



Quarterly Journal - February 2017

NEWS COMMENT and ANALYSIS on SPINOUTS from UK HEIs

In this issue

The three administrative regions in the South East of England - London, East (including Cambridge), and South East (including Oxford - comprise the so-called 'Golden Triangle', and dominate the news in the spinouts sector.

For example, of the 14 investment deals included in the table on page 9, universities in the Golden Triangle took over 80% of the total investment. Many of the largest deals are often in life sciences, with life sciences companies in the Golden Triangle accounting for 75% of the total, even after excluding the \$35m invested in Bath's Atlas Genetics.

This trend has intensified over the past year, in part thanks to the considerable extra finance injected into the sector by the likes of Oxford Sciences Innovation and IP Group, as acknowledged and explained by Matt Perkins, the new CEO of Oxford University Innovation (p15). Besides the increasing concentration of activity and resources in the South East, there has been some consolidation of the specialist investors focusing on the sector - with Enterprise Ventures joining Mercia Technologies in March, and Parkwalk Advisors acquired by IP Group before the end of the year (p14).

However, the Golden Triangle is not the 'only game in town', and this issue includes details of new spinouts and investments across the country. Ewan Chirnside explains the more considered approach adopted by the University of St Andrews when considering the formation of spinout companies (p3), and James Wilkie of Alta Innovations asks 'Is there really nothing between London and Manchester?' (p13) The University of Manchester's Innovation Company has a new chairman (p11), and is itself represented by a couple of exits by spinouts (p5), not previously covered in our Quarterly Journals, while Birmingham and Nottingham have been bringing their new companies to the attention of investors (p11).

Several of the Spinouts UK project partners are based in the Golden Triangle, and this area will continue to provide much of the news we report. However, we are very keen to cover activity across the UK, at every scale, and will continue to tell the story of how excellent research in UK universities is being commercialised for the benefit of society as a whole..

- Jonathan Harris, Editor

Organisations mentioned in this issue

Alfacyte	6	Linear Diagnostics	12	SurePulse Medical	12
ApcinteX	7	Locate Therapeutics	12	Tarsis Technology	3
Atlas Genetics	7	Orbital Diagnostics	4	TDL Sensors	5
AURIL	10	Oxford Biodynamics	4	Touchstone Innovations	10
Azotic Technologies	12	Oxford Nanopore Technologies	6	University of Birmingham	11
Beyond Medics	4	Oxford Sciences Innovation	14	University of Nottingham	11
Biovici	12	OxSonic	7	University of St Andrews	3
Breathing Buildings	4	Parkwalk Advisors	14	Uquant	2
Cambridge Graphene	4	Phagenesis	5	Veryan Medical	7
Circadian Therapeutics	2	Pneumagen	4	Wrapidity	5
Cytora	6	Polypharmakos	2		
Cytox	12	PraxisUnico	10		
Dietary Assessment	3	Promethean Particles	12	Project partner pages	
EnzBond	2	Razorbill Instruments	4	UMIP	11
Footfalls & Heartbeats	12	Ripptide Pharma	4	Alta Innovations	13
IP Group	14	Smart Antenna Technologies	6, 12	Oxford University Innovation	15
Irresistible Materials	12	Smart History	4		
LAB282	13	St Andrews Lean Consulting	4		

QJ22 recent spinouts

The companies below are all new to the Spinouts UK database. In the table on p6 we give dates of incorporation – many universities regard the date of IP transfer, often some months later, as the start of the spinout's life, but we are unable to find this information regularly so use dates of incorporation instead.

Polypharmakos

Polypharmakos is a spinout from the University of Cambridge and the Royal Botanic Gardens, Kew, with the mission to screen natural-product sources of plant, fungal and insect origin for antimicrobially active substances with novel mechanisms of action and to develop them to address the emerging global antimicrobial resistance (AMR) crisis.

