

GIBSON INDEX NEWSLETTER

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Your Monthly e-Newsletter on British Enterprise and Innovation

Welcome to the UK's most comprehensive and best-read Newsletter on Small Technology Companies, Academic Enterprise and Latest Innovation

Is this why the UK economy is 'growing'?

The **UK Government** claims, with some justification, that the country's economy and workforce is growing. Latest jobs figures show that the UK unemployment rate is 5.4%, the lowest it has been since the recession in 2008, analysis by **Office for National Statistics** (ONS) stated.

Some 31.1m people are now in work, an increase of 359,000 while 1.77 million people are unemployed, or 198,000 less than in 2014. The employment rate is currently 73.6% with employees working in the UK rising by 441,000 to 26.43 million. This is the highest level the employment rate has reached since records began in 1971.

All good news... but then an astonishing statistic was released this week. Across the UK no less than '917,404 people were granted the right to work in the 12 months to June 2015' – an increase of 62% on the figure for 2014.

In September 2015, deputy governor of the **Bank of England**, **Ben Broadbent**, said the huge influx of foreign workers taking 'low-paid jobs' had depressed average wages and productivity. He said Britain's recovery attracted immigrants from Europe, where growth is sluggish and unemployment high, and that although many migrants are well-qualified, they are happy to take low-skilled, low-paid jobs – unlike many British-born workers. Average wages, he added, have been pushed down as a result.

More than 6,000 foreign nationals were granted the right to work in **Greater Manchester** in just three months. Government figures show 6,201 migrants registered with the **Department for Work and Pensions** between April and June – an increase over 12 months of more than 70%.

While **David Cameron** wined and dined the Chinese president – or tyrant – **Xi Jinping**, **UK Steel** issued a stark warning in reaction to **Tata Steel's** wider announcement that it is likely to close plants in **Lincolnshire** and **Scotland** with the loss of 1,200 jobs.

Britain risks losing its ability to build nuclear submarines, and offshore drilling platforms, following the mothballing of Tata Steel's **Dalziel** plant in Scotland. As a result, the next Trident fleet will almost certainly be produced with imported steel. Earlier, in March 2015, UK Steel had issued a safety warning about the poor quality of Chinese steel.

www.gibson-index.com

The Newsletter is compiled and edited by **Marcus Gibson**, former *Financial Times* technology correspondent, who has been covering enterprise and innovation for more than 20 years. The Newsletter aims to highlight developments in at least 100+ companies each month. It is derived from the wide-ranging news-gathering operation that produces the [Gibson Index SME database](#), which now contains profiles on more than 52,000 UK-based technology SMEs.

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COMPANY OF THE MONTH

SmartKem Ltd's TruFlex product generates a great deal of interest..

The firm's product is an organic semiconductor that enable the manufacture of thin-film transistors, which combine 'industry grade electrical performance with physical flexibility for fully foldable displays in tablets, smartphones and wearable devices'.

Flexible displays are currently a big trend in the consumer sector, including early iterations in the smart watch field. SmartKem thinks it's lightweight, unbreakable, flexible and wearable materials are key.

Displays have significant pull in the arena of touch-and sensor-based applications – able to carry technology with comfort or to embed displays, touchscreens and sensors in almost any space, shape or surface.

Tru-Flex was awarded the Innovative Product of the Year at the **ESTnet Awards**. It also won the Printed Electronics Asia Award in 2013. From its St Asaph's HQ in Wales, **Julian Carter**, tech manager, said rapid growth had happened in the past few months.

"2015 has been a landmark year for us. Following the uptake of Tru-Flex technology in Asia the firm will soon be announcing further expansion in their directors and formation of a dedicated tech transfer team based in Asia."

The material is also a finalist in the Materials category for the **2015 R&D 100 Awards** in Las Vegas in November. So when will commercialisation occur? Mr Carter said "The display market has recognised the differentiators of our platform – fold, cost and power. We believe our semiconductors offer the only route to foldable displays, a key value addition.

"Furthermore, our ultra-low TFT 'off currents' enable mobile and wearable displays that consume less power, up to less than low temp polysilicon, in some instances, offering extended battery life operation. Couple this with the potential for manufacturing at 50% reduced cost, and this offers display makers a 'perfect storm' of compelling reasons to adopt."

The firm in late 2015 was at the pre-production and pilot line stage, and market entry points being targeted for Tru-Flex are foldable mobile devices and fully conformal smartwatches, with extended battery life."

Contact: www.smartkem.com

SME NEWS – ENGINEERING, CONSTRUCTION & ENERGY

Ex-RAF trainers Tom Ball and Mike Squires build simulation training business

Their firm, **Close Air Solutions**, have trained over 1000 JTACs and pilots, during their military careers. The company was formed in 2012 in order to provide a Forward Air Control training provision and consultancy service to UK and NATO forces, said CTO Tom Ball.

In mid-2015 Close Air Solutions was one of the winners of the **UK Defence Growth Partnership (DGP) Innovation Challenge**. The £10 million Innovation Challenge was launched in March 2015 with the aim of encouraging the development of innovative defence products. Close Air Solutions will work with partner **Cursive Simulation Ltd** on the project.

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The founders are both ex-RAF military fast jet pilot instructors. Tom said “I spotted that the existing programs had some flaws that did not allow us to train as well as we could. I then designed a new simulator that allowed us to train in more operational scenario-based ways. I received commendation in the **Queen’s Birthday Honours** for this.”

One hour in the CAS simulator costs about £500 compared with an hour flying a **Typhoon** jet that costs close to £100,000. Due to asset availability and peace-time training restrictions, it can be very difficult to get a realistic number of air and fires assets operating in the way that they would on war operations.

He added “In a simulator we can saturate the airspace with aircraft and add to that artillery and mortars all flying through the airspace, all requiring detailed coordination. Better still we can get trainees to make fatal mistakes (crash aircraft etc) and learn from them. One of the best bits of the training is the **After Action Review** – whereby we can playback from any aspect from any part of the simulation, including the radio transmissions, this really enables the lessons to be understood and learned in slow time after the training event. There is no hiding in the debrief; everything comes out!

“We delivered a simulator to the UK **MoD** in under 4 months, and it received the highest accreditation to replace live missions as part of UK national training. In the past, big defence prime contracts can often be measured in years, 4 months is almost unheard of.”

Contact: www.closeairsolutions.com

Oxford University spinout Kepler Energy ‘seeking \$220m in funding’

The marine turbine firm can’t be faulted for lack of ambition – it is projecting a “fence” of energy-generating turbines in the **Bristol Channel** in western England. The first project would be to install a 1km barrier with a generating capacity of 30MW, although Kepler hopes to scale this up to 600MW over time.

Peter Dixon, chairman of Kepler Energy, said “We’ll be having some intensive discussions with the **Welsh Government** because that is a very good location with access to EU regional development grants.”

The scheme would use the second-generation tidal turbines developed by the university department. These use a horizontal carbon fibre “roller” design rather than the conventional propeller configuration. According to Kepler, these sweep a greater area of the tidal flow and have an output “several times higher” than their predecessors.

The fence is expected to be located between **Aberthaw** in Wales and **Minehead** in Somerset. Kepler is hoping to attract a mix of public and private funding. Dixon said: “We’ll be having some intensive discussions with the Welsh Government because that is a very good location with access to EU regional development grants.”

Kepler says that if the fence receives funding and planning approval it could be operational within six years, after which further turbines could be added as the investment became available, with the ultimate aim creating a “serious, utility-grade” facility with a capacity of 600MW.

According to Kepler, a typical turbine rotor would be 10m in diameter and 6m long, and sited in a tidal flow with a mean depth of 20m. Flume tests on a scale model have shown that the basic configuration of two turbines with one generator should generate more than 4.4MW at a water velocity of 2m/sec, and more than 5.2MW at a water velocity of 2.5m/sec. In addition, the unit ‘can operate with efficiency at low water velocities’.

