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INFINITE MAGAZINE 2014

This issue has been published by Edinburgh Research and Innovation Ltd.
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First Word
by Sandy Finlayson
Senior Partner for MBM Commercial LLP

It is a great privilege to be asked to introduce this edition of Infinite as we are involved directly or indirectly with many of the University’s new spin-out companies and their investors.

I see at first-hand the exciting new technologies which are being developed, the solutions which they offer to make the world a better place and the opportunities which they offer for wealth creation. Li-fi is but one example of a disruptive new technology being developed here in Edinburgh.

Mankind will face its greatest challenges in the decades ahead as the world’s population edges up to 10 billion. There will be ever increasing demands for food, water, energy, health, climate, physical and cyber security. These challenges will only be solved by constant innovation and we are fortunate indeed that the University of Edinburgh is at the forefront of meeting so many of these challenges.

It is no exaggeration to say that the University has placed itself at the heart of entrepreneurship not just in Edinburgh but across the whole of our knowledge-based economy. We must all be grateful that innovation and entrepreneurship are flourishing at so many different levels within the University.

Through the efforts of Edinburgh Research and Innovation, the University is one of the top universities in the UK for the creation of spin-out companies and they have just introduced a new programme to take the lead in creating up to ninety additional new spin-out companies across Scotland over the next three years.

The University is also involved in many other initiatives such as Edinburgh BioQuarter, Edinburgh Centre for Carbon Innovation, Informatics Ventures and the Business School, to name but a few, which reach out successfully to the wider business-community for the benefit of us all.

We have over £750 billion under management in Scotland, much of it in Edinburgh, and we have some world class scientific research going on in the University.

The technology revolution happened in California because the business and financial communities were able to spot the potential of emerging new technologies and provide the funding.

We have taken a leading role in supporting the development of the Centre and we continue to provide strategic and commercial support.

The award winning Enterprise Support programmes at the University have continued to demonstrate why Edinburgh and Scotland remains the leading university/region in the UK for university company formation. In the past five years, ERI has supported 180 new business ventures who will further contribute positively to Scotland’s economy as they grow and flourish.

We were particularly pleased this past year that Edinburgh was chosen by the Scottish Funding Council to lead a new Scotland wide programme, in collaboration with the Universities of Aberdeen and Strathclyde, to boost enterprise and company formation activity by postgraduate students from all Scottish universities. The Enterprise Campus’ programme formally started at the beginning of August 2014, and aims to support the formation of 90 new technology companies from Scottish universities over the next three years.

We have taken a leading role in supporting the development of the Li-Fi R&D Centre that is led by Professor Harold Haas from the School of Engineering. The Centre aims to lead the global development of Li-Fi technology as a new $4 billion industry to provide a long-term solution to the expanding use of wireless communications. ERI has been instrumental in progressing this development of the Centre and we continue to provide strategic and commercial support.

We are proud to be Business and Enterprise Support Providers for the Scottish Funding Council’s Scotland-wide Enterprise Campus programme and for the Centre for Carbon Innovation’s Enterprise programme.

Organisations who have worked with ERI know what we (and the University) can do to help them address the challenges they face, and to those who have yet to experience the world-class expertise, services and facilities on offer at Edinburgh, I would encourage you to get in touch.

To find out more contact: Derek Waddell, Chief Executive Officer, Edinburgh Research and Innovation
Derek.Waddell@ed.ac.uk

Images: Left Sandy Finlayson, Senior Partner MBM Commercial LLP
Right Derek Waddeil, Chief Executive Officer, Edinburgh Research and Innovation
The University of Edinburgh has been successfully translating its world-class research into intellectual, social and economic benefits for business, industry and society around the world for over 45 years. Innovations from Edinburgh branch across many facets of everyday life, including healthcare, communications, energy and the environment. With over 150 new discoveries being disclosed every year, this offers an effective route for businesses and other organisations, to translate cutting-edge research into profitable new products, processes and services.
In June, the University of Edinburgh became the first university in the world outside Scandinavia to host an Academic Industry Meeting day or AIMday®, a collaborative knowledge exchange initiative which began life at Uppsala University in Sweden.

Organised by Edinburgh Research and Innovation (ERI), Edinburgh’s first AIMday focused on the topic of Modelling and Simulation and gave companies access to academic specialists capable of identifying solutions to specific business issues.

Companies attending the event posed a question around a company challenge, which was then tackled by a group of academics in a one hour session. Working collaboratively, the group identified pathways to solutions for the challenge with the goal of establishing future collaborative research projects.

Ian Sharp, Commercial Relations Manager at ERI, commented:

“The AIMday concept has proved a successful first step in the process of transferring University expertise out to industry. By providing a platform for exchanging information and ideas, as well as developing contacts, the event helps to identify areas for future possible collaborations which benefit both parties.”

The event was considered a success by company delegates and academics who attended the day, with the breadth of questions posed from industries as varied as brewing, oil & gas and forestry.

One company attendee commented;

“It was very well organised, especially for the first one of its kind at Edinburgh. Topic depending, I will definitely be back to another of these events.”

Plans are underway to run a second AIMday event later in 2014, around the theme of ‘Materials’, with two further events penciled in for 2015.

New online portal to boost product licensing at Edinburgh

Earlier this year Edinburgh Research and Innovation (ERI) launched its new online licensing portal to provide faster and easier access for business and research-based organisations to proprietary technologies created at the University of Edinburgh.

World-class research carried out at the University gives rise to a range of research tools, software and copyright materials that are of interest to academic colleagues. These tools can be often of considerable value to commercial partners too, whether enabling their R&D programmes or through direct productisation.

ERI became the first UK technology transfer office to offer a fully online licensing service to industry in 2009 with the launch of its original click-thru system. Since then, numerous licence deals have been entered into online, including over 25 for the CRFManager® software developed at the University’s Wellcome Trust Clinical Research Facility.

The new ‘click-thru licensing’ portal provides additional functionality and flexibility to help further streamline the end-to-end online licensing process, including online payments and direct access to downloadable software.

Dr Angus Stewart-Liddon, Licensing Executive at ERI, commented:

“The new system allows us to provide access to more University technologies, more efficiently. Our first fully automated deals have already been completed, where customers have been able to enter into a licence, pay by credit card and download their University software within minutes.”

The new portal was developed in collaboration with UCL Business and is based on their E-Lucid system, which was established with funding from the UK Intellectual Property Office’s Fast Forward competition.

There are now 23 ‘click-thru’ products available – all under standard commercial terms.

Find out more: 
www.aimday.se

Strategic investment in poultry research to improve food production

The UK poultry industry produces approximately one billion chicken, turkeys, ducks and geese every year, which accounts for around half of all meat eaten in the UK. It employs around 55,000 people and contributes £3.5 billion a year to the UK economy. Therefore, advances in poultry health and welfare research can be enormously beneficial to industry as well as the economy.

One of the world’s largest poultry breeders, Cobb Ventures, Inc., has recently agreed to fund a three-year strategic partnership with the University of Edinburgh’s Roslin Institute, the world famous animal research centre. This £1 million agreement will fund joint research projects to advance poultry genetics and improve food production.

The first collaborative project for the partnership has been granted to Cobb-Europe Ltd. This three-year collaborative research program will explore innovative cryopreservation (biobanking) and cutting edge sequencing technologies in commercial poultry production to address food security in developing markets and how to sustain flock diversity for the future.

“These are exciting new areas which we hope will lead to major breakthroughs in avian health and preservation.”

said Dr Christine Daugherty, chief technology officer of Cobb.

This announcement follows the launch of a new £14 million state-of-the-art National Avian Research Facility (NARF) at the University’s Easter Bush Campus, as part of Roslin’s research portfolio which supports a £85 billion global poultry market.