The company was founded in 2016 by Dr John Normanton and Tom Sopwith of ArgantriX, a project management business which offers services to link together academia in India and the UK to capitalise on the complementary strengths of both countries. The business arose from discussions with Prof Duncan Maskell (Marks & Spencer Professor of Farm Animal Health, Food Science and Food Safety) and Prof Monique Simmonds (Deputy Director of Science, Royal Botanic Gardens, Kew).

The company undertook a small Cambridge Enterprise-funded pilot screening exercise in 2016 in conjunction with the teams of Prof Clare Bryant (Professor of Innate Immunity) and Dr Mark Holmes (Reader in Microbial Genomics and Veterinary Science) at the University of Cambridge. The project revealed a number of active substances in a small sample of intelligently selected extracts, indicating that the Kew collections should be an ideal starting source for new antimicrobials. In addition, Polypharmakos received pilot project funding from Swansea University and Swansea Innovations for the structural characterisation of Seraticin®, a maggot-derived, small molecular weight, broad spectrum antimicrobial.

In January an investment of £500k in Polypharmakos was completed by Cambridge Enterprise and the University of Cambridge Enterprise Fund, managed by Parkwalk.

Uquant

Imperial College London spinout UQuant will provide consultancy services in areas that use computer simulations to predict outcomes.

UQuant is based on the work of Dr Francesco Montomoli and Mr Richard Ahlfeld, from the Uncertainty Quantification Laboratory at Imperial College London's Department of Aeronautics, and was founded by Co.Create, Innovations' company formation unit.

In engineering and other sciences, predictions are based on computer models and simulations: most of them are based on

deterministic assumptions, where the same parameters deliver the same results. The reliability of these models is limited by a level of randomness that is intrinsic to complex systems: rigid predictions are not able to account for natural variation. To tackle this, the founders of UQuant apply a form of analysis known as Uncertainty Quantification. By using these processes, UQuant is able to account for randomness inherent in complex systems, without simplifications, and delivers the probability of a particular outcome.

UQuant participated in the 2016 edition of the Venture Catalyst Challenge (VCC), an Imperial enterprise competition run by Imperial Create Lab, where the team was one of seven companies chosen to pitch their business to a panel of professional investors.

Circadian Therapeutics

Circadian Therapeutics, a University of Oxford spinout based on the research of Professor Russell Foster OBE, will identify and bring to market pharmaceutical and diagnostic platforms for the effective management of physiological and pathological conditions through their ability to modify the body's circadian rhythms.

Circadian Therapeutics has identified drug candidates and is looking to study their effects on circadian rhythms in clinical trials. Simultaneously, the company is aiming to replace hospital-based, expensive diagnostics through the development of a home-based ambulatory electroencephalogram (EEG) device that will provide accurate and minimally intrusive measurement of brain function and circadian rhythms.

Circadian's intellectual property draws on the input of the Nuffield Department of Clinical Medicine, the Department of Pharmacology, and the Institute of Biomedical Engineering, and builds on research supported by the Wellcome Trust.

Circadian has raised £2m from Oxford Sciences Innovation (OSI), the patient capital investor for Oxford University. The company is chaired by Dr Chris Blackwell, former CEO of Vectura Group.

EnzBond

EnzBond, a new biotechnology company from the University of Oxford, has been formed to commercialise in-silico technology which makes utilising enzymes in drug manufacturing both cost-effective and time-efficient.

At present, discovering the right enzymes for production in drug development can prove both prohibitively expensive and time consuming, as identifying the right enzyme is a trial and error process that can see companies go through potentially thousands of enzymes during the search. This prevents the penetration of enzymes in the industries like pharma where effective and green technologies are crucial.

EnzBond's in-silico technology allows the company to examine the potential properties of these enzymes virtually, rapidly speeding up the process. EnzBond claims that, compared with rival biocatalyst discovery firms, its technology has demonstrated itself to be at least ten times faster and far more accurate.