Contact: www.keplerenergy.co.uk

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North East Export Award goes to subsea specialist Tekmar Energy Ltd

A leader in its field, and with three decades of experience, **Tekmar Energy** announced that an impressive 86% of the company's total sales in 2014 – came from overseas trade.

As well as building on its position as the partner of choice for operators in Europe, the year also saw the firm begin work in the **United States** and the **Middle East** for the first time, its global growth being aided by the introduction to the market of its latest innovation, **TekTube**.

Specifically designed to help drive down costs, improve offshore installation rates and ensure cable integrity for the service life, the product is devised for onshore installation rather than offshore.

Once in place, the system can then be transported to the offshore project site to be secured to the jacket, sealed and prepared to be received by the cable installation vessel.

TekTube has been developed using the same protection methodology as the market-leading, industry standard TekLink system, which is designed for a 30-year life time and revolutionises the connection of subsea power cables into monopile foundations.

It is considered an alternative to **TekLink** for jacket, gravity-base and floating foundations.

Contact: www.tekmar.co.uk

Cobalt Light Systems named one of Britain's most innovative companies

In October it won Innovate UK's inaugural Innovation Award for its scanning technology that detects the chemical contents of passengers' unopened containers to prevent potentially explosive materials being smuggled onto aircraft.

Over the past two years Cobalt Light Systems has doubled the number of people it employs, from 21 to 42, and uses a network of distributors across Europe who are trained to sell and distribute the scanners. As a consequence, Cobalt achieved a 5-fold growth in revenue between 2013 and 2014.

Shortlisted firms included Tokamak Ltd, ASV Global, nquiringminds, Magnomatics, Fuel3D and Discuva. Cobalt's scanners use technology devised and patented at the Science and Technology Facilities Council's (STFC) Central Laser Facility. Since its inception in 2008 Cobalt has received support and funding from the UK Government and from STFC to develop a prototype of its liquid scanner. The result was the Insight100, which can detect dangerous chemicals in unopened containers within a few seconds. The Insight100 is now installed in more than 70 airports in the UK and across Europe, with further deployments in Australia and South Korea.

With further funding from Innovate UK, Cobalt is now about to launch the Insight200M, a more compact system with improved sensitivity. Insight200M has already met European aviation standards (ECAC Standard 3) and it has been designed to address the stringent environmental regulations and detection capabilities required for export to the US and worldwide.

Professor Pavel Matousek from STFC's Central Laser Facility developed the original concept, known as Spatially Offset Raman Spectroscopy. He said: "Cobalt's innovative products have gone from strength to strength and its latest product has been recognised once again as a leading innovation. It's also gratifying from a personal viewpoint to see our early scientific work at STFC producing technology that is both versatile and effective in addressing some of the many grand challenges we face today."

Contact: www.coballight.com

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Q-Mass defies offshore engineering slump with rapid expansion

The Scottish-based high-tech manufacturer of precision equipment for the oil and gas industry worldwide is defying the offshore slump with a £4 million expansion, as it seeks to diversify into the renewables, defence and nuclear power.

The £10m-turnover company, which employs 53 people, will this month move to a site five times larger than its current premises, in the second move since foundation in **Stirling** by owners **Ronnie Robertson** and **John Harvey** in 2006.

The specialised company claims to be one of the few machining companies in the UK capable of producing metalwork to within a tenth of one thousandth of an inch of the original specification.

Formerly focused on highly-engineered steel components such as valves and drill parts for the oil and gas sector, the plunge in the oil price and subsequent investment drought has prompted a search for alternative routes to growth.

Robertson said the company was now picking up orders for offshore wind turbines as well as fracking exploration and production, a potential growth area. The company is a manufacturing sub-contractor for secretive multinational oil-field service companies such as **Schlumberger** and **Halliburton**.

Robertson says that the Q-Mass is often in the dark as to the precise purpose of the machines it manufactures. "We often don't know exactly what we are making for our clients. We have to sign non-disclosure agreements or are sworn to secrecy," he says.

"We simply receive the specification and we are not expected to ask too many questions as some of the equipment is patented. We don't get involved in the functionality of the design and we are sometimes asked to return the drawings after we have finished."

Although Q-Mass's clients are mostly based in Aberdeen, its products are used in oil fields in **west Africa, the Caspian Sea, Brazil, the Middle East** and the **Far East** as well as the **UK** and **Norwegian** sectors of the North Sea.

That wide geographic spread has partly sheltered the company from the oil downturn of the last 12 months, which has crippled investment in the high-cost North Sea.

"We think there is a big future in the oil and gas industry," Robertson said. "There is a lot of volatility at the moment but we are taking the long-term approach to investment. Every oil well in the world is different in terms of its temperature, its pressure and so on so we think demand for our bespoke products will remain high. Sixty per cent of what we produce is exported but, so far, it has been exported by our customers. In the future we hope to sell more overseas directly."

Contact: www.q-mass.co.uk

Hyperdrive Innovation joins with energy firm Oxis to develop new batteries

The novel batteries, to be produced for the **British Antarctic Survey**, will apparently be capable of working at extremely low temperatures. Hyperdrive is developing a new battery system, while **Oxis Energy** is working on the chemistry which will power it.

Hyperdrive opened a new lithium ion battery production facility in 2015 to complement prototyping and vehicle development capabilities on the same site at the **Future Technology Centre** in Washington, Tyne & Wear. The flexible factory can accommodate modular and custom designed packs for electric and hybrid vehicles, portable power and off-grid energy storage.

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Set up in 2012, Hyperdrive Innovation is a forward thinking technology business specialising in lithium ion energy storage systems and associated electronics for low carbon automotive, industrial, offshore and subsea applications.

MD **Stephen Irish** said “The superior energy density offered by lithium sulphur makes it well suited for portability, especially in vast, remote locations like the Antarctic where flight is the only method of transport and operations are restricted by resources and weather windows.”

Huw Hampson-Jones, CEO of Oxis Energy, said “It is very difficult to secure the effective utilisation of battery systems in extreme temperatures, whether hot or cold. OXIS Li-S cell technology can operate at up to 80C, but to do so at the other extreme of -80C is very challenging. The programme will have an important impact on vehicles operating in cold climates across North America and Northern Europe.”

Hyperdrive business development manager **Steven Abbott** said “We use Lithium Ion technology to produce batteries for electric vehicles. It is more suited to lower temperatures but it is also more ‘energy dense’ which means it is lighter. The chemistry is being developed by Oxis and then we will build a battery to go around it. The British Antarctic Survey goes out during the summer and places monitoring equipment that works through the winter.”

The project is one of 32 to be supported with a share of £11.3 million from the latest round of the Energy Catalyst programme, a joint scheme run by the Government’s **Innovate UK** initiative and the **EPRSC**.

Contact: www.hyperdriveinnovation.com

SME NEWS – ELECTRONICS & TELECOMS

Pricey mobile phone maker sold to group of private investors

The British manufacturer which has made some of the world’s most expensive mobile phones has been sold by its private equity owner to a group of private investors.

Vertu, whose latest **Signature Touch** model starts at a cool £9,500, was founded by **Nokia** in 1998 and operates in 66 countries through its own retail stores, independent distributors and more recently through its ecommerce platform. More recently, the business partnered with luxury car maker **Bentley** to launch a special edition phone retailing for £14,000. Vertu is headquartered in **Church Crookham**, Hampshire, and employs more than 800 staff.

It is understood the company’s chief executive **Massimiliano Pogliani**, who is credited with transforming coffee brand Nespresso, has also remained in his post. The business has been sold by **EQT Partners**, which bought a 90 stake in Vertu in 2012. Since then, the company has transferred its operating system from **Symbian** to Google’s **Android** platform and launched a range of new handsets.

Vertu hit the headlines in 2006 when it launched the Signature Cobra with a price tag of more than £150,000. Although the identity of the private investors have not been revealed, Companies House records show Chinese citizens Jingchun Sun, Gang Chen and Ping Zhang, alongside Britain-born **Caige White**, have been appointed directors.