Find out more:
www.roslin.ed.ac.uk

In brief

Spin-out seeks crowd support

Carbomap, a new spin-out company from the University of Edinburgh’s School of GeoSciences, was launched in 2013 with an initial £141,000 investment from Scottish Enterprise’s SMART Scotland fund and the University’s Edinburgh Technology Fund.

The company is embarking on an ambitious plan to raise further capital through equity crowdfunding platforms to further develop its proprietary technology to map and measure the amount of carbon dioxide produced by the world’s forests.

New deal to expand successful iPad game

In September 2013, Edinburgh Research and Innovation announced further licence agreements with an award-winning games company to build on the success of an educational game for young children with autism, which was developed by researchers at the University.

The latest deal will enable Tigerface Games to create a suite of three new games for FindMe, which aims to improve the social skills of autistic pre-schoolers through this free interactive iPad-based games app.

UK first for student business challenge

In November 2013, over seventy students from a wide range of academic backgrounds participated in a US entrepreneurship programme at the University of Edinburgh, which was run in the UK for the first time as part of Global Entrepreneurship Week 2013.

The inaugural 3 Day Startup (3DS) helped the students develop their entrepreneurial skills in a live entrepreneurship lab in the university campus, and ‘create a fledging business’ in just 72 hours.

A second 3DS event is planned in October 2014.
Living in a complex material world

The University of Edinburgh’s School of Physics and Astronomy hosts one of the world’s top research groups in complex fluids (‘squidgy liquids’), as can be found in every bathroom and kitchen. Such fluids, from toothpaste to ketchup, have an identity crisis when it comes to flow, sometimes behaving like a liquid and sometimes like a solid. For example, toothpaste flows out of a tube to sit on your toothbrush!

Since Professor Peter Pusey founded the Soft Matter Physics research group in the early 1990s, its researchers have applied their knowledge to solve industrial problems and derived inspiration for fundamental research in turn.

Such activities increased sharply when Dr Rut Besseling, Dr Andy Schofield and Professor Wilson Poon published a paper in 2007 with a collaborator from Emory University, showing that they could collect and analyse high-resolution images in real time of complex fluids under flow. This technique promised new insights on how microscopic constituents in squidgy liquids (e.g. the abrasive powder in toothpaste) influence their strange macroscopic flow properties.

Accordingly, many industrial scientists started to beat a path to Edinburgh to take a look, usually for the very first time, at how the ingredients of their previous experience as postdoctoral researchers within the research group. Professor Poon has led to the recent appointment of Honorary Professor Alex Lips, previously the Principal Scientist at Unilever, is an exciting new addition to the team, sharing valuable industrial perspectives that help bridge the cultural divide between fundamental academic research and real challenges experienced by industry. Further, invigorating research ideas and themes are emerging through work with industry which is beginning to influence the direction of future academic research.

In two years ECFP has carried out a range of projects across a real diversity of applications. Over the past year alone, ECFP has worked with 16 different organisations from a wide range of sectors, including food & drink, pharmaceuticals, personal care, coatings and agrochemicals. Here are a few examples.

**PAWSitively Natural Ltd, Glasgow**

Researchers at ECFP helped this Scottish start-up company develop a formulation for a new toothpaste in which therapeutic ingredients, discovered by the company, are protected until application. This work was funded by an Innovation Voucher from the Scottish Funding Council and Follow-on Funding is currently being pursued to bring development of this product closer to market.

**Lyon Healthcare Ltd, Lockerbie**

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**The Mentholatum Company Ltd, East Kilbride**

Mentholatum repeatedly returns to ECFP to ensure that the manufacture and supply of high quality consumer healthcare products continues to meet their customers’ high expectations. The company worked with ECFP during its transition from a legacy processing facility to an advanced large-scale facility to ensure that its topical medicinal products (including Deep Heat™) were consistent with those manufactured previously.

**Ipsen, France**

Research Associate, Jay Gillam, is currently enjoying a six month industrial placement exploring protein aggregation with the multinational pharmaceutical company, Ipsen, based in France. The placement is funded by the Scottish Universities Physics Alliance to encourage collaborative research between Scottish universities and companies.

Such projects bring financial benefits to companies of all sizes, from start-ups to global multinationals, through product innovation and, in the longer term, by solving manufacturing challenges.

The ECFP model has been supported by the Head of School, Professor Arthur Trew, who is very keen to support interdisciplinary research, especially when it delivers benefits to both our research and the UK economy.

"The University has built its reputation on research excellence. It is vital that we support initiatives such as ECFP, especially when they demonstrate industrial impact."

"One of the delights of working with industry is that new material structures and requirements are revealed which inspire new academic research topics – knowledge exchange really is a two-way process!"

With a project portfolio that includes consultancy work, industrially led research, industrial placements, postgraduate projects and summer studentships, ECFP offers new opportunities for researchers to gain an understanding of the industrial environment and challenges. The exposure to industrial environments is also enhancing the employability of physics students and postdocs as they progress from working with ECFP into jobs with industry.

ECFP is also a collaborating partner in the EPSRC Centre for Doctoral Training in Soft Matter and Functional Interfaces, which is providing industrially integrated postgraduate training in research, enterprise and innovation for future industrial leaders.

Dr Tiffany Wood says:

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"One of the delights of working with industry is that new material structures and requirements are revealed which inspire new academic research topics – knowledge exchange really is a two-way process!"

**Images:** 01 ECFP’s food testing lab 03 Dr Tiffany Wood and Professor Wilson Poon
Innovative ways
to watch paint dry

AkzoNobel is the largest global paint and coatings company, producing well known UK decorative paint brands, such as Dulux, Glidden, Cuprinol and Hammerite. Passionate about innovation and seeking sustainable solutions, they are keen to work with others who bring ideas and complementary knowledge, know-how and technologies that help them to accelerate the delivery of innovation.

When ECFP’s Dr Tiffany Wood met AkzoNobel’s Dr Phil Taylor at a Technology Strategy Board event in early 2013, this chance meeting led to a fascinating project that has revealed previously unseen changes in paint structure as paint dries.

During this meeting, Dr Wood told Dr Taylor about ECFP’s fast ‘rheoimaging’ system, which allows the 3D microstructure of a sample to be reconstructed when the sample is subjected to an external field, applied shear or temperature and humidity variations. Dr Taylor soon realised that this instrument might be very useful for watching paint dry.

During the summer of 2013, AkzoNobel funded an eight-week summer studentship to carry out a feasibility project to see if ECFP’s confocal laser scanning microscope could be used to elucidate the microstructure of their paint product as it dries. Fluorescent dyes were mixed into the paint to help differentiate and identify the location of oily polymeric emulsion droplets and water in the continuous phase. Through this work, scientists at AkzoNobel gained new insights into the processes of film formation and drying within their paints.

Dr Taylor, leader of AkzoNobel Decorative Paints Open Innovation, said of the project: “Great progress was evident for just eight weeks’ work and a good display of the power of the technique has provided us with valuable technical insights, which we intend to follow up with further work with the University.”

For Matthew McCluskey, an undergraduate Masters student at the University, “my summer studentship with AkzoNobel provided me with an opportunity to experience working with physics in industry. I gained valuable experience that has improved my research and presentation skills and I now feel better prepared as I enter my Master’s year and for work after University.”

From small beginnings, several projects have been generated and now this technique is being used to investigate the effect of brushing on paint structure as it dries and to image the microstructure coatings used to seal the inside of beverage cans. This summer, AkzoNobel is funding another student with ECFP who is exploring an alternative technique, Diffusing Wave Spectroscopy, to see whether it can be used to predict the shelf-life of a can of paint.
Blackford Analysis is a supplier of software products that speed up the comparison of medical images, saving the time of healthcare professionals and increasing their productivity.

