earning, and whether they are on benefits.”

This will give us a much more complete picture of the impact training is having on the economy, employers and young people. We will know which skills are most in demand and which qualifications seem best able to supply those skills,” he added.

“We are trying to carry out the kind of experiment a physical scientist would do, holding other things constant so that we could take two identical youngsters, with similar key stage one and two test scores, who went to the same school and had the same average grades at age 16. The only difference would be that one did an apprenticeship and the other didn’t. This would allow us to move much closer to establishing cause and effect. That’s the challenge.”

Sheffield will also be doing some training of its own. “We have been asked by the government to develop the economics of education researchers of tomorrow.

So we will have two new PhD students and a postdoctoral researcher working with us on this project. That makes it all the more exciting as it gives us the chance to build a critical mass of expertise in this vital field here in Sheffield,” Steve said.

In addition to the number crunching, Steve will also be interviewing apprentices at the University’s Advanced Manufacturing Research Centre’s Training Centre. “This will allow us to put some flesh on the bones of the data. We will be looking at what motivates young people to train, what their family background is, how well they did at school, and what happens to them when they complete their course. It will also give us a unique insight into what apprenticeships are like in a university setting.”

Sheffield.ac.uk/OverLSE
Cameron and Osborne have discovered that elite modern crops, which are optimised to a system of high nutrient inputs and chemical control of pests and disease, have lost their natural partnerships with microbes to extract complex nutrients from the soil and build up their defences against natural enemies. “Soil is becoming a hydroponic system: a physical substrate to support plants, but providing little else. Deep ploughing has caused a decline of soil organic carbon, with adverse effects for water-holding abilities and the natural supply of nutrients, and a loss of structure that allows rapid soil erosion,” says Professor Osborne, Associate Director of the Grantham Centre for Sustainable Futures.

Despite this gloomy backdrop, the Sheffield team believe that all is not lost. “Our nineteenth century farming forebears had little access to artificial fertilisers, and consequently had to manage the soil well. The combined application of manures and the rotation of annual crops with grass and nitrogen-fixing legume cover crops, recharged soil carbon and nutrients as well as rebuilt the soil physical structure.”

While this method is still practised on organic farms, the yields are too low to be able to sustain a growing global population. “But a combination of the lessons of history with the benefits of modern technology could provide a sustainable model of intensive agriculture,” Cameron and Osborne argue. The clever rotation of annual and cover crops, plus the application of manure, will restore the vitality of the soil.

Biotechnology, meanwhile, could be used to wean crops off the addictive chemical cocktails they have become all too dependent upon. And, in a Back to the Future scenario, we could even recycle waste as well reducing pollution in watercourses as a result of fertiliser run-off.”

Sheffield’s £2.6 million Grantham Centre for Sustainable Futures brings together a powerful collection of interdependent, multidisciplinary teams whose research is breaking new ground in finding solutions to the grand challenges of climate change, food and energy security, water scarcity and environmental resilience.

“Grantham gives us both the research tools and the voice through which to communicate our research to policy makers in a way that enables us to maximise our impact on these big environmental challenges,” says Grantham’s Associate Director Professor Colin Osborne.

“Grantham brings together research teams from every possible discipline, from the social to the physical sciences, giving our partners easy access to the thought leaders in their fields, and enabling excellent fundamental research to be more rapidly translated into real world solutions to real world problems,” he added.

grantham.sheffield.ac.uk
@granthamcsf

DISCOVER — Issue 07 — Dec 2015

1

RESTORING SOILS FIT for Future Generations

Combining the lessons of agricultural history with the insights of modern biotechnology is the key to reversing the lethal degradation of the world’s soil base, which is now threatening humanity’s ability to feed a growing global population.

This was the powerful message Sheffield’s researchers gave to leading policy makers on the eve of a crucial climate change gathering in Paris – the 21st Conference of Parties on Climate Change (COP21).

Speaking at Chatham House in the run up to COP21, plant and soil scientist Professor Duncan Cameron, and his colleague Professor Colin Osborne, an expert in the evolutionary and environmental physiology of plants, warned that time is rapidly running out for a change in direction. Failure to act quickly could trigger food shortages around the world, with knock on effects in increased mass migration, political and social instability and conflict.

“The current system of agricultural intensification, which consumes 5% of the world’s natural gas and 2% of its energy, is not sustainable,” says Professor Cameron, who heads the P3 Plant Production & Protection research group at Sheffield, a 2022 Futures initiative backed by £8.5 million of university investment. “Even with the current levels of intensification, the yields from a number of key crops have been flattening for the last fifteen years. The model doesn’t work.”