Caspar Callerström, partner at EQT Partners, said “We believe Vertu is operationally stronger today with a leading position in the luxury mobile phone market. Vertu is now ready to take the next step in its development together with a new owner.”

Contact: www.vertu.com

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Rail wi-fi firm Icomera UK Ltd moves UK headquarters to Chatham Maritime

Icomera has moved 50 employees to the new HQ, where it monitors internet connections on trains, coaches and ferries around the globe. Icomera set up its first operations in this country with a small team at the **Medway Innovation Centre** in 2006 but has since outgrown the site near **Rochester Airport**.

It supplies internet connections to commuters on coaches run by **Chalkwell** and the **Kings Ferry**, as well as on **South West Trains** and scores of other clients. Rochester and Strood MP **Kelly Tolhurst** cut the ribbon on the new headquarters in Victory House, which is also home to Swedish bank **Handelsbanken**.

Dave Palmer, MD of Icomera UK, said: "We didn't want to move away from Medway as we have good support here, our people live here and staff like the lifestyle here, as opposed to London."

Established in Gothenburg in 1999, Icomera is one of **Sweden's** fastest growing technology companies, providing open Internet connectivity and application platforms for passenger transport and emergency vehicles. After opening their first UK office at the **Kent Science Park** in Sittingbourne in 2006, Icomera then moved to the Innovation Centre Medway in 2009. Rapid growth in recent years has seen the total number of staff increase to over 50, and the company anticipates continued substantial growth over the coming years.

Karl-Johan Holm, CEO of Icomera, said: "Eleven years ago we won our first UK contract to provide Wi-Fi on GNER, and it is nine years since we established our first UK office with five staff. Our successful growth has been in no small part due to the excellent support we have received here and I am delighted that the next phase of our growth will be based in Chatham Maritime."

"Icomera has led the way in the installation of wi-fi in trains, buses, coaches, trams and ferries over the past decade. The UK was one of the first countries to recognise the value of this technology and is therefore a highly valued market for our products and services."

UK customers include **Arriva, First Group, Stagecoach, Northern Rail, Transport for Edinburgh, Cardiff City Council, Irish Rail** and **Virgin East Coast**.

Contact: www.icomera.com

New startup Drayson Technologies Ltd 'converting radio's energy to power..'

With smartphones and wi-fi everywhere, the air today is saturated by radio waves. The technology, called **Freevolt**, can harvest that energy to run low-energy devices such as sensors and beacons so their wireless communication ability is matched by a wireless power supply, too.

Drayson Technologies, chaired by former Labour industry minister and biotech entrepreneur **Lord Drayson**, unveiled the harvester – a device the length and width of a mobile phone but the thickness of a credit card.

Freevolt could help smooth the way to a future in which computing brains are infused into everything from tea kettles and cats to trash cans and cars. This idea, called the Internet of Things, will link billions of devices and, according to analyst firm **International Data Corp.**, lead to an immense \$1.7 trillion in spending by 2020.

Radio isn't the only energy source for energy harvesting. Other designs take advantage of acceleration forces, temperature differences, sunlight and differences in chemistry. One example: A rotating car wheel provides enough force to power a sensor that gauges tyre pressure and sends the information to the car's computer control system.

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The Freevolt is currently pocket-sized, but Drayson Technologies is working on making it even smaller so it could work better with compact wearable products. Limited battery life has so far been a major drawback of smartwatches and activity trackers, but with Freevolt tech built in, it's possible that one day we may not have to worry about constantly recharging them, the company hopes.

Similarly, the modules could be made larger to power multiple connected objects within a smart home. Unlike solar panels, which must be mounted outside, Freevolt could be built within walls.

Contact: www.draysontechnologies.com

Scottish video camera firm Edesix launches VideoBadge series at DSEI trade show

Headquartered in **Edinburgh**, and established in 2002, Edesix manufactures body worn cameras for those in public-facing roles, helping to improve safety, while producing compelling legal evidence when needed.

Edesix currently supplies key markets across the globe, including the **UK, Europe, USA, Canada, South America, China, the Middle East** and **Australasia**. All hardware and software is designed, developed and manufactured in the UK.

Edesix currently provides **VideoBadges** and **VideoManager** software to security and enforcement personnel, police forces, bailiffs, transport firms and emergency services/first responders.

The VB-300 series is a body worn video camera styled like an ID card holder. Its simple operation makes it versatile. The camera has wi-fi capability which allows streaming and uploading of video in real-time, and it can record for up to 14 hours of continuous video coverage, with up to 96 hours of battery capacity when on standby.

Edesix's VideoManager, a video management software suite, is web-based, and suitable for handling, editing and sharing your captured footage. It comes fully equipped with state-of-the-art features, such as redaction, to prepare and share evidence-ready footage without extensive training or expensive resources.

Richie McBride, CEO of Edesix, said "All the studies examining body worn video cameras show they make a real difference in protecting frontline staff and the public.

"Body Worn Cameras help prevent crime and anti-social behaviour, and record unbiased evidential footage for criminal prosecution. There can be no doubt that cameras deter aggression and in many cases eliminate the need to activate a panic alarm or radio during an incident. When members of the public know they are being recorded, their behaviour tends to change to a more positive attitude."

Contact: www.edesix.com

Nwave Technologies Ltd targets radio bands 'below 1GHz'

In Oct 2014 it was reported that this **Cambridge** firm was 'winning the race to establish a de facto standard for M2M connectivity' to deliver the full power of the Internet of Things globally.

Professor William Webb, CEO of the **Weightless SIG** said that major players from Korea, China and the US are now engaging with the Cambridge standard. The Cambridge-born Weightless standard has stolen a march on global rivals through a significant alliance with London-based **NWave Technologies Ltd**, a leading IoT over ISM spectrum vendor.

NWave will provide connectivity in unlicensed spectrum – specifically the industrial, scientific and medical

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bands below 1GHz. NWave's technology is designed to operate in 868MHz in Europe and 900MHz band in the US.

Professor Webb said: "NWave is a leader in IoT over ISM spectrum and the company's deep technical experience in LPWAN connectivity will make a significant contribution to the rapid development of **Weightless-N**.

"Bringing proven capability from an existing technology provider to the SIG and merging it with the expertise already established within the group will accelerate the development of Weightless-N as the leading global open standard for machine connectivity over licence exempt spectrum."

Nwave Technologies software has been applied to AMI (advanced metering infrastructure), smart agriculture and smart parking. NWave is a leading provider of network solutions, hardware and software for the IoT and M2M communications, based around its ultra narrow-band comms protocol operating in license-exempt ISM spectrum.

Contact: www.nwavetec.com

SME NEWS – CHEMICAL, MATERIALS & ENVIRONMENT

Oxford University spinout Oxford Flow develops innovative flow control device

Their novel design, developed at the **Osney Thermo-Fluids Lab** by **Professor Tom Povey**, to meet a specific requirement in his research work for **Rolls-Royce**.

Many industrial and manufacturing processes require the control of the flow of gases and fluids. From water and compressed air through to rare gases, steam, and chemicals, accurate flow control is key to process efficiency and safety.

The **Oxford University** spinout firm said 'this is a displacement technology in the \$3.1bn pressure regulator market, and has potential as a platform technology for wider applications in the \$65bn valve and actuator global market'.

The patented design has strong competitive advantages. It has a very precise flow control. It is also smaller and more compact than other pressure regulators, leading to cost effective installation and maintenance. And it can be manufactured at a very competitive price point. All these attributes meet the needs of industry, and give the device significant commercial potential.

Oxford Flow is led by industrial entrepreneur **Simon Hombersley**, who founded and successfully developed a similar business in the same field – the novel compressor company **Lontra Ltd**.

The first product is in field trials, and is close to market, with no significant further development required for initial products. The aim is to create in Oxford Flow a high value industrial product developer, and the company is seeking £500k seed investment.