EnzBond is the first Oxford spinout developed by students since NaturalMotion, which was sold to games company Zynga for \$527m in one of the largest spinout exits on record. Typically, spinout companies are either led or advised by an academic founder. In the case of EnzBond, the founders did everything from develop the underlying technology to pitching the technology to pharmaceutical partners and investors while PhD students, and officially founded the company upon completion of their studies.

Oxford University Innovation, the research commercialisation company of Oxford University, was involved with spinning out the company, while Oxford Sciences Innovation, the spinout investment company for Oxford University, has backed EnzBond with £350k in seed financing.

Tarsis Technology

Tarsis, a University of Cambridge spinout, plans to develop and commercialise technology created by Dr David Fairen-Jimenez, a Royal Society University Research Fellow at the Department of Chemical Engineering and Biotechnology, and his research team. The technology allows slower and more controlled delivery of drugs using metal-organic frameworks (MOFs). The pharmaceutical industry has demonstrated early interest in the technology. Intellectual property commercialisation firm Frontier IP has acquired a 20% stake in the company.

Dietary Assessment

A new spinout company from the University of Leeds, Dietary Assessment has been formed to help track and analyse dietary intake.

Thanks to initial investment from the University's Enterprise Fund, the company has developed an online tool, myfood24, which allows researchers, teachers, health professionals and dietitians to monitor diet and analyse food and drink consumption to help reduce and manage diet-related diseases such as diabetes.

Funded by a grant of almost £1 million from the Medical Research Council, myfood24 was developed to stand up to the academic rigour demanded by world-class research into dietary intake. The website tracks not just the eight 'back of pack' nutrients included on most supermarket foods, such as energy, fat, protein and fibre, but also more than 100 additional macronutrients and micronutrients such as vitamins and trace minerals which have been mapped by a team of nutritionists and dietitians.

After users have submitted details of their eating habits to myfood24's online food diary, the report generated will have a comprehensive nutrient breakdown of the food and drink consumed including the additional macronutrients and micronutrients unique to myfood24. This level of detail will help professionals to better monitor food intake and advise on diet.

Janet Cade, Professor of Nutritional Epidemiology and Public Health at the University and founder of Dietary Assessment, said "While tools to track calorie consumption or protein intake are currently available, myfood24 is a tool that can stand up to the scrutiny needed to support a health professional's assessment or an academic research project.

"No other mainstream tool gives the full picture when it comes to dietary intake. For example, an individual may be eating the average amount of calories for their age and sex but their intake of certain key vitamins might be lower than recommended, which could pose a health risk."

University of St Andrews

In this Quarterly Journal, we highlight the University of St Andrews, which has changed its approach to commercialisation, and in the process has generated six new spinout companies over the past two years.

The University's Technology Transfer Office is its Knowledge Transfer Centre (KTC), which like most TTOs helps researchers access and bid for translational funding to develop technology and business ideas, with the objective of licensing technology to existing companies or creating new spinout companies to develop the commercial applications of research results.

Dr Ewan Chirnside, KTC Director, explains the new approach: "We have 'pivoted' our business approach to enterprise, spinouts and start-ups - we now support a strategy of 'patient IP' (akin to patient capital), and establish and support soft start businesses around opportunities within the university to test the commercial viability and/or develop technology which we are

looking to exploit. This then progresses more formally in one of four ways:

- fold/abandon the soft-start business (and IPR) due to lack of success; or continue with it and either:
- license technology or soft start business opportunity to an established company
- form a wholly owned university start-up company within our STAAR group of companies to further commercialise the opportunity (these may be offered for investment or sale at some time in the future)
- form a spin-out, prosecute key IPR, develop technology & seek investment”

STAAR is St Andrews Applied Research Ltd, a wholly owned subsidiary company of the University used as a holding vehicle for its other wholly and majority-owned tech and consultancy companies.

He adds: “So far that diverse approach appears to be working positively for us – at least with better results than we managed previously.”

Recent spinout companies from St Andrews include:

Razorbill Instruments

razorbillinstruments.com

Razorbill is developing nanopositioning technology that can deliver precise and reliable nanoscale movement, which will have a wide range of microscopy and nanofabrication applications.