Their research shows the degraded status of the world’s soil is largely responsible for this yield plateau. “Soil is lost rapidly but replaced over millennia and this represents one of the greatest global threats for agriculture.”

“Soil is becoming a hydroponic system: a physical substrate to support plants, but providing little else. Deep ploughing has caused a decline of soil organic carbon, with adverse effects for water-holding abilities and the natural supply of nutrients, and a loss of structure that allows rapid soil erosion,” says Professor Osborne, Associate Director of the Grantham Centre for Sustainable Futures.

Despite this gloomy backdrop, the Sheffield team believe that all is not lost. “Our nineteenth century farming forebears had little access to artificial fertilisers, and consequently had to manage the soil well. The combined application of manures and the rotation of annual crops with grass and nitrogen-fixing legume cover crops, recharged soil carbon and nutrients as well as rebuilt the soil physical structure.”

While this method is still practised on organic farms, the yields are too low to be able to sustain a growing global population. “But a combination of the lessons of history with the benefits of modern technology could provide a sustainable model of intensive agriculture,” Cameron and Osborne argue. The clever rotation of annual and cover crops, plus the application of manure, will restore the vitality of the soil.

Biotechnology, meanwhile, could be used to wean crops off the addictive chemical cocktails they have become all too dependent upon. And, in a Back to the Future scenario, we could even recycle waste as well reducing pollution in watercourses as a result of fertiliser run-off.”

Sheffield’s £2.6 million Grantham Centre for Sustainable Futures brings together a powerful collection of interdependent, multidisciplinary teams whose research is breaking new ground in finding solutions to the grand challenges of climate change, food and energy security, water scarcity and environmental resilience.

“Grantham gives us both the research tools and the voice through which to communicate our research to policy makers in a way that enables us to maximise our impact on these big environmental challenges,” says Grantham’s Associate Director Professor Colin Osborne.

“Grantham brings together research teams from every possible discipline, from the social to the physical sciences, giving our partners easy access to the thought leaders in their fields, and enabling excellent fundamental research to be more rapidly translated into real world solutions to real world problems,” he added.
Fossil fuel dependency may be one of the most pressing global challenges of our time, but for engineering researcher Dr Mark Walker the way to meet that challenge is to be found at the local level: on the ground with villagers in a remote corner of India.

An expert in anaerobic digestion (AD), Dr Walker is part of a multinational, multidisciplinary team drawn from three UK universities and three Indian universities. He and his colleagues in Sheffield’s Energy 2050 group are working with tribal people in West Bengal to develop a sustainable energy system based on energy from waste biomass and a novel solar photovoltaic technology.

“The technology has to be appropriate and practical, otherwise it won’t get used and it won’t bring about the improvements that we want to achieve,” says Dr Walker, who is one of 120 researchers within the recently established Energy2050 initiative, which also supports the Grantham Centre for Sustainable Futures.

Funded jointly by the Research Councils UK (RCUK) and the Indian government, the BioCPV project is developing a new class of solar photovoltaic technologies – Concentrating Photovoltaic (CPV) which will be integrated with biomass and waste power generation and will include high efficiency hydrogen generation and storage.

“It will be the first ever such integrated system combining solar, biomass and hydrogen,” says Dr Walker, who will be travelling out to the village later this year to start up the AD plant and bring power to a village that has never been on the grid.

“We do this by putting in a large dose of inoculum to start the process, and then we have to bring the plant slowly up to full power, from which point on it becomes self-sustaining,” Dr Walker said.

This project, part of an India-UK research programme known as Bridging the Urban-Rural Divide, is aimed at connecting rural people to a localised power supply using an integrated technology they are trained to operate and maintain.

“One of the keys to the success of this project is the strong links between the UK researchers and their counterparts in India. Without good local connections none of this would have been possible,” says Dr Walker. “The connection between our Indian partners and the villagers, and their understanding of tribal customs and cultures, has enabled us to win the trust of the people and gain insights into what they really want and what they need.

“We could not have just walked in to the place and started work. A lot of work had gone on behind the scenes before we arrived that allowed our meeting with the villagers to take place. There is no way this project could work without the social science and local link.

“The project is breaking the traditional boundaries among the renewable energy systems, including CPV, biomass and hydrogen generation and storage. It is also advancing our understanding of how best to integrate CPV and biomass,” he added.

FEATURE — Powering India: Energy Needs of Remote Communities

Fossil fuel dependency may be one of the most pressing global challenges of our time, but for engineering researcher Dr Mark Walker the way to meet that challenge is to be found at the local level: on the ground with villagers in a remote corner of India.