The technology behind Oxford Flow's patented regulator has been in development for five years at the Osney Thermofluids Lab in Oxford. The company has been created to commercialise the technology.

Contact: www.puntios.com/oxford-flow

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In 2015 Jellagen receive a £97,500 Smart grant award from Innovate UK

In June 2013, Jellagen secured initial funding to assess the technical feasibility of harvesting multi-tonne quantities of jellyfish to extract collagen. This resulted in the first successful harvest and extraction of jellyfish collagen in the UK.

Following this, Jellagen secured additional private investment in 2014 to enable the commercialisation of their technology and allow for larger scale extraction and production of collagen from jellyfish and support the creation of ground-breaking medical devices.

Jellagen was founded in May 2013 and has its base of operations in the **Pembrokeshire Science and Technology Park, Wales**. They have manufacturing support provided by its strategic partner **Collagen Solutions plc**.

Importantly the firm is led by **Professor Andrew Mearns Spragg**, a marine biotechnology entrepreneur with over 10 years commercial experience in developing and growing a successful venture backed businesses. He grew his first company, Aquapharm whilst holding a **Royal Society of Edinburgh (RSE) Enterprise Fellowship** in biotechnology and grew this to a company of >20FTEs focused on the development of novel targeted treatments for cancer and drug resistant bacteria (antibiotics) from chemical scaffolds derived from marine microorganisms, an untapped source of natural product chemistry. Since 2005, Prof Spragg has raised over £10m in equity finance and secured >£1.5m competitive grant funding from EU and UK sources.

Contact: www.jellagen.co.uk

TerraVerdae BioWorks sells biodegradable bioplastics, chemicals, and bioactives

Sited in the UK's **Centre for Process Innovation**, in Wilton, Teesside, TerraVerdae has successfully scaled-up its biodegradable and biocompatible materials technology from laboratory pilot scale to 10,000+ litre capabilities, validating process scale up and production economics for commercial deployment.

Its industrial biorefinery platform combines systems biology, bioprocess engineering, and polymer chemistry capabilities to produce high-value, performance biomaterials. These products have applications in the agriculture/horticulture, personal care, dietary supplement, and associated markets. TerraVerdae's synthetic biology platform and proprietary genetic tools have developed biobased products and challenging proteins for companies and institutes worldwide.

These include 10,000 litre production runs of the firm's line of biodegradable, natural microspheres for use in personal care and cosmetic products, as a direct replacement for synthetic, non-degradable plastic microbeads.

William Bardosh, CEO of TerraVerdae BioWorks, said "Developing the technologies needed to produce commercial scale quantities of our biomaterial products in an economic and efficient process is a milestone for the company, and potentially the industry.

Their first product developed using this technology, biodegradable and biocompatible microspheres will replace synthetic microbeads in personal care products, removing plastic contamination from water supplies.

TerraVerdae BioWorks is headquartered in **Canada** with operations in the US and the UK. The Centre for Process Innovation (CPI)

Contact: Becky Bendell, 01642 443 637 – becky.bendall@uk-cpi.com – www.terraverdae.com

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Mission Therapeutics win £1.9m boost for its work developing cancer medicines

Founded in 2011 to commercialise research from several **Cambridge** institutions, Mission Therapeutics is based at the **Babraham Research Campus** and has received £27m in venture capital funding.

The new grant comes from the latest round of Innovate UK's **Biomedical Catalyst**, a joint programme run with the **Medical Research Council**. The fund supports UK academics and SMEs seeking to take their research from discovery through to commercialisation to deliver patient benefit.

The company is probing preclinical DUB inhibitors directed at specific deubiquitylating enzymes (DUBs), which present a very real problem as they are involved in multiple cellular processes, including DNA damage and cell proliferation. It is thought the inhibition of these enzymes has considerable potential for the generation of novel drugs for treating cancer and other conditions.

Anker Lundemose, CEO at Mission Therapeutics, said "It will help us develop our pipeline and establish Mission Therapeutics as a world-leader in the DUB field. More importantly, it will enable us to expand our search for new solutions to treat life-threatening diseases such as cancer."

Contact: www.missiontherapeutics.com

Liverpool Chirochem seeks £550,000 via crowdfunding platform Syndicate Room

The firm submitted a pitch to **Syndicate Room** in which it is seeking £550,000 in return for giving away a 31 per cent stake in the business. The start-up, which was founded in 2014, has developed a manufacturing process for making exceptionally pure chemicals in three steps rather than the usual ten, delivering cost efficiencies and time efficiencies for the pharmaceutical R&D industries that rely on these chemicals.

The **University of Liverpool** spinout, which won the 2015 Merseyside Innovation Awards, 'has already started to purchase specialist laboratory equipment' and hire chemists to carry out production of its novel products.

Deepbridge Advisers is leading the funding round. According to the pitch, the funds will be used to produce a larger portfolio of Liverpool Chirochem's novel, specialist chemical products that will be sold to pharmaceutical R&D specialists worldwide.

Co-founder **Dr Paul Colbon**, chief operating officer and director, is currently in California to promote the company. He said: "The company's plan has been carefully formulated over the last 18 months. Now that the investment is secured, we are putting the plan into action; we have already started to purchase the specialist laboratory equipment and hire PhD-trained chemists to carry out the chemical production of our novel products."

Contact: www.liverpoolchirochem.com

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Imperial Innovations leads £4m round for Cancer Research UK spinout Inivata

Co-investors in Inivata include **Cambridge Innovation Capital** and **Johnson & Johnson Development Corporation**. Inivata is a clinical cancer genomics company harnessing the emerging potential of circulating DNA analysis to improve testing and treatment for oncologists and their patients.

Unlike conventional invasive biopsies, Inivata detects and analyses genomic material from a cancer patient's cell-free, circulating tumour DNA (ctDNA) which can be collected through a simple blood sample. This non-invasive approach – a liquid biopsy – offers a revolution in how cancer is detected, monitored and treated.

Novel applications of ctDNA are enabled by Inivata's technology platform which includes its proprietary, enhanced **TAm-Seq** technology. TAm-Seq, which is licensed to Inivata from **Cancer Research Technology** and the University of Cambridge, allows the detection and analysis of genomic material from a cancer patient's cell-free ctDNA collected through routinely accessible blood samples.

Inivata has a comprehensive understanding of cancer genomics and circulating DNA and it is applying its enhanced TAm-Seq approach and cutting-edge technologies to address critical clinical decision points in cancer care and cancer drug development, alongside pharmaceutical partners, leading clinicians and academic groups.

The firm is based in Cambridge, and its scientific founders are leading figures in the ctDNA field. They include **Nitzan Rosenfeld** (Cancer Research UK Cambridge Institute, University of Cambridge), **Tim Forshew** (UCL Cancer Institute, University College London), **James Brenton** (Cancer Research UK Cambridge Institute, University of Cambridge) and **Davina Gale** (Cancer Research UK Cambridge Institute, University of Cambridge).

Contact: www.inivata.com

Liverpool's drug firm Evgen Pharma joins AIM and raises £7 million

In mid-October the company, a portfolio company of the **North West Fund for Biomedical**, raised £7m before expenses via an oversubscribed placing of 18.9 million shares at a price of 37p per share with institutional and other investors.

The net proceeds of the placing will be used for a number of purposes, including funding a Phase IIa study in metastatic breast cancer, a Phase II study in subarachnoid haemorrhage, preclinical studies in multiple sclerosis and long-term safety and toxicology studies.

Dr Stephen Franklin, Evgen Pharma's chief executive, said: "The fundraising proceeds will allow us to advance a Phase IIa study in breast cancer and a Phase II study in subarachnoid haemorrhage along with preclinical work in multiple sclerosis. We are excited by the progress we are making with our **Sulforadex** technology, which has the potential to address orphan and major indications in multiple disease areas."

Northland Capital Partners is the company's nominated adviser and broker. SPARK Impact first invested in Evgen Pharma via the North West Fund for Biomedical in 2011.