The company was spun out from the University in 2010 by Dr. Panter, after receiving funding from Scottish Enterprise and US-based angel investors. Four years later and with a second round of funding completed, the company has grown significantly with a presence in both the UK and the US.

Dr. Panter is positive about the spin-out process that enabled him to start the company:

“It was tough, but invigorating. In becoming an entrepreneur you are empowered to do what you think is right, and you have to try to not get too bogged down with the details.”

One of the main differences between being an academic and an entrepreneur is the focus on the product rather than the technology.

Dr. Panter said:

“In business there’s a relentless focus on the product proposition and its fit to the customers’ needs, which is of far higher importance than perfecting the technology. In making the transition from academic to entrepreneur, there’s a whole new set of skills to learn. Professional networking, effective delegation, recruitment and management are all essential for a business, but not necessarily what you might know from an academic background.”

Edinburgh Research and Innovation at the University of Edinburgh offers assistance to spin-out companies in a variety of forms, which were very important to Blackford Analysis in its early days.

“Edinburgh has an excellent framework for start-up and spin-out companies in helping them get the assistance that they need. I found that they had huge resources for giving advice to young businesses, and a comprehensive external network of people who could help me, such as investors and mentors.”

The University of Edinburgh has an excellent framework for start-up and spin-out companies, which were very important to Blackford Analysis in its early days.

Dr. Panter also speaks highly of Informatics Ventures and Scottish Enterprise who have both contributed to his success:

“I received world-class expertise from Informatics Ventures, who understand the process of starting and running a company, and were able to give me comprehensive training on this. Additionally, the High Growth Start-Up Unit at Scottish Enterprise gave me useful pre-company and post-spin-out support and advice.”

With sales offices now in the UK and the US and plans to further expand their product range over the healthcare sector, it looks to be an exciting few years ahead for Blackford Analysis. So would Dr. Panter recommend that other aspiring academics follow the same path as him?

“If you’re willing to leave academia and have massive drive, energy and ambition then yes, I think it’s a great route to follow. If you don’t want to commit 100% (in life as well as in your career) then I’d suggest finding an alternative route, perhaps partnering with a postdoc, PhD or MBA student who can build a team to take the technology out into a company for you.”

Finally, Dr. Panter has some words of wisdom for entrepreneurial academics looking to form spin-outs:

“Just remember that it’s a marathon not a sprint, and you’re in it for the long haul.”

Academic success in switch from bench to boardroom

The transition from academic to entrepreneur by Dr Ben Panter, the CEO of Blackford Analysis, is a prime example of the success that can be achieved through the University of Edinburgh’s spin-out process.
Investing for success

High Growth

the University of Edinburgh has recognised an opportunity to invest in its spin-out and start-up companies.

In 2011 the University of Edinburgh established a fund called Old College Capital (OCC) with the support of the Endowment Fund. OCC works in partnership with investors who are interested in high growth potential businesses.

OCC has a private sector Investment Committee and operates on a fully commercial basis. Currently the fund invests an average of £250,000 in each company, and adopts a ‘co-investment model’, working alongside venture capitalists, angel groups and corporate investors. External investors have welcomed the fund and take confidence in OCC’s investment strategy through larger and longer term engagements with companies like Blackford Analysis. In this way, enterprise academics can focus on building sustainable businesses while maximising the commercial impact of their research.

Previous collaborations with investment partners have proven to play a pivotal role in creating successful businesses. Besides additional funding, the partners provide valuable expertise and industry contacts, thus creating a mutual partnership beneficial for both sides.

In May 2014, OCC invested £150,000 in Peakabu Studios, a technology company founded by Alex Cole, a Design and Digital Media graduate of the University. OCC’s investment joined one by Jenson Digital Media graduate of the University. Together with Old College Capital, the University is going to adapt its investment strategy through larger and longer term engagements with companies like Blackford Analysis. In this way, enterprise academics can focus on building sustainable businesses while maximising the commercial impact of their research.

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OCC’s portfolio of investments includes Blackford Analysis Ltd, Destina Genomics Ltd, i2eye Diagnostics Ltd, Mobile Aculy Ltd, Peakabu Studies Ltd, SkoogMusic Ltd, and Solant Technologies Ltd.

Experts collaborate to improve dementia signage

An award winning design agency based in Leith has been working with the Universities of Edinburgh and Stirling on a joint project to develop a new and innovative set of signage for people with dementia.

StudioLR met Interface – The knowledge connection for business at an industry event in December 2013. Dissatisfied with existing ‘way-finding’ products for dementia, and sensing an opportunity for a fresh and novel approach, the company wanted to access Scotland’s academic expertise to use the latest research to inform their design, ensuring an effective, as well as an attractive, finished product.

Interface identified extensive research expertise in the care of people with dementia at Edinburgh and Stirling, and proposed both universities to StudioLR. After discussions with both universities it was agreed that a collaborative approach to the project would be the best solution to provide the company with access to the most wide ranging expertise. A Scottish Funding Council (SFC) Innovation Voucher was also awarded by Interface to support this project.

The project was led by Professor Heather Wilkinson, a leading researcher in dementia, undertook an extensive literature review of all the studies that have been published around the world on dementia and living environments. The review highlighted key factors, such as placement of signage for maximum impact, colours, and other elements, relating to how people with dementia can become disorientated and how to best help them to find their way. Their findings would be used to inform the company’s design process.

The University of Stirling provided research input through Dr Fiona Kelly, an academic with valuable first-hand experience of a care home environment, who was able to give practical feedback on the design, informing the company’s design process.

The University of Stirling provided research input through Dr Fiona Kelly, an academic with valuable first-hand experience of a care home environment, who was able to give practical feedback on the design, informing the company’s design process.

As a result of this successful business-academic collaboration, StudioLR has developed a set of design guidelines for creating consistent signage to increase independence and wellbeing for older people and dementia patients in care homes, hospitals or other related environments.

The group is looking to capitalise on this work to date and it is likely that there will be other opportunities to work together to further develop this and other products.

Lucy Richards, Creative Director at StudioLR, said: “The collaborative process we have experienced working together with the Universities of Edinburgh and Stirling on the Innovation Voucher has been both stimulating and fruitful, with exciting new thinking emerging throughout the process. As the project builds in momentum our purpose has become clearer and more worthwhile.”
Research translates into healthcare spin-out

Potentially fatal lung complications are a common problem for ventilated patients in intensive care units (ICU). There is currently no method to accurately determine whether ICU patients have infections, inflammation or scarring in their lungs. Therefore, doctors caring for these patients face many challenges, often needing to make quick decisions without the information necessary to properly inform such decisions.

A new approach to rapidly diagnose lung complications in ICU patients would enable doctors to target the correct drugs to the appropriate patients and to withdraw drugs with confidence; thus revolutionising ICU care. This would improve patient outcomes, reducing the high death and disability rates, and result in major cost savings for the UK’s National Health Service.

For the last five years an interdisciplinary team at the University of Edinburgh, led by Professor Mark Bradley, Professor Chris Haslett and Dr Kev Dhaliwal, have been targeting this important issue.

The research team have been developing advanced Optical Molecular Imaging (OMI) technologies, particularly fluorescent ‘smartprobes’ with the potential to address major unmet needs in the diagnosis and monitoring of several major diseases.

These fluorescent probes will be delivered in tiny amounts [microdoses] to detect harmful processes deep inside the human body and provide rapid diagnostic results at the bedside, in real time and at molecular resolution.