Smart History

www.smarthistory.co.uk

Provides 3D 'open virtual worlds' historical site reconstruction

Beyond Medics

www.beyondmedics.com

Creation of medical imaging and sensing platforms for clinical use.

Pneumagen

Development of engineered carbohydrate binding molecules (CBMs) as immunomodulators and anti-virals.

Ripptide Pharma

www.ripptide-pharma.com

Development of a chemoenzymatic process for the efficient production of macrocycles and cyclic peptides, addressing entirely novel areas of chemical space for drug discovery and development.

St Andrews Lean Consulting

standrewslean.com

Bespoke 'lean' consultancy services to higher education institutions, and public, private, and charitable organisations.

Orbital Diagnostics

Rapid detection of antimicrobial resistance (AMR) & antibiotic sensitivity testing (AST).

For further information, go to: www.st-andrews.ac.uk

Recent exits

Further details about the companies reported below are given in the table on p8

Oxford Biodynamics

Oxford BioDynamics plc was admitted to the London Stock Exchange Alternative Investment Market (AIM) on 6 December. The placing raised gross proceeds of £20 million, of which £7.1 million (before expenses) was allocated to the company, and at admission the company had a market capitalisation of £136m. OBD is a biotechnology company with a proprietary biomarker discovery platform, EpiSwitch™, based on the latest advances in gene expression, non-coding RNA and epigenetics.

The company was spun out from Oxford University in June 2007 with the aim of translating fundamental scientific advances into a commercialised platform technology and a new generation of biomarkers for cancer and other diseases.

OBD will use the additional resources raised by the flotation to fund the expansion of its proprietary biomarker programmes, enhance its IP portfolio, and establish a presence in the USA.

Breathing Buildings

On 19 December Breathing Buildings announced its acquisition by the Volution Group plc. Volution is a leading supplier of ventilation products to the residential and commercial construction markets, and the acquisition of Breathing Buildings is in line with its growth strategy. Breathing Buildings will be part of Volution's Ventilation Group division in the UK where it will widen the capability especially in the new build commercial market.

Breathing Buildings was formed in 2006 following the development of the proprietary e-stack mixing ventilation system, as part of a major research programme at Cambridge University and MIT, funded by BP. The technology was filed for patent by the University of Cambridge, and Breathing Buildings has exclusive rights to this IP.

The terms of the acquisition were not disclosed.

Cambridge Graphene

Versarien plc, an engineering solutions company headquartered in Cheltenham, has acquired a majority stake in Cambridge Graphene, a University of Cambridge spinout company.

Cambridge Graphene develops inks based on graphene and related materials using processes developed at the Cambridge Graphene Centre whose mission is to investigate the science and technology of graphene and other carbon allotropes, layered crystals and hybrid nanomaterials.

Cambridge Graphene has commercialised graphene inks for novel technology applications.

Through subsidiary companies, Versarien delivers targeted solutions as well as research and development into new, complementary technologies. 2-DTech, a spinout enterprise from the University of Manchester, is an existing subsidiary of Versarien which also focuses on graphene-related technologies.

Following the acquisition of Cambridge Graphene, both universities will be ultimate shareholders in Versarien, with the expertise of both universities enhancing its ability to pursue the market opportunities for graphene both in the UK and internationally.

The total consideration for the 85% stake in Cambridge Graphene is £170k to be settled by £25k in cash, and the issue of new ordinary shares in the Versarien. For the year ended 31 May 2016, Cambridge Graphene had negative net assets of £9,047 and made a profit before tax of £2,809.

Wrapidity

Media intelligence business Meltwater has acquired Wrapidity, an artificial intelligence (AI) spinout from the University of Oxford whose technology automates data extraction from content on the web.

Wrapidity's underlying technology will help Meltwater to improve and scale its analytics software and address the volume of data coming from new sources as required for future product generations.