An expert in anaerobic digestion (AD), Dr Walker is part of a multinational, multidisciplinary team drawn from three UK universities and three Indian universities. He and his colleagues in Sheffield’s Energy 2050 group are working with tribal people in West Bengal to develop a sustainable energy system based on energy from waste biomass and a novel solar photovoltaic technology.

“The technology has to be appropriate and practical, otherwise it won’t get used and it won’t bring about the improvements that we want to achieve,” says Dr Walker, who is one of 120 researchers within the recently established Energy2050 initiative, which also supports the Grantham Centre for Sustainable Futures.

Funded jointly by the Research Councils UK (RCUK) and the Indian government, the BioCPV project is developing a new class of solar photovoltaic technologies – Concentrating Photovoltaic (CPV) which will be integrated with biomass and waste power generation and will include high efficiency hydrogen generation and storage.

“It will be the first ever such integrated system combining solar, biomass and hydrogen,” says Dr Walker, who will be travelling out to the village later this year to start up the AD plant and bring power to a village that has never been on the grid.

“We do this by putting in a large dose of inoculum to start the process, and then we have to bring the plant slowly up to full power, from which point on it becomes self-sustaining,” Dr Walker said.

“One of the keys to the success of this project is the strong links between the UK researchers and their counterparts in India. Without good local connections none of this would have been possible,” says Dr Walker. “The connection between our Indian partners and the villagers, and their understanding of tribal customs and cultures, has enabled us to win the trust of the people and gain insights into what they really want and what they need.

“We could not have just walked in to the place and started work. A lot of work had gone on behind the scenes before we arrived that allowed our meeting with the villagers to take place. There is no way this project could work without the social science and local link.

“The project is breaking the traditional boundaries among the renewable energy systems, including CPV, biomass and hydrogen generation and storage. It is also advancing our understanding of how best to integrate CPV and biomass,” he added.

energy2050.ac.uk
@energy2050
One of Britain’s biggest and best loved bread makers has joined forces with researchers at the University of Sheffield and a leading agricultural intelligence provider, to better understand the impact its activities are having on the environment – from the plough to the plate.

“It’s important for Hovis to know where the environmental hotspots in their supply chain are,” says University of Sheffield supply chain and energy efficiency researcher, Dr Liam Goucher. “By working with us, we can help them identify those hotspots and develop targeted solutions that both reduce the impact on the environment and make them more efficient as a company.”

Using real-world data ranging from the energy consumption of its ovens and mills, to the volume of fertiliser used on its farmers’ fields, members of a multidisciplinary research team are now undertaking analysis using the Supply Chain Environmental Analysis Tool (SCEnAT) developed by Professor Lenny Koh at the University’s Advanced Resource Engineering and Social Science Centre.

“This tool allows us to pin point where the weak points in a supply chain are and assess their impact across a range of environmental indicators,” says Professor Koh. Early results, which are currently being poured over by Hovis and independent agricultural intelligence services company, AgriK.

“What makes this project especially interesting to a company like Hovis, is that once we have identified and quantified environmental impact throughout the supply chain, the members of our multidisciplinary team are able to develop viable and sustainable interventions to address key problem areas,” says Dr Liam Goucher, who has undertaken much of the original research.

Whether it is a way to reduce the energy inputs needed to bake the more than 60 million loaves annually in a single bakery, or the development of novel seed varieties and production techniques, the Sheffield team has the intellectual resource to design these solutions.

“Smart companies like Hovis know that reducing energy costs, cutting back on waste, and being more efficient is good not just for the environment, but also for business.”

Professor Lenny Koh

But for biochemist, Professor Peter Horton, of the University’s Grantham Centre for Sustainable Futures, this specific piece of research has much wider implications. “We know that big challenges such as sustainable food production will not be met by research within a single discipline. That’s why we are so passionate about the integration of science, engineering and social science here at Sheffield. By creating teams like this we can not only identify the problems, we can also design the sustainable solutions,” he added.

Researchers at Sheffield will shortly publish a report that shows how onshore and offshore wind farms are significantly reducing wholesale energy costs – contrary to popular myth.

The soon-to-be-published report follows hot on the heels of an independent private sector study carried out by Good Energy. That report also shows how renewable energy is cutting the wholesale price of energy and reducing the cost of subsidies on users.

Dr Lisa Clark, who carried out the research as part of the Sheffield Solar Group, said: “Decarbonising electricity generation is typically saving consumers around £1.5bn per year.”

“Smart companies like Hovis know that reducing energy costs, cutting back on waste, and being more efficient is good not just for the environment, but also for business.”