The researchers have worked closely with Edinburgh Research and Innovation’s IP Development Manager, Dr Keith Finlayson, from the outset of these activities and have secured over £7 million of translational research funding from the Medical Research Council, Wellcome Trust and Department of Health to develop these technologies.

The team’s research has primarily focused on making smartprobes to image neutrophils, bacteria and lung scarring, as well as looking at the implementation and use of such technologies in a clinical setting.

In early 2014, a University of Edinburgh spin-out company, Edinburgh Molecular Imaging Ltd [EMI], was formed to expand on, develop and take the innovative smartprobes to the global healthcare market.

On formation of the company, Liz Roper, Partner at Epidarex Capital, said:

“We believe this technology has the potential to facilitate major changes in the in-vivo diagnostic medical imaging market, particularly in areas of high mortality and high cost, where current diagnostic tools are failing to improve patient outcomes. We are looking forward to working closely with the EMI team to take this product into the global healthcare market.”

Dr Kev Dhaliwal, co-founder of EMI, added:

“As respiratory clinicians, we are faced with diagnostic uncertainty on a daily basis and we have few means in our current practice to rapidly and accurately diagnose, monitor and treat many pulmonary conditions. Over the past five years, we have been developing know-how and expertise in optical molecular imaging at the University to overcome these hurdles. The investment in Edinburgh Molecular Imaging by Epidarex Capital heralds an important landmark in the journey of taking our concepts and research from the bench to the bedside and, ultimately, to improve patient care.”

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For the last five years an interdisciplinary team at the University of Edinburgh, led by Professor Mark Bradley, Professor Chris Haslett and Dr Kev Dhaliwal, have been targeting this important issue.

The research team have been developing advanced Optical Molecular Imaging (OMI) technologies, particularly fluorescent ‘smartprobes’ with the potential to address major unmet needs in the diagnosis and monitoring of several major diseases.

These fluorescent probes will be delivered in tiny amounts [microdoses] to detect harmful processes deep inside the human body and provide rapid diagnostic results at the bedside, in real time and at molecular resolution.

The researchers have worked closely with Edinburgh Research and Innovation’s IP Development Manager, Dr Keith Finlayson, from the outset of these activities and have secured over £7 million of translational research funding from the Medical Research Council, Wellcome Trust and Department of Health to develop these technologies.

The team’s research has primarily focused on making smartprobes to image neutrophils, bacteria and lung scarring, as well as looking at the implementation and use of such technologies in a clinical setting.

In early 2014, a University of Edinburgh spin-out company, Edinburgh Molecular Imaging Ltd [EMI], was formed to expand on, develop and take the innovative smartprobes to the global healthcare market.

On formation of the company, Liz Roper, Partner at Epidarex Capital, said:

“We believe this technology has the potential to facilitate major changes in the in-vivo diagnostic medical imaging market, particularly in areas of high mortality and high cost, where current diagnostic tools are failing to improve patient outcomes. We are looking forward to working closely with the EMI team to take this product into the global healthcare market.”

Dr Kev Dhaliwal, co-founder of EMI, added:

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New centre signals a bright future for Li-Fi industry in the UK

THE world’s answer to unsustainable demand for wireless bandwidth is being pioneered in Edinburgh and urgently needs industry partners to develop next-generation products and services.

Li-Fi – light fidelity – enables off-the-shelf LED lightbulbs to transmit data at ultrafast speeds and offers 10,000 times more capacity than the existing radio spectrum, which supports Wi-Fi.

Professor Harald Haas, Chair of Mobile Communications at the University of Edinburgh, is widely recognised as the ‘father of Li-Fi’ and is the driving force behind the University’s new Li-Fi Research and Development Centre.

“The amount of data that’s transmitted on the mobile network is accelerating by a compound annual growth rate of about 70 to 80%, which means that by 2018 we’ll be transmitting the equivalent of 1.8 million years of high definition video per month,” explains Haas, whose work has been compared in significance to that of Sir Tim Berners Lee, inventor of the World Wide Web.

“This means we’re about to run out of spectrum, and Ofcom (the UK’s industry regulator for communications) has issued a warning that the UK may have a major problem by 2020.”

Haas’s solution harnesses the very high flicker rate of LEDs – which can achieve one billion on-off cycles per second versus the 100 cycles per second of a standard TV or computer monitor – to transmit data digitally. This rapid modulation can’t be seen by the human eye but is picked up by receivers (photodetectors) at speeds of up to 4 gigabits per second for a single LED, using three colours – red, green and blue. This would mean 12 gigabits from a light source that sends out white light – many thousands of times faster than the 30 to 100 megabits per second speed of a standard household superfast wireless broadband connection currently.

Haas describes Li-Fi as an emerging industry that could be worth at least £5 billion to Scotland’s economy and calls on commercial partners to help develop products across sectors including mobile communications, energy, healthcare, transport, manufacturing, security and advertising.

Haas explains:

“It’s very critical that industry gets involved because that’s how we’re going to spread the take-up of Li-Fi through applications in wireless communications, healthcare, security, intelligent transport, advertising, industrial processes, sensor networks and many more. What we’re trying to do at the Li-Fi Centre is develop reference designs for all these various applications and work with industry to get them into the market. We can help companies enhance their products and develop a strong patent portfolio by providing all that’s needed to commercialise their products, whether that’s through licence agreements or new spin-out companies. The idea is to be the catalyst for this new industry and maximise its impact for society, business and the economy globally.”

Key applications for Li-Fi include environments that don’t currently support Wi-Fi, such as aircraft cabins, hospitals and hazardous environments. Because light waves don’t pass through walls, indoor light sources in aircraft cabins can be used as wireless data transmitters without interfering with the aircraft’s equipment. In healthcare, micro LEDs integrated into an earring, for example, can monitor changes such as temperature, blood pressure or sugar levels and transmit the data to your mobile phone direct, or via the light fixtures in the room to your local surgery.

In hazardous environments such as offshore oil and gas platforms, using light waves to check the safety of gas pipes could save the industry hundreds of millions of pounds a year.

Haas explains:

“These gas pipes have to be shut off every six months for maintenance and that currently costs about $200,000 a time. The radio frequency spectrum can’t be used offshore for fear of sparking explosions so the answer is to use a light source at the bottom of the pipe that continuously measures the gas pressure and temperature and transmits this to a photodetector at the top.”
A connected future

A connected future

The beauty of Li-Fi is that it uses existing infrastructure, avoiding the need for thousands of radio masts, as the current spectrum requires. If the world’s lampposts were fitted with LED lightbulbs, for example, they could provide the next 5G and 6G networks. Li-Fi is also free, unlike the radio spectrum, which the government licences for billions of pounds a time, and does not carry the health risks of Wi-Fi, which has the potential to be carcinogenic, according to the World Health Organisation.

The students.

We’ve established relationships with key players in the security defence, lighting and wireless communications market, as well as gaining traction in the healthcare and home automation industries. The Li-Fi R&D Centre has the potential to engage companies and businesses that not only develop Li-Fi solutions (such as us) but also Li-Fi components. For example, the optical requirements for Li-Fi are unique and so present a huge new opportunity for industry.”

National Instruments, the Texas-based producer of automated test equipment and virtual instrumentation software, is working with the Li-Fi R&D Centre to explore the potential of new wireless technologies in its market.

“Our tools are uniquely suited to allow researchers like Professor Haas to rapidly prototype systems to test out these new ideas,” says Erik Luther, Marketing Group Manager for National Instruments’ software defined radio division.

National Instruments, producer of automated test equipment and virtual instrumentation software, is working with the Li-Fi R&D Centre to explore the potential of new wireless technologies in its market.