After evaluating over 20 companies globally in this space, the Meltwater team determined that Wrapidity was the strongest technology of its kind, complemented by an experienced engineering team led by co-founders Dr Tim Furche, Dr Giorgio Orsi and Dr Giovanni Grasso.

Jorn Lyseggen, Founder and Chief Executive Officer (CEO) of Meltwater, said "Data science, machine learning and artificial intelligence are areas of strategic importance for Meltwater. Today, we are all drowning in unstructured data, and Meltwater is putting the whole weight of our company behind research efforts to unlock insights buried in the large amount of disparate data types found online."

The terms of the deal were not disclosed.

Two exits for University of Manchester spinouts, not previously reported in Spinouts UK:

Phagenesis

In September Nestlé Health Science (NHSc) and Phagenesis announced that NHSc is entering into a staged, milestone-based acquisition of Phagenesis, a University of Manchester medical device spinout company that has developed a new treatment for dysphagia.

Under the terms of the agreement, NHSc will make an upfront payment, followed by milestone-based funding, while Phagenesis completes the clinical evaluation of Phagenyx®. The staged acquisition will be based upon successful completion of European and US development programmes anticipated by 2019. Financial terms have not been disclosed.

Dysphagia, the inability to swallow safely, is a condition with high prevalence as well as high clinical and health economic burden. Dysphagia occurs in around 29% to 55% of stroke patients, with 15 million people worldwide suffering a stroke every year.

TDL Sensors

The acquisition of TDL Sensors by Environnement S.A Group, a supplier of environmental monitoring equipment headquartered in France and quoted on the NYSE, was announced in September. The terms of the acquisition were not disclosed.

TDL Sensors was founded in 1999 and spun out of the Department of Chemical Engineering, University of Manchester, to develop a tunable diode laser based gas analysers. The new alliance will contribute to the market release of a new range of laser based emission monitors such as ultra-low detection of HCl emissions. TDL has retained its management team and employees and plans to recruit additional product development professionals.

François Gourdon, President and founder of Environnement S.A stated "The expertise of TDL Sensors Ltd through tunable lasers (including cascade lasers) for the monitoring of high-resolution gas concentration in industrial processes, combined with the expertise of Environnement S.A Group in the monitoring of gas and particulate, will definitively help to anticipate the worldwide requirements for much lower emissions."

Recent investments

Oxford Nanopore Technologies

Oxford Nanopore Technologies has raised £100 million in a new financing round via a private placement of ordinary shares.

Oxford Nanopore has designed and sells the world's only portable DNA/RNA sequencer, and plans to use the funds to expand its commercial operations across a range of territories, including in Asia.

The investment round was led by new investor GT Healthcare, a pan-Asian fund with special reach in China, and existing investor Woodford Investment Management on behalf of its clients. Other new and existing investors including IP Group also participated in the round.

The transaction brings the total funds raised by Oxford Nanopore since its formation in 2005 to £351.0 million, and the latest round now values Nanopore at £1.25bn.

Cytora

Cytora, a three-year-old, London-based AI spinout from the University of Cambridge, has raised £2.4 million in Series A funding led by Parkwalk with participation from Cambridge Enterprise, iLexIR and a high-profile group of angels, including Alan Morgan, Paul Forster and Matthew Grant, a former executive at RMS.

The business is focused on capturing hidden economic insights that exist in online data, giving clients a comprehensive overview of what is changing in the world and an unparalleled ability to unearth leading indicators and opportunities.

With a background in geopolitical and supply chain risk, the 20-person company now works with major global names in finance and insurance and has deep relationships in asset management. Using machine learning, Cytora connects billions of data points together, automatically assembling vast datasets that humans are unable to generate because of the huge volume and velocity of data on the web. Insurers use this data, for example, to quantify the number of losses across insurance lines such as Cyber and Product Recall to optimise their underwriting strategy and risk pricing.