Contact: www.evgen.com

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Isis Innovation and Ludwig Cancer Research jointly launch spinout

The firm, **iOx Therapeutics Ltd**, is planning clinical trials to test immunotherapy candidates in melanoma patients in conjunction with approved checkpoint inhibitors. Investor **Jim Mellon**, an Oxford alumnus, is backing the new spinout. He invested in the company through **SalvaRx**, an oncology-focused investment vehicle that provides capital and drug development expertise to support emerging technologies and companies.

iOx will develop a novel cancer immunotherapy discovered through a collaboration between Ludwig Cancer Research and **Professor Vincenzo Cerundolo**, the director of the MRC Human Immunology Unit within the University of Oxford's **Weatherall Institute of Molecular Medicine**.

Since 2003, Professor Cerundolo, supported by funding from Ludwig Cancer Research, has led a research team working in collaboration with **Professor Gurdyal Besra** and **Dr. Liam Cox** of the University of Birmingham and **Professor Richard Schmidt** of the University of Konstanz. This team discovered multiple synthetic lipid compounds, now under development by iOx, which activate iNKT cells.

A body of evidence suggests that iNKT cells play an important role in anti-tumour immune responses and could prove highly effective in combination with other immunotherapies. **Isis Innovation** Head of Technology Transfer, Life Sciences **Dr Adam Stoten** said "The field of cancer immunotherapy is moving forward with unprecedented momentum."

Contact: www.imm.ox.ac.uk – www.isis-innovation.com – www.ludwigcancerresearch.org

Xerion Healthcare emerges from Oxford University's Dept of Engineering Science

The tech is based on the work of **Dr Helen Townley**, research fellow of the department. She first began developing the technology in 2007. She founded the firm with **Gareth Wakefield**, who previously helped spin out two other nanoparticle tech companies, **Oxonica** and **Oxford Advanced Surfaces** – neither of which had particularly good business track records, of course.

It secured funding from the University's **Isis Fund II**. It aims to market technology that uses nanoparticles for cancer therapy. Their tiny size enables chemotherapy drugs to be delivered directly to the tumour, cutting harm done to the rest of the body. The nanoparticles can also be used to increase the efficiency of radiotherapy. The spinout will use the funding for further trials in mice, following a completed first study undertaken with the help of the **University of Stanford**.

Contact: www.xerionhealthcare.co.uk

Serial entrepreneur Tim Edwards helping to promote Atopix Therapeutics Ltd

Mr Edwards is chairman of Atopix Therapeutics Ltd, based in Oxford, a pharmaceutical company developing a novel class of oral CRTH2 antagonists to treat atopic dermatitis and severe asthma. He is also a non-executive director of the **Cell Therapy Catapult**.

Tim was previously CEO of **Cellzome Inc**, a US-owned drug discovery company with a chemoproteomics technology platform, acquired by **GlaxoSmithKline** in 2012.

In late 2015 they plan to start a Phase 2 proof-of-concept study to evaluate the effect of OC459 in patients with severe asthma who have persistent airway eosinophilia, despite treatment with high doses of inhaled corticosteroids.

The company has secured a capital loan from **Silicon Valley Bank**; won a BioMedical Catalyst grant of

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£1.7m from Innovate UK to advance its lead asset OC459 through a Phase II study in atopic dermatitis, and helped **Imperial College** win a £1.3m Biomedical Catalyst award to investigate OC459, the company's lead product, for the treatment of asthma triggered by the common cold.

Atopix's drug programmes target the CRTH2 receptor which plays a pivotal role in the initiation and maintenance of allergic conditions. The company has a pipeline of small molecule drugs, the most advanced of which is OC459 in Phase 2b clinical trials.

OC459 has demonstrated efficacy in both asthma and allergic rhinoconjunctivitis. One year safety studies have also been completed showing the molecule to have an excellent safety profile.

Atopix owns the rights to develop and commercialise CRTH2 antagonists (including the lead molecule OC459) in all indications in all territories except Russia/CIS, where a related company, **Oxagen Ltd**, has retained the rights.

The company's major investors are **SR One, Wellington Partners, SV Life Sciences** and **MPM Capital**, and the company has also raised funds from **Bessemer Venture Partners** and **Red Abbey Venture Partners**.

Contact: www.atopixtherapeutics.co.uk

SME NEWS – IT, SOFTWARE, SERVICES & INTERNET

San Francisco's Veeva Inc buys Oxford-based Veeva Systems Ltd

Zinc Ahead chief executive **James Brown** anticipates the Oxford-based company will take on more staff following its £86m acquisition by Veeva Systems.

Veeva specialises in cloud-based software for the global life sciences industry. Mr Brown will now lead Veeva's commercial content management business. Zinc Ahead generates annual revenue of about £20m. Mr Brown said the company was "very profitable", although he declined to specify its annual earnings. It employs about 190 staff overall.

San Francisco-based Veeva completed the cash transaction, which included paying off Zinc Ahead's undisclosed debt, on September 29. Mr Brown said: "My view is that this time next year we will be a bigger organisation in Oxford. We expect to see even stronger growth. We will be looking to recruit staff in the future in our Oxford office."

He said Zinc Ahead, whose major shareholder was previously US-based private equity firm **Accel-KKR**, currently employs about 120 people in Oxford.

Mr Brown said the management team at Zinc Ahead, which was founded in 2001 and provides commercial content management solutions for more than 120 life sciences companies around the world, had decided about a year ago to team up with a larger company to "drive forward more quickly how we help our clients".

Over the past two years, there had been changes in how to manage and distribute digital content – such as websites, videos and apps – at life science companies within an increasing regulatory framework, he added.

Contact: www.zinc-ahead.com

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VocallQ Ltd becomes third UK firm to be snapped up by Apple Inc

VocallQ is a start-up whose artificial-intelligence software helps computers and people speak to each other in a more natural dialogue. It uses machine learning to build virtual assistants that try to recreate the type of talking computers that appear in science-fiction films such as Samantha in Her or Jarvis in Iron Man.

The deal marks **Apple's** third acquisition of a UK company in 2015. While VocallQ's speech processing and machine learning technology could be incorporated into devices from wearables to the connected home, the company was particularly focused on in-car applications. This included a collaboration with **General Motors**.

In a blog earlier this year, VocallQ described how a "conversational voice-dialog system" in a car's navigation system could prevent drivers from becoming distracted by looking at screens. Its "self-learning" technology allows "real conversation between human and the internet of things", VocallQ stated.

This would improve on virtual assistants such as **Siri**, **Google Now**, **Microsoft's Cortana** and **Amazon's Alexa**, which rely on scripted interactions and can respond only to particular commands. In another blog, VocallQ said existing assistants have fallen "well short of consumer expectations", singling out Siri as a mere "toy".

VocallQ, which was spun out of the **University of Cambridge's** Dialogue Systems Group, uses deep learning to improve language recognition, with a focus on trying to understand the context in which commands are given.

The company is led by chief executive **Blaise Thomson**, a South Africa-born mathematician, and chairman **Steve Young**, a professor of Information Engineering at Cambridge. It raised £750,000 in seed funding in 2014, led by **Amadeus Capital Partners**, the venture capital firm. VocallQ's team is expected to stay in Cambridge rather than moving to the US group's headquarters in Cupertino, California.

The VocallQ acquisition follows two other recent purchases of British companies earlier this year. Apple bought **Semetric**, maker of the Musicmetric analytics tool for record labels to track online sales and activity on social networks, in January. The following month it acquired **Camel Audio**, a maker of virtual instruments and synthesizer software, which some have speculated may be used to improve its tools for musicians, Logic Pro X and GarageBand.

Contact: www.amadeuscapital.com/vocalig

UK startup Storm tackles search firms Google and Yahoo with new search engine

For many users the Storm search engine is more ethical – it doesn't collect user data and plans to turn over half of its revenue to charities. To make money, the company will take a small portion of any sales made on retailer websites which are reached via its search engine.