“Li-Fi is the world’s first Li-Fi system to deliver cost-effective, high-speed data communication (up to 10Mbps) using commercial LED lighting. The system has proven so popular with customers worldwide that a second production run was required within the first quarter!”

According to Professor Haas:

“Li-1st is the world’s first Li-Fi system to deliver cost-effective, high-speed data communication (up to 10Mbps) using commercial LED lighting. The system has proven so popular with customers worldwide that a second production run was required within the first quarter!”

“‘Li-1st’ is the world’s first Li-Fi system to deliver cost-effective, high-speed data communication (up to 10Mbps) using commercial LED lighting. The system has proven so popular with customers worldwide that a second production run was required within the first quarter!”

The company attracted financial support worth over £1 million in grants and initial seed funding from a leading investment syndicate within its first year of trading. With an experienced management team in place, it set about developing the first commercial Li-Fi product.

In October 2013, the company’s first prototype Li-Fi technology application was launched by Boris Johnson, Mayor of London, as part of a ‘Sustainable Schools’ project installed at the Business Academy Bexley in London. The school had installed new LED light fittings and is working with pureLiFi to trial Li-Fi technology with the LED lights to deliver internet services to the students.

At the start of 2014, and now called pureLiFi™, the company released its first commercially available Li-Fi product for pilot Li-Fi projects with industry partners.

The company is also developing the ‘Li-Fire Platform’, which will enable the world’s first ubiquitous high-speed wireless network solution using visible light communications.

Edinburgh spin-out LEDs the way

In 2012, following a successful Scottish Enterprise Proof of Concept project, pureLiFi Ltd (or pureVLC as it was known then) was spun out from the University’s School of Engineering to commercialise Li-Fi technology developed by Professor Harald Haas.

The Li-1st system provides the first major opportunity for customers to rapidly develop and test Li-Fi applications, not forgetting that it simultaneously provides ample illumination from a standard, off-the-shelf, LED light.”

The company has also been approached by billionaire Hollywood movie mogul Peter Guber to showcase Li-Fi in a new state-of-the-art arena planned for his San Francisco basketball team, the Golden State Warriors.

About Victoria Masterson

Victoria Masterson is a respected freelance business journalist, copywriter and producer with more than 20 years’ experience in print and broadcast journalism. Formerly Scottish business editor of The Sunday Times, she specialises in web, intranet and print content for sectors including economic development, inward investment, technology and financial services.

A connected future

The Li-Flame, a precursor to the Li-Fire and sharing much of the same functionality, was deployed in September 2013.

The Li-Fire technology will meet data transmission and security requirements to complement current Wi-Fi solutions.

In addition, the combination of LED-based lighting with wireless communications will provide a measurable reduction in both infrastructure complexity and energy consumption.

pureLiFi clearly establishing themselves as world leading in the light-based communications market and will be in prime position to meet the demand for internet data usage, as Wi-Fi bandwidth becomes overwhelmed.

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Find out more:

www.purelifi.com
Common interests spark growing relationship

In 2011, when Professor Stefano Brandani established the Adsorption Research Industry Consortium (ARIC), the initiative did more than facilitate a knowledge programme in adsorption techniques for carbon capture. It sparked a longer term research partnership between Professor Brandani and American equipment manufacturer, Quantachrome Instruments.

Quantachrome, a world leader in the design and manufacture of laboratory instruments for characterising properties of porous materials and powders, was a key early stage supporter of ARIC, contributing state-of-the-art adsorption test equipment to the consortium.

Professor Brandani, Chair of Chemical Engineering in the University of Edinburgh’s School of Engineering, discovered that his research interests in the development of CO2 separation technologies also had a strong synergistic overlap with Quantachrome’s adsorption test equipment.

A year later, Dr Matthias Thommes, Quantachrome’s Director of Applied Science and the company’s main contact on the ARIC initiative, was appointed as visiting Professor to the School of Engineering. This has led to joint research activities and publications, as well as the delivery of CPD courses at the University of Edinburgh to PhD students and industrialists.

Professor Brandani was then invited to visit Quantachrome’s main R&D labs in Florida for one month earlier this year. An EPSRC Impact Acceleration Account (IAA) award through Edinburgh Research and Innovation funded Professor Brandani’s exchange visit. During his visit Professor Brandani undertook some collaborative research and demonstration of the University’s Zero Length Column (ZLC) test techniques to key Quantachrome researchers.

Professor Brandani and Dr Daniel Friedrich have been developing an automated analysis tool for their ZLC test method. This is a well-known technique for the measurement of equilibrium and kinetic properties in adsorption systems, and the experimental method is mature. However, there is critically no automated analysis tool, which has hampered the development of a commercial system.

A second EPSRC IAA funded project for Dr Friedrich will produce a Graphical User Interface (GUI) that automatically fits the test parameters. Quantachrome will provide valuable feedback support, ensuring an optimised automated analysis tool with the required GUI performance will be the end result.

This will facilitate the deployment and take-up of the tool by external research groups and industrial parties and the successful commercialisation of the University’s ZLC technology.

Dr Thommes commented:

“Working with Stefano Brandani and his group is a fantastic experience and our researchers benefit greatly from knowledge transfer and exchange of ideas between our scientific groups.”
Developing a new product to monitor deforestation

Tropical forests, savannas and woodlands are crucial to the planet. Not only do these environments contain over 80% of the world’s biodiversity, they also moderate and modulate the climate, protect water resources, and absorb greenhouse gases from the environment; thereby reducing the impact of climate change. The lives and livelihoods of over 1.4 billion people, many of whom live in poverty, depend on their survival.

Sadly, many of these forest environments are under threat due to deforestation and degradation activities that are often illegal but also unreported. Deforestation is where some trees are removed from an area of forest (for example by logging), but the area remains defined as forest afterwards - an area with tree cover greater than 30%.

A large number of trees can be lost before an area switches from forest to non-forest. Therefore, deforestation can result in over half the carbon stored in a forest being lost, but isn’t reported in figures on rates of deforestation.

The ability to remotely monitor large areas of forest for such deforestation is a crucial tool for authorities tackling this issue. However, degradation cannot typically be seen using ‘traditional’ optical satellite technology.

Now, thanks to new Sentinel-1 radar satellite launches funded by the European Union, a reliable form of data. The development of new radar satellite technology.

According to Dr Edward Mitchard, a Chancellor’s Fellow in the University’s School of GeoSciences,

"Our research suggests that at least as much forest is degraded each year as is deforested, and in reality probably far more. But we have no real idea because traditional satellite systems have not been able to see it.”

Dr Mitchard is leading a project at the University of Edinburgh that has been co-funded by the NERC Impact Acceleration fund at Edinburgh and the Technology Strategy Board, to develop a new algorithm to separate undisturbed from degraded tropical forest using radar data. This will lead to a software product for monitoring deforestation and forest degradation by clients and end users.

Edinburgh’s partner in the SAREDD project is Airbus Defence and Space, Europe’s largest satellite and space technology company, which has the capacity to provide advanced processing, storage and dissemination facilities for bulk volumes of radar data.

As part of this project, Dr Mitchard is also working with Gabon’s Ministry of the Environment and National Parks Agency, who are providing an invaluable end user perspective. Potential end users in other countries with tropical forests will also be consultated, to ensure the product is as accurate and useful as possible.

The main beneficiaries of this project will be governments in tropical countries, who would receive massive payments for reducing both deforestation and degradation rates under the REDD system. The new product will be invaluable in making their efforts more efficient and robust. This will, in turn, empower efforts to reduce activities leading to deforestation, such as illegal logging, mining and ranching.