Professor Lenny Koh

But for biochemist, Professor Peter Horton, of the University’s Grantham Centre for Sustainable Futures, this specific piece of research has much wider implications. “We know that big challenges such as sustainable food production will not be met by research within a single discipline. That’s why we are so passionate about the integration of science, engineering and social science here at Sheffield. By creating teams like this we can not only identify the problems, we can also design the sustainable solutions,” he added.

Researchers at Sheffield will shortly publish a report that shows how onshore and offshore wind farms are significantly reducing wholesale energy costs – contrary to popular myth.

The soon-to-be-published report follows hot on the heels of an independent private sector study carried out by Good Energy. That report also shows how renewable energy is cutting the wholesale price of energy and reducing the cost of subsidies on users.

Dr Lisa Clark, who carried out the research as part of the Sheffield Solar Group, said: “Decarbonising electricity generation is typically saving consumers around £1.5bn per year.”

At the moment the costs of renewable subsidy schemes such as Feed-in Tariff and Renewable Obligation have cast doubt over the future of renewables. But there are very few reports of the actual financial savings from renewable generation like wind and existing savings to consumers. The Good Energy report supplies that evidence, which shows that wind generation is typically saving consumers around £1.5bn per year.”

“So not only is wind energy decarbonising our electricity generation, it isn’t costing any more than any other source of electricity to do so,” Dr Lisa Clark

Researchers at Sheffield will shortly publish a report that shows how onshore and offshore wind farms are significantly reducing wholesale energy costs – contrary to popular myth.

The soon-to-be-published report follows hot on the heels of an independent private sector study carried out by Good Energy. That report also shows how renewable energy is cutting the wholesale price of energy and reducing the cost of subsidies on users.

Dr Lisa Clark, who carried out the research as part of the Sheffield Solar Group, said: “Decarbonising electricity generation is typically saving consumers around £1.5bn per year.”

“Smart companies like Hovis know that reducing energy costs, cutting back on waste, and being more efficient is good not just for the environment, but also for business.”

Professor Lenny Koh

But for biochemist, Professor Peter Horton, of the University’s Grantham Centre for Sustainable Futures, this specific piece of research has much wider implications. “We know that big challenges such as sustainable food production will not be met by research within a single discipline. That’s why we are so passionate about the integration of science, engineering and social science here at Sheffield. By creating teams like this we can not only identify the problems, we can also design the sustainable solutions,” he added.

Researchers at Sheffield will shortly publish a report that shows how onshore and offshore wind farms are significantly reducing wholesale energy costs – contrary to popular myth.

The soon-to-be-published report follows hot on the heels of an independent private sector study carried out by Good Energy. That report also shows how renewable energy is cutting the wholesale price of energy and reducing the cost of subsidies on users.

Dr Lisa Clark, who carried out the research as part of the Sheffield Solar Group, said: “Decarbonising electricity generation is typically saving consumers around £1.5bn per year.”

“Smart companies like Hovis know that reducing energy costs, cutting back on waste, and being more efficient is good not just for the environment, but also for business.”

Professor Lenny Koh

But for biochemist, Professor Peter Horton, of the University’s Grantham Centre for Sustainable Futures, this specific piece of research has much wider implications. “We know that big challenges such as sustainable food production will not be met by research within a single discipline. That’s why we are so passionate about the integration of science, engineering and social science here at Sheffield. By creating teams like this we can not only identify the problems, we can also design the sustainable solutions,” he added.

Researchers at Sheffield will shortly publish a report that shows how onshore and offshore wind farms are significantly reducing wholesale energy costs – contrary to popular myth.

The soon-to-be-published report follows hot on the heels of an independent private sector study carried out by Good Energy. That report also shows how renewable energy is cutting the wholesale price of energy and reducing the cost of subsidies on users.

Dr Lisa Clark, who carried out the research as part of the Sheffield Solar Group, said: “Decarbonising electricity generation is typically saving consumers around £1.5bn per year.”

“Smart companies like Hovis know that reducing energy costs, cutting back on waste, and being more efficient is good not just for the environment, but also for business.”

Professor Lenny Koh

But for biochemist, Professor Peter Horton, of the University’s Grantham Centre for Sustainable Futures, this specific piece of research has much wider implications. “We know that big challenges such as sustainable food production will not be met by research within a single discipline. That’s why we are so passionate about the integration of science, engineering and social science here at Sheffield. By creating teams like this we can not only identify the problems, we can also design the sustainable solutions,” he added.
“What attracts them to Sheffield is our unrivalled expertise in advanced manufacturing techniques, many of which have been developed in our close collaboration with leading companies in the aerospace industry,” Mike Tynan

Unlike large-scale reactors, which are chiefly constructed on-site, this new technology would be produced in factories. “This is what excites our potential partners and the Government. By harnessing the advanced manufacturing techniques developed here at Sheffield they will be able to drive down production costs and deliver the economies of scale that come from multiple production,” Tynan added.