The company is responding to a growing concern from people about the amount of data which is collected on people. **Kevin Taylor**, chief executive, Storm, said: "I think there are large numbers of people who are a little bit tired of being dictated to, and that dictation is coming from **Silicon Valley**. People are fearful of how invasive these companies have become. There's an awful lot of very clever manipulation of people's personal and private information."

The search engine claims to have a holistic algorithm which is self-learning, which means that over time the usefulness and accuracy of search results will improve. A quarter of UK spending done online, but only 15% of charitable donations done are done this way. The company aims to generate £25 annually per

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user in order to reach its £200 million donation target by 2017.

Storm Technologies now employ over 150 people all focused on delivering the best customer solutions and services, said sales director **Trevor Nickolls**. “We go to great lengths to find and recruit the best young talent into the IT industry across all our sales and technical departments. Once on board, our staff rarely leave to work anywhere else; we look after them, we support their ambitions and they continually exceed our expectations.” Storm Technologies is also one of the fastest growing independent IT value-added resellers in the UK.

Contact: www.storm-technologies.com

IT services firm SecureCloud+ secures £500,000 capital loan from Santander

SecureCloud+ was established in 2014 and generated sales of £2.1m in its first year of trading. The business plans to double that figure by March 2016. It has already secured a number of government contracts, providing end-to-end managed services at all tiers of the government’s IT security classification system. To date, the main clients have been from within the **Ministry of Defence (MoD)** and the company is now planning to deliver similar service offerings into the broader public sector.

The Santander funding will enable SecureCloud+ to grow its workforce and operations as its revenues increase. The business will also be able to broaden its customer base, expanding its range of services while developing “strategic alliances” with technology and delivery partners.

Founding director **Pete Williamson** said: “Since our incorporation sales have grown exponentially and the funding package from Santander Corporate & Commercial will help us to continue growing to meet customer demand.

“The future for SecureCloud+ is extremely positive in terms of innovation, solution development, customer services and our reputation in the marketplace.”

Diane Fairbairn, relationship director at Santander Corporate & Commercial, added: “SecureCloud+ has enjoyed tremendous growth since its incorporation and we are pleased to be partnering with such an exceptional, dynamic and well-managed company. We anticipate the business will be the one to watch in the sector over the coming years.”

Contact: www.securecloudplus.co.uk

‘How to find people in video data?’ – problem sorted, say SeeQuestor Ltd

Some 1.4 trillion hrs of CCTV footage in 2014 – yet only a fraction of 1% of that data are ever analysed. Systems developed so far to deliver more effective searching have failed, although security teams across the globe demand a solution.

SeeQuestor is working with the thought leaders in person re-identification and other areas of video analytics to develop a system capable of finding people in vast amounts of video data, either retrospectively or in real time. **Price Bailey Strategic Corporate Finance** has succeeded in raising more than £750,000 in investment funding for three separate clients during the first quarter of 2015.

The funding for the three companies; data management analytics software company **Meniscus Ltd**, video analysis company **SeeQuestor Ltd** and intelligent pipeline monitoring specialist **Syrinx Ltd**, was secured from members of the Price Bailey Investor Community and ranged from £10,000 up to £200,000.

Chief executive **Henry Hyde-Thomson** said “Seequestor was founded to help police solve crimes and

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save lives by finding and tracking people in large quantities of CCTV data. We are now at the stage of completing the software development prior to rolling out our video analysis platform to a wider audience next year. Price Bailey's assistance sourcing investors and funds will help enable us to swiftly move forward with our implementation plans."

Tristram Riley-Smith – founder-chairman is, like Henry Hyde-Thomson, a director of Anglo Scientific Security & Resilience Division. Riley-Smith is also an ex-leading national security specialist with decades of experience in HMG, and director of research at Cambridge University's Department of Politics and International Studies.

Best of all **Prof Sean Gong**, CSO, is professor of Visual Computation at Queen Mary University (QMU), London. Gong is a world-leader in the visual recognition of behaviour from video data, founder QMU's Department of Computer Vision in 1993, and a Queen's Research Scientist award & Royal Society Research Fellow (1987/1988).

Contact: www.seequestor.com

FINTECH SMEs

KPMG launches new Fintech 100 list – call-out for the top fintech companies

The chosen innovators will get free **KPMG** services and free membership of the **Matchi** fintech financing service, with the top 10 emerging innovators flown to pitch at the consultancy firm's FinTech Summit in London in February 2016.

The hunt, which will identify 50 more established firms and 50 "emerging stars", has been launched in association with Australian fintech investor and accelerator **H2 Ventures**. The deadline for entries or nominations is 31 October and the list will be unveiled during a series of parallel events in **Sydney, London, Hong Kong, San Francisco** and **Tel Aviv** in November.

The programme expands on KPMG's **50 Best Fintech Innovators of 2014** list, which was led by **Wealthfront, Kabbage, Motif Investing, Klarna** and **Square**.

Ian Pollari, KPMG's global co-lead of the company's fintech practice, said: "Fintech is rapidly evolving and the Fintech 100 celebrates the most dynamic companies in the industry. These startups are pushing the frontier of new products, services, technology, and business models in financial services."

Contact: www.kpmg.com/ie/en/issuesandinsights/articlespublications/pages/alliance-with-fintech-matchi.aspx

Startupbootcamp brings companies from Europe, Asia and America to London

Ten financial services startups have been chosen by startup accelerator **Startupbootcamp FinTech** to participate in its annual London programme, which seeks to find the best new companies in financial services and bring them to market. Notable themes among the finalists include **Bitcoin** and the **blockchain**, big data, algorithms, cloud computing and social networking.

After three months, the teams will present to 500 investors, mentors and partners on the Startupbootcamp FinTech demo day. A selection of the UK teams chosen are:

- **Blockverity**

Blockverity is a company that uses blockchain technology to improve anti-counterfeit measures. The idea

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is to make it impossible to duplicate products by creating a digital record.

- **Delio**

Delio was created to provide wealth managers, private banks and other financial institutions with a compliant way of allowing clients and advisors to share and access direct, private market investment opportunities internally and across their networks.

- **Money Fellows**

Money Fellows has created a lending system in which people use social media such as Facebook to lend and borrow with their friends and contacts. There is no interest charged, instead there is a one time fixed fee. The idea is to make loans much cheaper and saving more rewarding.

- **StockViews**

StockViews is a social network for investors. Members post their “investment thesis” in 250 characters or less together with a “rating” (buy, sell or neutral). Performance of recommendations is then tracked in real time by the site and compared against Wall Street professionals.

- **WoraPay**

WoraPay provides merchants software based self-service with multiple mobile wallets connected to it. On the other hand, WoraPay provides banks, payment service providers, telecoms or other institutions that operate a mobile wallet quick access to the wider merchant network.

Contact: www.startupbootcamp.org/accelerator/fintech-london

Fintech company Hello Soda announces expansion into the US

Hello Soda is expanding its UK business overseas after experiencing huge demand for technology platform Profile which helps reduce fraud and improve responsible lending and borrowing.

Marketing manager **Taylor Waldock** oversees all online marketing and communications, spending the majority of her time on social media platforms to ensure all Hello Soda activities are promoted clearly, concisely and creatively.

The cloud-based, unstructured data engine gives organisations insight into a customer by analysing their digital footprint. It takes customer information from social media platforms and blends it with other third-party data sources to create real reputation scores with a human element, helping lenders reduce fraud and make fairer decisions around affordability, pricing and terms. Hello Soda’s new credit scoring methods are helping to transform the credit industry.

Hello Soda has been attracting interest from some of the world’s biggest alternative lenders, banks and insurance companies following its development of the Profile platform which helps reduce fraud and improve responsible lending and borrowing using **Bayesian Belief Network** principles to create 4D data. Plugging a gap in the industry, the technology helps companies understand a person as an individual and aims to take advantage of the fact that traditional credit rating models are based on historical financial performance, and do not take into account a person’s ‘true’ and real-time circumstance.