FACT:

According to the United Nations Food and Agriculture Organization (FAO), an estimated 7.3 million hectares (73,000 square kilometres) of forest are deforested each year. That’s an area twice the size of the Netherlands – every year! The area affected by degradation is likely to be at least as large again!

Students have designs on business

Design Agency is a flagship initiative in the University’s Edinburgh College of Art (ECA) that enables graphic design students to graduate with an honours degree and, more importantly for this industry, three years of work experience.

Each year, senior students have the opportunity to form their own design agencies. They create their own brand for the agency and advertise vacancies at all levels, from interns to senior designers, for which students in junior years are interviewed and appointed.

It is rare that students work across the different year groups of a university undergraduate programme; although the rewards that are gained from peer feedback is unoubte. Within Design Agency, students work collectively towards a common objective based on ability, regardless of age or experience.

Edinburgh-based design agencies act as ‘industry mentors’ to the student agencies. Responding to established briefs sub-contracted by the mentor agency, as well as self-initiated commercial projects, the student agencies experience work-like scenarios within the safety of the academic environment, developing rounded, ‘real world’ skill sets, such as risk-taking, selling, presenting, delegating and networking.

The initiative was first established in 2009 and since then ECA’s student agencies have worked with over 50 clients, including Lake Victoria Disability Centre (in Tanzania), Ellie Goulding, National Library, Edinburgh Zoo, Scottish National Blood Transfusion Services, BBC, Barrie Cashmere, Craft Scotland and The National Portrait Gallery.

The long-term relationships that are built with mentors ensures that students have the chance to show, over a period of years rather than just a few weeks on placement, what they can contribute to potential employers.

According to Programme Director Zoe Patterson:

“Mentors have commented on how Design Agency redresses growing industry concern over graduate readiness for work and on how it has helped convey, to students, what a design consultancy is looking for in a graduate and their portfolio. They have also spoken about the benefit, to them, of working with people who have ‘explosive and infectious energy and passion’, demonstrating that the benefit is mutual.”

In 2013, the ECA Design Agency won the Guardian University Awards 2013 prize for Employability Initiative, with the judges praising its ambition and said its risk-taking innovation “should be applauded”.

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Saving heat, saving the planet

Securing sustainable energy for UK consumers and businesses is one of the biggest challenges the country faces, not to mention the need for energy autonomy, which recent geopolitical events have demonstrated.

It is in this context that Professor Colin Pulham, from the University of Edinburgh’s School of Chemistry, has been collaborating with Sunamp Ltd, a local SME based in Macmerry, East Lothian, to produce innovative solutions to some of today’s biggest energy problems.

As the impact of fossil fuels has become ever clearer over the previous decades, renewable energy initiatives, such as wind farms and solar panels, have increasingly been encouraged and incentivised in an effort to increase the renewable contribution to the National Grid.

However, 42% of UK energy consumption in 2007 was in the form of heat, which means that, as well as producing more electricity from renewable sources, the huge heat wastages embedded in the system need to be addressed.

Sunamp’s big idea was to create heat storage systems, using Phase Change Materials (PCMs) that are capable of storing and releasing heat as they change phase. Examples of these materials include inorganic salts (e.g. hydrated sodium sulfate) or organic materials (e.g. beeswax), which absorb heat as they melt or dissolve and release it on undergoing the reverse transition (freezing or crystallisation). In this way excess energy, which would normally be wasted, can be stored as heat for later use.

In 2009, inconsistencies in performance led Sunamp to ask Professor Pulham and his team to analyse the PCMs they were using. After meeting to discuss the results and issues raised from this routine work, Professor Pulham felt his experience with PCMs could help not just with analysis, but could offer the company the prospect of better, more reliable materials.

The big problem with PCMs is incongruent melting, when the hydrate melts irreversibly to form the anhydrous salt. This affects their ability to store and release heat over a long lifetime and was therefore hampering their performance in Sunamp’s heat batteries.

Encouraged by his discussions with Sunamp’s CEO Andrew Bissell, Professor Pulham agreed to collaborate on the project, and recruited a PhD student, David Oliver (funded through an academic publications. David has also secured funding from the University’s EPSRC Impact Acceleration Account, for a further six months’ work with Sunamp.

In addition, the company has hosted industrial placement students from the University, giving them invaluable experience of the fast-paced nature of SMEs.

For Professor Pulham it has been a fulfilling experience, and one that has changed his outlook on other research that he is conducting at the moment.

Professor Pulham says: “It helped me to think about research with more of a business sense, with questions like, ‘how expensive are these materials?’ and ‘will the resultant product be cost effective?’”

From Sunamp’s perspective, they have expanded and developed in four years from an embryonic start-up with only three employees, to a flourishing business with 15-20 employees. The company will shortly begin selling SunampPV, a heat battery that takes photovoltaic (PV) panels and stores it as heat energy.

Several more heat store products are due to go on sale over the next few years.

And what has been the key to the collaboration’s success? Professor Pulham is convinced that speed and flexibility are the great advantages of working with an SME such as Sunamp. Of course, it helps that they are based locally. This is a working relationship that seems set to continue bearing fruit for a long time yet.

Photovoltaic (PV) panels and stores it as heat energy.

Around 50% of homes with PV panels have combi boilers with no heat storage, but, by using the neat and compact SunampPV, homeowners can get up to 75% of their hot water free.

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Collaboration drives innovation

Potential applications for Sunamp’s heat storage systems extend beyond the family home. Recently, Sunamp Ltd and Professor Pulham, from the School of Chemistry, secured funding for a collaboration with Zytek Automotive Ltd, a specialist vehicle engineering company, to develop and adapt Sunamp’s existing technology for use in automotive applications.

The project, which received almost £600,000 from the Technology Strategy Board (TSB) competition on ‘IDP8 Disruptive technologies in low carbon vehicles’, will use Sunamp’s experience in Heat Store and Processor (HSP) technology to make significant improvements to the efficiency and sustainability of vehicles on the roads.

For example, since a car’s fuel efficiency is lower during a ‘cold start’ of the engine, warming the engine has the potential to reduce CO₂ emissions by using less fuel. On top of that, by heating the engine and catalytic converter before use (and thereby reducing the need for idling), dangerous emissions, such as NOx, HC, and CO, can be reduced; thereby avoiding incomplete combustion and improving urban air quality and public health.

With these factors in mind, Sunamp plans to incorporate HSP technology, which combines two different Phase Change Materials (PCMs), allowing both the engine cylinder head and the catalytic converter to be heated to their appropriate temperatures in very short order.

The technology could be applied to different types of car, from internal combustion engine vehicles to the many variants of electrified vehicle, including battery, hybrid and plug-in hybrid electric cars.

Perhaps, most important for the success of electric vehicles, however, could be the range extension that Sunamp’s technology promises.

The market penetration of these vehicles has been hampered in large part by their poor ‘range’ - the distance the car is able to travel before recharging the battery. 

Electric vehicles must often use electrical energy to heat or cool the cabin - to demist the screen and for the driver or passengers’ comfort. In winter, this extra demand on the battery can reduce the range by 48% or more. HSP incorporated into electric cars could eliminate the problem, by providing a separate store of heat, to warm or cool the car, and thereby achieve significant range extensions whatever the weather.

Delivering this ‘range consistency’ will encourage more people to buy electric vehicles. It could also prove instrumental in carriage heating / cooling and waste heat recovery on a much larger scale; for instance, in the New York and London Underground systems.

With so many potential benefits, the prospect of the University’s School of Chemistry, Sunamp and Zytek leading a transport revolution is very exciting indeed!
Access all areas

As part of a programme designed to develop stronger collaborative ties between business and the academic community, the University of Edinburgh has been throwing open its doors to showcase its research facilities and academic expertise to industry.