Many of the manufacturing technologies being developed by the Nuclear AMRC – including electron beam welding, diode laser cladding, hot isostatic pressing and large-scale high-precision machining – have the potential to deliver significant productivity savings for SMRs. “We believe the Nuclear AMRC is the only collaborative R&D centre in the world with the capabilities to manufacture key assemblies and components for a full-scale SMR prototype,” Tynan added.

He also sees the growing diplomatic friendship between the UK and China, as evidenced by the recent state visit of President Xi Jinping to Britain, as a positive development.

“Small modular reactor technology has the potential to play a substantial part in the UK’s clean energy future, and also to help boost UK wealth creation by virtue of the significant scope for UK companies to be part of the supply chain for SMR systems,” said Paul Howarth, NNL Managing Director.

“The Nuclear AMRC is working with principal SMR technology vendors in support of their drive for a UK SMR and has the technology, expertise and experience to de-risk SMR programmes, support design for manufacturing, develop innovative solutions for SMR manufacture and deliver high value complex components, large and small,” said Mike Tynan.

namrc.co.uk
@NuclearAMRC
MIDAS TOUCH
A Golden Opportunity

Britain’s next generation of nuclear power facilities will be supported by a newly established research centre which is developing novel technologies and environmentally sound strategies for the safe treatment and disposal of radioactive wastes.

The £3 million Materials for Innovative Disposition from Advanced Separations (MIDAS), is led by one of the UK’s foremost experts in the field, Professor Neil Hyatt, whose work with the British nuclear industry has helped shape policy and practice in the sector.

“Our mission is to provide a high quality environment for research on radioactive waste and disposal, supported by the world-class expertise we have here in the Department of Materials Science and Engineering at Sheffield. We are already working in collaboration with leading industrial users on a range of national and international research projects,” Professor Hyatt said.

Energy Minister Andrea Leadsom said: “Britain is a world leader in nuclear power – from construction to generation to waste management – and these new national facilities at the University of Sheffield will both enhance our thriving scientific and innovative skills base and play an important part in building the Northern Powerhouse.”

CLIMATE CHANGE
Forecasting Sea Levels

Parts of Greenland’s ice sheet have been found to be less vulnerable to climate warming than was previously thought – a discovery that could have a small but beneficial impact on sea level forecasts.

Satellite images and computer model output of ice melt analysed by an international research team, have revealed that despite dramatic increases in melting ice across Greenland in recent years, the speed of ice movement in some areas has slowed rather than accelerated.

Professor Edward Hanna said: “Our research underscores the complexity of the relation between climate change affecting Greenland and the response of its ice sheet to the ongoing warming. It is clearly not always a simple case of more ice melt resulting in faster-flowing ice, as was originally thought by some to be the case.”

Scientists say more research is needed to understand the movement of other parts of the ice sheet which terminate in the ocean and have seen acceleration in recent decades. The study, published in Nature, was carried out in collaboration with the University of Edinburgh and Université Savoie Mont-Blanc in France.

CHALLENGES MET
Sustaining our Water Supply

Sheffield’s pivotal role in meeting the grand engineering challenges identified by the government has been acknowledged with £4.4 million of funding for two new research projects.

The £3.9m TWENTY 65 (Tailored Water to Ensure sustainability beyond 2065) project, involves six universities and 26 companies from across the UK water sector. It will tackle key challenges such as population growth, ageing infrastructure and climate change.

The man heading the project, Professor Joby Boxall, Director of the Sheffield Water Centre, said: “Our vision is that by 2065, collaborative innovation has generated a water sector that is delivering sustainable tailored water solutions that positively impact on public health, the environment, the economy and society. We have support pledged from over 50 partners and will be looking to get more organisations on board.”

The second Sheffield-led project is a new network known as the Engineering Complexity Resilience Network Plus (ENCORE), Professor Martin Mayfield, from Sheffield’s Department of Civil and Structural Engineering, who is heading the network said it will: “Apply a systems approach to areas such as transport, energy and aerospace, so we’re able to improve how complex systems function and improve their adaptive capacity.”

ENCORE has already gained the support of major aerospace and digital companies and national infrastructure managers and will involve academics from 18 UK universities.