But it’s not just creditworthiness that Hello Soda’s platform is being used for, propensity to commit fraud, employee vetting, and insurance claimants’ trustworthiness are just some of the issues the technology is being put to use to resolve.

Contact: www.hellosoda.com

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UNIVERSITY NEWS

Early detection of sepsis the urgent focus for University of Liverpool spinout

The company has already secured more than £400,000 to develop a tool for the early detection of blood poisoning. The investment in **Sepsis Ltd**, which includes private equity investment as well as funding through a **Smart Award** and an **Innovation Voucher**, will be used to fund the company's development and testing of a working prototype of a handheld device that can be used at the patient's bedside for the rapid diagnosis and treatment of sepsis.

Sepsis, often referred to as blood poisoning, is a life-threatening condition triggered by an infection, from which the body's immune system sets off a series of extreme reactions. This includes inflammation, increased blood clotting and injury to the lung and other organs that can lead to shock and death.

Sepsis Ltd, which was spun out in 2010, is founded on the research of blood specialist **Professor Cheng Hock Toh** from the university's **Institute of Infection and Global Health**. This resulted in patented technology developed at the university being assigned to the company.

Professor Toh, who also provides direct patient care at the **Royal Liverpool University Hospital**, said: "This is an important step in translating original research from Liverpool into a global test that can improve antibiotic treatment and save lives."

Contact: www.liv.ac.uk/infection-and-global-health

University of Leicester spinout MIP Diagnostics pioneers special polymers

MIP Diagnostics Ltd was founded in 2015 as a spin out from the University of Leicester by several leading experts in the field, including **Prof Sergey Piletsky**, in order to commercialise various forms of **Molecularly Imprinted Polymers** (MIPs), sometimes called "plastic antibodies".

Its proprietary technology includes a novel method to make nanoMIPs which circumvents the drawbacks of traditional MIP manufacturing methods. **NanoMIPS** are, as the name suggests, nanostructured polymer particles typically containing a single binding site for their target. Whilst MIPs are exceptionally robust polymers [plastics], nanoMIPS are sufficiently small to be essentially soluble. They can also be fused to solid substrates, such as sensor surfaces, if required.

The robust nature of MIPs and nanoMIPs make them ideal reagents for a wide range of applications including point-of-care diagnostics and in field based testing. They can withstand harsh chemical environments, such as extremes of pH, seawater or high concentrations of organic solvents. MIPs have successfully been created and deployed against all major target classes including peptides, proteins and other macromolecular structures, as well as smaller chemical entities such as drugs, their metabolites and commonly used biochemical species such as enzyme cofactors.

In 2015 it began the initial expansion of its business operations with the appointment of **Adrian Kinkaid** as CEO. This followed a recent investment of £182,000 made by **Mercia Fund Management**.

Mr Kinkaid has extensive experience in the life sciences sector, with particular expertise in affinity reagents, including antibodies, affirmers and aptamers. He therefore has an in-depth understanding of the market and its competition, which will enable him to effectively market MIPS as a cost effective and high quality alternative to existing agents because of their robustness and speed of development.

Contact: www.mip-dx.com

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Northern Ireland's PicoPUF Ltd develops an application to make internet secure

PicoPUF, a spinout from **Queen's University Belfast's Centre for Secure Information Technologies (CSIT)** took first prize at the latest **Invent** awards. The **Northern Ireland Science Park competition**, run in partnership with **Bank of Ireland UK** recognised the firm in the electronic category and gave it the overall prize.

PicoPUF invented a tiny semiconductor IP core that provides strong, unique authentication for even the cheapest microchip. It was deemed by judges to have the most innovative product with the biggest global commercial potential.

PicoPUF founder **Neil Hanley** said the product was developed in the midst of a "perfect storm" that he said was happening in IT security. "The huge number of devices on the market, combined with the low-cost nature of these devices, makes it impossible to use heavily-computationally-resourced security solutions," he said.

"Lightweight security will be a game-changer and we are set to capitalize on that. This Invent competition has been a massive step towards that goal, and we thank the science park for the chance to get involved. We can't believe we won."

The award was presented to the trio of Queen's researchers who invented PicoPuf, **Neil Hanley, Maire O'Neill, and ChongyanGu**. Their invention means that any grade of device can have the highest level of security. They took home a prize package of £13,000, a fast-track to NISP's **Springboard** programme, and a space on the **NI TechMission to California** in January 2016.

The other five winners, who received £3,000 and a place on the TechMission were:

- **NextGenBiopesticides**

Insect parasitic nematodes selectively bred to be a safe, effective biopesticide for the control of crop pest insects. The company is headed by **Dr Jonathan Dalzell** from Queen's University, who was the Agri-Food category winner of Invent 2014. NextGen Biopesticides are using selective breeding approaches to develop more effective organic biopesticides. They are working with insect parasitic nematodes, that is, microscopic worms that find and kill pest insect larvae in the soil.

- **Cognition Video**

A processing framework that enables the effective understanding of media content using intelligent automated algorithms. Enterprise Software firm led by **Dr Fabian Campbell West**, who is a Senior Engineer at CSIT. Cognition Video is a flexible software program that automatically analyses video and understands the content. The intelligent algorithms can recognise and track people, determine age and gender and identify behaviour.

- **Skunkworks Surfboard** company

Robust soft (learner) surfboards that are 100 per cent recyclable and unbreakable.

Led by brothers **Chris** and **Ricky Martin** from Portrush. Skunkworks has invented a custom made heat bonding technology that bonds boards together using heat instead of glues and adhesives, which break down and fall apart. The boards become one single, solid unit once finished.

Contact: www.csit.qub.ac.uk – www.skunkworkssurfco.co.uk

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St Andrews spinout Photosynergy Ltd starts trials of new subsea lighting

Photosynergy Ltd (PSL) said industry feedback had led it to further develop its Lightpath concept, a system that last year scooped **Subsea UK's** Innovation for Safety Award.

PSL has its origins in scientific research undertaken at St Andrews University's **Photonics Innovation Centre** at North Haugh. Its long-term aim is to establish Lightpath as a global commercial product for the domestic upstream oil and gas supply chain.

PSL said testing of its **SLS5000 system** had led to comments about size and underwater usability. The company has now created a compact unit which provides a light source to saturation divers via an LED attached to the umbilical at the divers' end.

The development of the SLS2000 follows the successful launch earlier in 2015 of the deep-water SLS7000, a version of Lightpath that may help identify the position and orientation of seabed operations down to 3,000m. Despite the cutbacks in the North Sea arising from the low oil price, PSL said firms were still keen to invest in proven deep-water technologies.

PSL director **Don Walker** said "We had been testing the SLS5000 with a number of clients during its development phase and had received feedback from divers and their teams on the benefits of having a low power, minimal sized package, which would not impede the diver and which could be illuminated from the diver end as opposed to the dive bell end."

"The first unit was ready for testing just two months after we received the initial feedback on specific requirements. As a sealed-for-life unit, it's a first for PSL and simplifies the construction in terms of its complexity, part count and minimal size, and maintenance while retaining the lighting concept. It's our aim to start sea trials by the end of this year at the very latest."

While Lightpath has been targeted at the subsea sector, PSL believes it could be used in a wide range of industries from guide path illumination through to other applications in challenging, hazardous and submerged environments.

Contact: www.photosynergy.co.uk

York spinout SimOmics Ltd aims to cut clinical trials via clever software

Ahead of plans to expand into the biotech market in San Diego, **SimOmics** was formed to reduce clinical trials for therapeutics and healthcare products through software which simulates preclinical and clinical trial conditions.

Professor Jon Timmis, from the university's department of electronics, has worked with co-founders, **Dr Mark Coles** from York's Centre for Immunology and Infection and **Professor Vipin Kumar** from Torrey Pines Institute for Molecular Studies, in San Diego, for more than seven years developing models and simulations of the immune system.

Their software informs decisions on trial design and predicts long-term effects for drugs and healthcare products in a bid to eliminate the need for animal and patient trials, enabling manufacturers to focus on products most likely to succeed.