The University is renowned for providing extensive support to business and industry, from local Scottish SMEs to major international corporations, across a wide range of market sectors.

In the past five years, Edinburgh Research and Innovation (ERI) has collaborated with industry on over 1,600 consultancy projects, utilising the broad range of expertise, equipment and capabilities available at the University of Edinburgh.

In May 2014, ERI organised ‘Access All Areas’, a one day event for companies looking to explore opportunities to access some of the best science and engineering research facilities and academic expertise in Europe.

The event programme included tours of the facilities, open doors to showcase its research facilities and capability beyond their internal R&D process.

Companies are increasingly recognising that innovation can derive from external collaboration. Working with academic institutions enables them to access knowledge and capability beyond their internal R&D process.

This collaborative approach encourages knowledge exchange and opens doors for universities like Edinburgh, not just with industry but also with other academic institutions. The investment allows the University to work with a wider range of companies, to support the local economy.

Funded by the University and EPSRC (Engineering and Physical Sciences Research Council), the new equipment is capable of handling an array of molecular constituents, across a broad spectrum of chemical and proteomic-sampling. This offers greater efficiencies for industry, such as higher sensitivity, shorter measurement times, high throughput, better accuracy and superior characterisation.

Nuclear Magnetic Resonance (NMR) is a sophisticated and powerful analytical technology that is used by many disciplines of scientific research, medicine and industry. NMR delivers structural determination and identification of a range of materials including small organic/inorganic molecules, steroids, antibiotics, carbohydrates, lipids, polypeptides, proteins, nucleic acids and complex mixtures.

Mass Spectrometry is a powerful analytical tool which can help to answer a wide range of biological and chemical questions. For example, the identification and characterisation of proteins - of interest to researchers involved in the discovery of new therapeutic targets and to the biopharmaceutical industry for the characterisation of new potential products.

The combination of world-class equipment and expertise are critical factors for industry.

Dr Charlie Bavington from Oban-based marine biotechnology company GlycoMar Ltd told us:

"The University of Edinburgh has always been good at high field NMR work. It's not just the instrumentation; it's the expertise in the group which is essential for the interpretation of the data."

Dr Sandy Dobbie, chairman of Chemical Sciences Scotland, the partnership of industry with Scotland's world-renowned academic sector and government agencies, said:

"This is another great example of how Scotland's academic sector is helping to support research within industry to improve manufacturing processes and develop new products."

Find out more:

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Advanced chemical analytics facilities boost for industry

A multi-million pound investment in some of the world’s most advanced Nuclear Magnetic Resonance (NMR) and Mass Spectroscopy instrumentation within the University of Edinburgh’s School of Chemistry will provide the chemical and life sciences industry with access to one of the most advanced facilities in Europe.

Companies wishing to explore opportunities to access some of the best science and engineering research facilities and academic expertise in Europe.

The event programme included talks with technicians and academic researchers from a range of facilities in the University. This was followed by tours of the facilities, to open up opportunities for attendees to gain a fuller understanding of how accessing the University’s facilities and knowledge base could provide tangible benefits to their business.

There have already been a number of projects initiated as a result, with several others in the pipeline.

The combination of world-class equipment and expertise are critical factors for industry.

Dr Ian Archer from industrial biotechnology company Ingenza Ltd said:

"Many universities have mass spectrometry but the expertise at Edinburgh is really appreciated."

Dr Sandy Dobbie, chairman of Chemical Sciences Scotland, the partnership of industry with Scotland’s world-renowned academic sector and government agencies, said:

"This is another great example of how Scotland’s academic sector is helping to support research within industry to improve manufacturing processes and develop new products."

Find out more:

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There have already been a number of projects initiated as a result, with several others in the pipeline.

The combination of world-class equipment and expertise are critical factors for industry.

Dr Ian Archer from industrial biotechnology company Ingenza Ltd said:

"Many universities have mass spectrometry but the expertise at Edinburgh is really appreciated."

Dr Sandy Dobbie, chairman of Chemical Sciences Scotland, the partnership of industry with Scotland’s world-renowned academic sector and government agencies, said:

"This is another great example of how Scotland’s academic sector is helping to support research within industry to improve manufacturing processes and develop new products."

Find out more:

www.edin.ac/1jXusIh
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FloWave – the ocean in the lab

After two years of construction, the new £10.5 million FloWave Ocean Energy Research Facility at the University of Edinburgh is now in operation. Early performance results have been very encouraging, indeed surpassing initial design simulation models.

The large circular wave and current tank is able to mimic the normal, challenging and extreme conditions of coastlines around Europe, and is designed for testing single devices and array projects at scales between 1/40th and 1/10th. Depending on the scale chosen the tank can replicate conditions equivalent to full-scale seas of up to 28 metre waves, currents in excess of 12 knots, and a sea-area of approximately 2 square kilometres.

This is ideal for testing and de-risking marine devices, the wave energy sector, and other subsea technologies, including autonomous underwater vehicles, installation and service vessels, floating wind turbine platforms, and other energy sectors, such as offshore wind companies active in other marine sectors like oil and gas. It also has the potential to support a wide range of scientific research projects.

The 25 metre diameter tank was filled with 2.4 million litres of water last year and took almost five weeks to fill. Following technical completion by main contractors, Edinburgh Design Ltd, FloWave staff then undertook the essential commissioning and characterisation process. Extensive testing over several months through mid-April included pre-launch testing with several wave and tidal devices developers to ensure the facility was able to operate at the levels required.

At the August launch of the new facility, Stuart Brown, FloWave’s Chief Executive, said:

“We believe FloWave will help accelerate learning for researchers, improve performance of devices and projects for engineers, and reduce costs for developers and utilities. With proper programming the FloWave can be made to accurately replicate at scale any point on the UK continental shelf, and almost all existing and planned wave and tidal generation sites around the world.”

Brown concluded:

“If EMEC is the lab in the ocean, then FloWave is the ocean in the lab.”

Scottish SME, Albatern Ltd, a wave energy developer, has spent more than a week testing their unique array-based wave energy converter, WaveNET, at the FloWave facility. This helps the company to better understand the WaveNET technology’s performance under different sea states, particularly in the common near-shore situation where the waves may be coming from more than one direction simultaneously.

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David Findlay, Chief Technology Officer at Albatern is keen to endorse and encourage use of the FloWave facility:

“Having access to this world class testing facility on our doorstep allows us to predict and confirm the response of our device before deploying it in the sea – an essential part of our ongoing research and development activity.”

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FloWave is already helping renewable energy companies develop new marine energy devices for the future.

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Find out more: www.flowavett.co.uk

Edinburgh’s RSE Enterprise Fellowship success

This year the Royal Society of Edinburgh (RSE) has awarded three out of five Enterprise Fellowships to University of Edinburgh postgraduates. For David Hunter, Orfeas Boteas and Liita-Iyaloo Naukushu the fellowship is a unique opportunity to accelerate their research and further improve their products out of Scotland’s science and technology base.

Hosted by Edinburgh Research and Innovation and the Edinburgh Technology Transfer Centre, the successful candidates can rely on a network of experts and mentors to make the most out of their time as RSE Enterprise Fellows.

David Hunter
David Hunter graduated with a Professional Graduate Diploma in Advanced Engineering Design and technology in 2013, having previously worked in the electronic design industry where he designed products for medical, military and industrial markets. Since the start of the fellowship, David has progressed his patent pending wearable technology that monitors sports performance from prototype to electronics the size of a 50p coin. Shot Scope is a smart wristband that automatically collects scoring and statistical data during a round of golf. The technology has been proven and it is now ready for trials with professional golfers.