Both projects were developed in response to an Engineering and Physical Sciences Research Council call in early 2015 which set out four Engineering Grand Challenges, developed through a two day event involving academics from many disciplines, representatives from industry and government.

sheffield.ac.uk/research/water
Rock fragments obtained from boreholes drilled more than 25,000 feet below the surface waters of the Gulf of Mexico could provide valuable clues as to where best to drill for oil and gas in the world’s most challenging deep-water environments.

A research collaboration between the University of Sheffield and global energy giant, Shell, is investigating whether the rocks have the potential to be a hydrocarbon reserve by analysing the fossilised remains of microscopic phytoplankton.

“These microfossils contain valuable information about what the marine environment was like when they died,” says PhD student Stephanie Wood.

“Among other things, they tell us the thermal maturity of the well, whether it was a shallow marine setting, whether it had high salinity, and whether the water was warm. When we compare and correlate this information with data from nearby oil wells and similar findings in the fossil record, the microfossils reveal how old the rock is and the likelihood of it producing oil or gas.”

Stephanie, whose pioneering work is funded by the Natural Environment Research Council (NERC), is taking part in a national scheme that is training the next generation of researchers and scientists in specialist disciplines where dangerous skills gaps are emerging.

“The energy sector has identified a scarcity of skilled palynologists – people who study dinoflagellates (microscopic phytoplankton), spores and pollen, both living and fossilised,” Stephanie Wood

Her work with Shell is helping the company train a potential new employee, while giving her the breadth of knowledge and skills needed by the industry.

“It’s invaluable experience working and building a relationship with such great people,” she said. “I feel more confident in species identification, and feel like part of the international palynology community.”

There are big advantages for the industry too,

“Our industry has a shortage of micropaleontology specialists, with many contractors close to retirement and not enough young people educated to fill in. NERC studentships enable us to sponsor and educate talent like Stephanie to keep the global skill pool from running dry.”

Dr Katrin Ruckwied, Stratigrapher/Palynologist, Shell

Stephanie’s work in developing a map of the rock underneath the Gulf will systematically help to identify where to drill, leading to safer and more efficient oil and gas extraction.

“In a business where drilling operations costs can be easily over $1 million per day, this information can have a huge impact,” Dr Ruckwied, Shell.

Watch a short film on this research collaboration

See more at: https://www.discover-magazine.com/features/vol-07-no-07/2015-12-training-specialist-disciplines.html

DISCOVER — Issue 07 — Dec 2015
If Professor Steve Peters were ever asked to provide an impact case study for a Research Excellence Framework submission, he would probably shuffle a little uncomfortably and try to divert the conversation to another topic.

Pressed for an answer, this quietly spoken, self-effacing academic might eventually invite the questioner to take a look inside the Olympic Cycling team’s crowded trophy cabinet. Otherwise, he could suggest they talk to snooker star Ronnie O’Sullivan and former England and Liverpool captain, Steven Gerrard. All these elite athletes have acknowledged the impact Peters has had on improving their performance.

It was not a goal he set himself. Balancing a busy academic career with his role as a psychiatrist in the NHS was challenging enough. “But then one of my students took a job with British Cycling as a medic. He asked me for an opinion on one of the team members, which I was happy to do. Shortly after that, the head of cycling, Sir Dave Brailsford, asked if I would work with another team member. It was Sir Chris Hoy. So I went undercover to the Olympic Games where Chris won Gold, and after a year I was persuaded to go full time with the team and leave the NHS.

“I was still undercover, so to speak, as I wasn’t very keen on the limelight, and it took two more years before Dave persuaded me that, as I was now in the world of entertainment, I had to talk to the media. They were increasingly asking who I was, and what it was that I was doing with the team. It was kind of quirky, here is this guy who is in forensic psychiatry and who suddenly pops up working with Olympic squads.”

Nowadays, the Dean of Undergraduate Studies in the Sheffield Medical School is perhaps best known to the wider world as the “brain mechanic” and the author of the runaway bestseller, The Chimp Paradox.

Less well known, perhaps, is also the Director of a recently formed not-for-profit company, Chimp Management, which is based in Sheffield and has more than 30 bright and highly motivated staff who are dedicated to “helping people get the best out of themselves and others.” At this point, Peters is keen to point out that he is “no guru” and repeatedly downplays the importance of his role in the success of others. “I just do what I do,” he says with a disarming lack of self-promotion.

He does, however, acknowledge a gift for communicating the complex neuroscience that underpins the study of the mind to a wider audience. “I was able to hone this skill over many years as an undergraduate lecturer,” says the man who was twice bestowed the University’s coveted Senate award for teaching excellence (a fact he fails to mention, and which has never been repeated).