With help from the **University's Research Innovation Office** (RIO) they applied for funds from the Centre for Chronic Diseases to test the technology, and Mr Timmis successfully applied for a **Royal Academy of Engineering Enterprise Fellowship**, allowing him to focus on developing SimOmics.

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Now SimOmics is applying for **Innovate UK** money to develop a core product. Mr Timmis said: “We are focusing on how best to develop a core product line of software to support decision making for clinical trials. In the next three years we plan to expand to San Diego, where there is a large market of biotech companies and where we have local expertise and contacts.”

The SimOmics team has just been awarded, as part of a larger consortium led by the **Centre for Immunology and Infection** at York under **Prof Paul Kaye**, a project to develop a virtual laboratory for infectious diseases, to allow for the computer based simulation of different therapeutics in the treatment of **Leishmaniasis**, a neglected tropical disease. Mr Timmis added: “The project is for two and a half years and will provide a very strong start for us as a company, allowing us to employ a senior software engineer.”

Contact: www.simomics.com

‘Electronics Weekly’ magazine invites readers and surfers to vote on research

Each year the magazine asks readers to cast their vote in favour of the Elektra 2015 Award in the University Research category, for the project that they feel is the most interesting – with the result being announced at the awards dinner on 24 November at the Lancaster London Hotel.

The finalists are:

- Phone apps could equal conventional eye tests for remote communities.
UK researchers have used a phone app for eye tests in **Kenyan** homes, and found it as good as conventional eye chart test in a clinic. The test – called Peek (portable eye examination kit) Acuity – has been developed by **the London School of Hygiene & Tropical Medicine, the University of Strathclyde** and the **NHS Glasgow Centre for Ophthalmic Research**.
- LED lighting could help with sleep patterns.
Designers could learn a lot about how their products will affect wake-sleep patterns following research by the **University of Manchester**. This has little to do with bright lights waking people up, nor the gradual shift to red as the sun goes down. Instead it is new knowledge on the changing balance between blue and yellow in the spectrum, and direct evidence that it affects the wakefulness of mammals.
- DIY-microscope – Brunel scientists saves £1,000s with £160 DIY microscope.
Scientist **Adam Lynch** was stuck for a piece of research equipment, so he made his own, saving thousands of pounds, and getting a research paper published on the instrument. From **Brunel University’s College of Health and Life Sciences**, Lynch was studying cell movement and needed a microscope to look up at the cells through the bottom of a transparent container, or more than one container so tests could be run in parallel.
- **Oxford University** makes graphene crystals in just 15 minutes.
Millimetre-sized high-quality graphene crystals can be made in minutes instead of hours, claim researchers from Oxford University. The team says it has demonstrated the production of large graphene crystals around 2-3 millimetres in size in just 15 minutes, instead of the more typical 19 hours to produce using current chemical vapour deposition (CVD) techniques. This is another example of the research taking place all over the world to make graphene cost-effective as a commercial semiconductor technology.
- Bristol-NTT-quantum-optical-chip. Photon processor tests quantum computing theory
Researchers from the **University of Bristol** and **Nippon Telegraph and Telephone (NTT)** have built a programmable optical chip that can process photons for quantum computer research. In a demonstration, the chip was re-programmed to perform a number of different experiments, each of which, said the

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university, would previously have taken months to build. The linear optical chip has six modes and consists of 15 cascaded Mach-Zehnder interferometers with 30 thermally driven phase shifters.

Contact: www.electronicweekly.com

AND FINALLY...

>> Pun-filled SME business names such as these have been scattered across the nation – which are the best? You choose. **The Codfather**, a fish and chip shop, as the business with the best quirky name. **Curl Up and Dye**, a hairdressers, and **Back to the Fuchsia**, a florists, were both picked by 23 per cent of people. Other high-ranking names included a sandwich shop called **Arnie's Sarnies – You'll Be Back**, a florists called **Florist Gump** and a Welsh fish and chip shop called **A Fish Called Rhondda**.

Some more:

- Loft in Space – Loft conversion
- Mows Art – Garden maintenance
- Mission Inflatable – Tyre repairs
- Bits & PCs – Computer repair
- Cash22 – Bureau de change
- Frying Nemo – Fish and chips
- Tequila Mockingbird – Spirits shop
- Yahpoo! Plumbing – Plumbing
- Iron Maiden – An ironing service
- Jason Donvervan – Kebab shop
- Jean-Claude Van Man – A moving van
- Alan Cartridge – ink refillers

>> The Wild East that is **China's** high-risk chemicals and toxic substances manufacturing sector delivered a self-devastating blow on August 12 with the double explosion at **Tianjin**, the city that is the No.1 gateway to the country's industrial north.

Some 1,300 tonnes of oxide compounds mixed with 500 tonnes of inflammable materials, and 700 tonnes of sodium cyanide led to destruction. A thick white foam covered the city three days after the blast, causing skin burns and undrinkable water for 50 km around the city. Thousands of dead fish then polluted already toxic water sources.

>> Social media may not have the accurate predictive value many digital 'experts' believe. Oxford spinout **TheySay** said former Labour leader **David Miliband** 'won first round' of pre-election TV debate with **David Cameron** – even though all other surveys gave Dave a clear lead. Is social media the least accurate form of public polling?

An election day exit poll from US-based social media monitoring company **TalkWater** showed 2,500 Twitter users claimed to have voted Labour against 777 for the Tories. Former Sun editor **David Dinsmore** warned "Social media kept talking of a Labour victory. If you tuned into Twitter during the campaign you would have assumed it was a done deal for Ed."

>> As we had long predicted.. **Kids Company's** implosion continues apace. The charity had claimed to have 15,933 clients to whom it was giving intensive support, yet it handed over the files of fewer than 2,000 clients to local authorities. Next, **Camila Batmanghelidjh** claimed her staff had sought written authorisation to spend part of a £3m **Cabinet Office** grant on the charity's pay bill for July – which was not a permitted use for the grant. No email has emerged which supports this claim and the charity has not claimed that the civil service ever gave its consent. Is a **Scotland Yard**-delivered charge of misusing a

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public grant now imminent, or arrests for fraud?

>> **The BBC** was accused of living in “fantasy land” after it defended paying six-figure salaries to senior managers and presenters. Its annual report says more than 100 stars at the corporation earn more than £150,000 while nine celebrities were paid between £500,000 to £1m. The accounts also showed that 74 BBC senior managers were paid £160,000 or more in 2014 to 2015, up from 66 the previous year. But **Anne Bulford**, the BBC’s MD of finance and operations, told MPs senior managers’ salaries are “discounted” compared to rival channels.

>> The **New York Times** reports that ‘many schools across the country are figuring out how to field increasing requests for animals by students with diagnosed mental health problems’. College students are demanding to be allowed to live with an animal. Worse, discrimination lawsuits filed by students denied so-called ‘emotional support animals’ have triumphed in the courts. In Sept 2015, on the eve of a trial in a case closely watched by administrators, the **University of Nebraska** at Kearney settled with the **Justice Department**, agreeing to pay \$140,000 to two students who had been ‘denied’ support animals.

>> The 20 climate scientists and academics at **The Institute for Global Environmental Strategies** (IGES) who sent a letter to President Barack Obama asking him to prosecute global warming sceptics may be in big trouble. A **Congressional Committee** is now looking into the government-backed nonprofit that circulated the letter, demanding they turn over “all e-mail, electronic documents, and data created since January 1, 2009.” The group has one week to respond in writing to the committee’s request. It seems like IGES’s effort to get Obama to prosecute global warming sceptics has completely backfired in the two weeks since their letter to the administration was published online. IGES has since taken down the letter and put up a message claiming the letter was “inadvertently posted” online.

Contact: www.iges.org

>> One commentator’s view of **Donald Trump’s** campaign: “In a parlance Trump would appreciate: ‘We’re still in the swimsuit competition. It gets harder in the talent rounds’.”

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