Orfeas Boteas
When Hollywood studios and game companies need monster sound effects, there is no way around Orfeas Boteas. Dehumaniser software, Orfeas, an MSc graduate in Sound Design, started his entrepreneurial career as an ‘Entern’ through the Santander Breakthrough programme. Only one year later Orfeas was able to hire his first employee, funded by the Santander internship programme. His company, Krotos Ltd, recently released a new version of his product, which was well-received by the industry and earned many positive reviews in professional magazines.

Although their fellowships are not over yet, the programme has already had an incredible impact on their companies. Their achievements confirm the importance of the RSE Enterprise Fellowship as an enabler for successful researcher and graduate businesses in Scotland.

RSE Enterprise Fellows at Edinburgh
There have been 26 RSE Enterprise Fellowships awarded to University of Edinburgh entrepreneurs to date, including:

• Dr Alison Blackwell
• Professor Iain Woodhouse
• Dr John Favier
• Dr Sonia Schulenburg
• Dr Orfeas Boteas
• Liita Naukushu
• Alex Cole

Images: 01 David Hunter 02 Liita Naukushu 03 Orfeas Boteas

Fellowship success

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These awards evolved from the successful Innovation Cup events that, in previous years, have focused on the University’s student entrepreneurs. This year, the event was scaled-up and included a new ‘Enterprise Award’ for postdoctoral researchers working on early stage business ideas at the University.

Keynote speaker Gregor Lawson, co-founder of Edinburgh-based Morphsuits, inspired the audience with his story of entrepreneurial success. He took the audience on an exciting journey of enterprise; taking a £3,000 investment and turning it into a flourishing business with a turnover of over £10.5 million. Gregor spoke about being resilient, scrappy, thinking big and enjoying the ride.

This year’s event was a showcase for twelve early-stage University start-ups, competing to win a share of over £15,000 in prize money and in-kind support. The finalists each delivered a ten-minute pitch in front of two experienced panels of judges, culminating in an evening ceremony in which three awards were given out.

The Innovation Cup
The Innovation Cup is an award for students or recent graduates with technology-based business ideas or young business ventures. The first prize of £5,000 was awarded to Atif Syed, a postgraduate student in the School of Engineering. Atif has developed Nanject, a pharmaceutical patch that uses nano needles to deliver drugs into the bloodstream. This offers a safer and more hygienic alternative to the traditional needles used for injections.

The two runners-up each receiving £1,000 were Maria Mullane for Capability Enhancement (a hand therapy tool that aids people who have suffered from a stroke to build up muscles and movements) and David Hunter for Shot Scope Technologies (a wristband that collects statistics as golfers play).

The Enterprise Award
This was the first year for the Enterprise Award, an award for postdoctoral researchers at the University working on early stage business ideas. The first prize of £5,000 went to Dr James Prendergast, a Research Fellow at the Roslin Institute. James has created Dipodo, a new online platform that filters relevant journal articles for scientists.

The two runners-up who received £1,000 each were Dr Lysimachos Zografos of Parkure Ltd (a company with the aim of finding a cure to Parkinson’s disease using fruitfly research) and Petros Pappanagiotou for WorkFlowFM (a business providing seamless communications within health organisations to reduce medical errors).

As winners of the Innovation Cup and Enterprise Award, Atif and James were also awarded in-kind support from MBM Commercial, Hit Tin Roof and Acumen PR to help further develop their businesses.

The Entrepreneurial Achiever Award
The Entrepreneurial Achiever Award was given to Dr Anthony Ashbrook, founder and CEO of Mobile Acuity Ltd. Anthony is a renowned expert on mobile visual search. He founded his first company, Visions Innovations, a computer vision consultancy in 2003. Three years later Anthony formed University of Edinburgh spin-out company, Mobile Acuity Ltd, to commercialise image recognition software for mobile devices from the School of Informatics. This technology allows offline pictures and objects to be linked with online digital content. Mobile Acuity’s clients include big brands, such as Tesco, Nike and Vodafone; and the company is rapidly expanding across North America and East Asia.

The event was a great success, with over 80 delegates from industry and the entrepreneurial scene in attendance to support the University’s most exciting entrepreneurs.

Celebrating entrepreneurial achievement

In June 2014, the inaugural ‘Inspire Launch Grow’ Awards for enterprise, a celebration of the University of Edinburgh’s top entrepreneurial talent, was hosted by LAUNCH.ed and PostDocBiz at the University’s Business School, in partnership with the E-Club.
evertheless, how can we guarantee that Scottish universities have the right tools and resources to help aspiring entrepreneurs? How can we make sure that no potential enterprising idea is left undiscovered?

These are the questions that the Universities of Edinburgh, Aberdeen, and Strathclyde are tackling in establishing the new ‘Enterprise Campus’ initiative. Coordinated by Edinburgh Research and Innovation, three regional hubs based in Edinburgh, Aberdeen, and Strathclyde will ensure that student and staff entrepreneurs across Scotland’s universities have access to high-quality enterprise services.

At the centre of this partnership stands the idea to guarantee the best possible support for new knowledge-based start-ups at all Scottish universities.

Some institutions already have company formation services; others are still in the process of developing similar offers. Resources can be scarce, especially when it comes to high-growth start-ups, which require both intensive guidance and adequate endowment with capital. In the future, every university will be free to choose how they want to implement the new initiative on their campus. Enterprise Campus can either complement existing programmes or provide the entire infrastructure.

To unlock the full potential of Scotland’s universities, local campuses will benefit from a wide-range of support services, such as advisory clinics, workshops, mentoring, and funding support.

Grant Wheeler, Head of Company Formation at Edinburgh Research and Innovation, said:

“ At present, the support mechanisms for this activity are highly variable at institutional and regional level. This new initiative will address this variability and ensure that all high value company formation projects at universities participating in the pilot project are optimally supported.”

The new £2 million Enterprise Campus project is funded by the Scottish Funding Council, with an objective to support the formation of 90 new high-growth technology companies over the next three years.

The impact of such start-ups extends beyond the university environment. These companies often become the driver of economic growth and innovation in their local area. Therefore, the initiative recognises the importance of high-growth university spin-outs for the whole Scottish economy, which will profit from intensified cooperation between universities across the country. Furthermore, it will create new opportunities and encourage knowledge exchange between higher-education institutions.

This pilot project aims to create flexible, immediately accessible local institutions that can rely on a powerful network of expertise and company formation services. It opens up a vast number of new possibilities for those universities who know their staff and students best.

In this way, universities can ‘think globally and act regionally’, making sure that all available resources are distributed effectively. As a result, more spin-out companies and university start-ups could make the step into a successful future.

Overall, Enterprise Campus is a chance to strengthen Scotland’s university landscape in the course of the next three years. It could become an enabler of new investments, increase cooperation between Scottish research institutions and promote entrepreneurial thinking throughout Scotland.

University spin-out companies are a crucial part of the university ecosystem. Spin-outs not only attract funding for innovative technologies, but also showcase the vast creative and commercial potential of both staff and students in Scotland’s universities.
Success in numbers

2009 – 2014

£1.2 billion in research awards

382 Patent applications

849 Invention disclosures

£14 million Royalty income generated

648 Licence agreements

£167 million Increased turnover for licensee companies*

2,487 Industry partnerships around the world

180 New companies formed

£275 million Investment raised

£664 million Estimated turnover in active spin-outs and start-ups

£79 million Value of industry partnerships

* The BiGGR Economic Impact report calculated that licensee companies will be making at least £12 million in increased turnover for every £1 million in royalty income the University receives.

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