“It’s a question of finding a language that resonates with the listener or the patient— that’s the job of any doctor, to communicate well.” — Professor Steve Peters

But what makes this difficult is that everybody is unique. I don’t have a recipe for success. If journalists ask me for five tips for the readers, other people might be able to do that, but I can’t.

“There are generic principles, but each person sees the world differently and has different values, dreams and aspirations. Good advice for one person, might be seriously detrimental to another. I am very much determined by the person in front of me. Some people are able to develop the skills to manage their minds and may just want to talk to me once every six months but others need what I call a mentor—someone to catalyse and give insights, but not to make decisions for them.”

When he met Chris Hoy, the athlete was eager to push his mind as well as his body to the limits. “He is a very astute and intelligent man. Chris came to me and told me he thought he was probably not using his mind to its full potential. He wanted that bit more. We talked for a while and I could see there were no deficits, there was nothing he was doing wrong; he just wanted to do more. So we sat down and worked out how to optimise his performance and use his mind even more effectively,” Peters said.

It is because we are so unique that Peters admits a grave reluctance to put pen to paper and write The Chimp Paradox. “I didn’t want people to see it as a recipe book. I wanted them to see it as a challenge. It is just a model that tries to explain how the brain works. If you access it, if you can resonate with it, then the model could work. It starts simple and gets progressively more complex. But if people take it in bite sized chunks, the complexity is still easy enough to swallow,” he said.

That more than 500,000 people have bought the book, suggests that the Peters’ bite sized chunks are not only easy enough to swallow, they are gobbled up.

chimplmanagement.com
When local policeman Roger Smith was made aware of a human skull exposed in the sand dunes above a popular Pembrokeshire beach he knew exactly what to do: rather than call his scenes of crime team, he contacted Dyfed Archaeological Trust.

“People in the area know the St Patrick’s Chapel site at Whitesands, which was excavated back in the 1920s and then more recently the 1970s,” says University of Sheffield archaeologist, Dr Katie Hemer, who is a leading authority on early medieval cemeteries in Wales, and a specialist in reading the past from the scientific analysis of human bones.

“My work happens at the interface between the sciences and the humanities,” said Dr Hemer, a Vice-Chancellor’s Fellow. “By combining bioarchaeology with the ability to draw on historical records you get a much more holistic interpretation of the past.”

In the case of the St Patrick’s Chapel cemetery, however, it looked very much like the past might suddenly be washed away. The skull had been unearthed by a spate of stormy weather, and heightened fears among the Trust that other remains might be threatened by the ravages of coastal erosion, despite previous attempts to stabilise the site.

“We called on Katie because we have a longstanding working relationship with her and she is an acknowledged expert in using scientific methods to unlock the secrets stored in human remains,” Ken Murphy, Trust Director, Dyfed Archaeological Trust.

With funding from Cadw, the Welsh Government’s historic environment service, Hemer and Dyfed Archeological Trust quickly assembled a team of volunteers for a three-week excavation. Among the volunteers was Sergeant Smith. “I had intended to stay for a day or two, but the whole project was so well run that I stayed a full ten days. The sense of community involvement in the project was remarkable. I was being stopped in the street and asked by people how the dig was getting on and what we had found.”

“We discovered around 25 burials in stone-lined graves known as cists,” says Dr Hemer. “And because of the nature of the dunes, we were able to see quite clearly the sequence in which the remains had been buried.”

But there were other discoveries that suggest St Patrick’s Chapel has more intriguing secrets buried deep beneath the sea swept dunes. “Those burials cut through an earlier structure,” says a clearly excited Dr Hemer. “We know it is a very large rectangular building, made from quite large boulders, which was clearly in use before the seventh century. But exactly what it is, and how it relates to the rest of the site is a big mystery and one we hope to solve when we conduct another excavation next year.”

“Among the other important discoveries is the only known example of a cist burial with a cross inscribed grave marker still in situ from this period,” says Dr Hemer. “These findings, along with the discovery of later craft working, and finds which suggest a connection to Ireland, show that St Patrick’s Chapel could be a very significant site in terms of our understanding of early medieval communities in Wales, the development of the church and Christianity in this region, and the connections between Pembrokeshire and beyond.”

With support from the University of Sheffield’s Impact, Innovation and Knowledge Exchange (IIKE) funding, Dr Hemer was able to use the project to reach out to a much wider audience. “We had guided tours of the dig every hour which attracted more than 1,000 visitors to the site during the excavation,” she says. This, coupled with a daily dig diary on the Internet, allowed the wider community to keep up to date with events.

A soon-to-be-published film of the excavation provides a striking visual documentary of the work that went into the project. “But the high point for me was an installation and exhibition at St David’s Cathedral which really raised awareness of what we have been doing. This culminated in a one-day conference for everyone involved in the excavation.”

sheffield.ac.uk/ris/vcfellows
@KatieAHemer
A DAY IN THE LIFE
Simon Foster

Molecular microbiologist Professor Simon Foster is the Director of the Krebs Institute and one of the lead academics behind KrebsFest, celebrating the life and legacy of the Nobel Prize winning researcher Sir Hans Krebs.

6.00am
The alarm rings. It’s a bit early for me, but with KrebsFest looming there’s lots to catch up on. A quick cup of tea before heading down to the station. It’s a crisp clear day in the Peak District.

6.40am
Look at messages on the phone on the journey in from Hathersage. Greg Oldfield says he’s seen a rehearsal of the dance interpretation of the Krebs Cycle. It’s a classical Indian dance group and Greg is excited. I was dubious at first but have come round to the idea. Greg, Vanessa and the rest of the Public Engagement Team have been great in making things happen.

7.30am
Quiet in the lab before the troops arrive. However papers to review and email stream to read. Message from gaming coder John Heap. He is developing an interactive game that the whole audience will play, projected onto one of the walls of the University’s Firth Court.

11.00am
Mark Leake from the University of York calls. We jointly supervise a PhD on the localisation of proteins using super resolution microscopy. Physics meets biology. I tell him about the festival and its theme of ‘hidden worlds’. We will be giving guests cheese nibbles and then inviting them to look down a microscope at the mites that inhabit cheese. Tasty!

11.30am
Snatch lunch (no cheese). The rigging again... Who’d have thought that hanging a 30 metre long inflatable E.coli in Sheffield’s Winter Gardens and then in the Grade II listed Firth Hall would be a problem? Anyway it looks like we will be able to drill holes in the wall so all systems go! The E.coli is one of the centrepieces of KrebsFest along with a Sir Hans Krebs portrait, a painting of the Krebs Cycle and a glass sculpture of a mitochondrion. All to be displayed in Firth Court.

12.00am
Lab meeting time. So important for everyone in the lab to share their results and ideas. Making connections, that’s what it’s all about.

1.00pm
Listen to final year student project presentation. So much to learn…

1.30pm
Catch up with a colleague in the US. Met him a week earlier at a workshop in Banff, Canada. Lots of mathematical modeling, which is certainly not my expertise, but it is always great to be exposed to new ideas and approaches. We have set up a collaboration to do molecular simulations of bacterial cell walls. The computer power he has at his fingertips could help us solve a problem we have been struggling with for more than a decade.

2.00pm
Meeting with PhD student to discuss progress. He has identified the role for a component required for division of S. aureus. Hard work has paid off.

3.00pm
Sort out the schedule for our Nobel Prize winning visitors. Richard Roberts is on the Krebs Institute’s external board. A Nobel Prize winner for his work on gene splicing, he will give a keynote as part of the Festival. He, along with Tomas Lindahl (one of the most recent Nobel prize winners) and Rob Cooke, are wise counsellors.

3.30pm
Look through the videos from the local schools that will be one of the highlights of the Festival. Our PhD students have gone into the classroom and given them ideas on everything from parasites in elephant poo to antibiotic resistant bacteria. What the kids have come up with is fantastic. If these are the scientists of the future, we are in good hands. They are all winners.

4.30pm
Meeting with our collaborator Simon Jones and his team in Chemistry to discuss new probes to determine how bacteria grow. Exciting prospects.

5.00pm
Email to say that a paper of ours has just been accepted. Another physics meets biology fusion, happy with that. Lucky to have such great collaborators.

6.00pm
Time to go. Meeting the family in town and we’re off to see the new James Bond film. Hope KrebsFest gets as good reviews, but perhaps with a fewer explosions.

Image: A giant inflatable E. coli sculpture was suspended in Sheffield’s Winter Gardens as part of the University of Sheffield’s KrebsFest, a seven-week festival celebrating the life and work of the University’s Nobel Prize winning academic Sir Hans Krebs. The artwork was created by installation artist Luke Jerram to contemplate the vital importance of bacteria to our lives, particularly for medical research.

www.krebsfest.group.shef.ac.uk

A point of interest is that the sculpture was suspended in the Peak District National Park, which is an Area of Outstanding Natural Beauty, a natural reserve of beauty and diversity.

www.floreyinstitute.com