Alfacyte

Alfacyte was established in 2012 by Professor William Stimson, Professor of Immunology at the University of Strathclyde in Glasgow. Alfacyte has been exploring the differences in immune response between the alpha-interferon sub-types with a view to identifying those that can be optimised in drug therapy. It has a patented portfolio of alpha-interferon molecules as well as a proprietary hybrid interferon which is showing promise as a novel therapeutic agent.

A second round funding of £250k has been provided by Alfacyte's existing investors, the St Andrews-based EOS Technology Investment Syndicate and the Scottish Investment Bank (the investment arm of Scottish Enterprise).

Alfacyte's goal is to broaden the scope of interferon therapy across a breadth of therapeutic applications from cancer treatment to autoimmune disease and allergy. Its first target, psoriasis, is a chronic, recurring skin disease for which current treatments can have significant side effects.

Professor Stimson, Alfacyte's Chief Scientific Officer, said "Our work over the last 18 months has shown that certain alpha-interferon subtypes are capable of suppressing the pro-inflammatory agents that cause the symptoms of psoriasis. Our goal is to formulate these into a topical treatment that will not produce the broad systemic effects that can be triggered by other treatments."

Smart Antenna Technologies

The University of Birmingham has made the first investment from its £5m University of Birmingham Spinout Investment fund, which provides match funding for spinout companies in which the University is, or will become, a shareholder.

The University of Birmingham Spinout Investment fund was created to provide investment where there is a clear commercial appetite for the technology, the concept or product has passed proof of concept testing, and where there is confidence in the management board to deliver to the next stage of planned growth.

The investment has been made in Smart Antenna Technologies, a University of Birmingham spinout founded in 2013 to develop a new generation of antenna for smart phones and laptops.

The £1 million investment round was led by Mercia Technologies, together with the University of Birmingham Spinout Investment Fund, and Australian developer and manufacturer of certified high-assurance encryption hardware, Senetas Corporation.

Smart Antenna Technologies (SAT) has developed a single antenna solution for mobile and portable devices requiring multiple data connections. Mercia has backed the company since 2013, initially via third party managed funds, then latterly as a direct investment.

SAT intends to use the funding to complete product development for a potential industry partner, further expand the engineering capabilities of the business and extend its core technologies.

Currently smartphones, laptops and other electronic devices require often up to six antennae to achieve their full

functionality, including Wi-Fi, GPS, Bluetooth and mobile network coverage such as 4G LTE. SAT's patented technology should reduce the overall number of antennae required, potentially achieving a reduction of up to 50% in the cost of materials for manufacturers, as well as improved performance, reduced size and increased battery life.

OxSonics

OxSonics, a spinout from the University of Oxford, established in 2013 to develop ultrasound therapeutics, has secured £9.4m in series B equity financing, bringing its total external fundraising to £14.2m. The funding was provided by a combination of new and existing investors, including Longwall Venture Partners, Oxford Technology Innovation EIS Fund, the University of Oxford, Winton Ventures, Perivoli Innovations and individual private investors.

OxSonics secured an over-subscribed £2.7m VC-led Series A equity financing in January 2014 and then also went on to secure an additional £2.1m non-dilutive government grant in March 2014. This Series B financing represents a >4x uplift in valuation from the Series A round.

The financing will be used to fund OxSonics and its sister company OrthoSon. Whilst OxSonics is developing SonoTran™, a drug delivery platform for the enhanced delivery of oncology agents to solid tumours, OrthoSon is developing a minimally-invasive incision-free motion-preserving alternative to spinal fusion for the treatment of chronic low back pain. Both products harness novel ultrasound mediated cavitation technologies originally invented at the University of Oxford.

Atlas Genetics

University of Bath spinout Atlas Genetics, the Point-of-Care (POC) molecular diagnostics company, has raised \$35 million from a syndicate including all Series C Investors and one new investor, Wondfo Biotech.

Development of the Atlas Genetics io® system has been completed with the successful CE marking of the Chlamydia trachomatis (CT) test announced in February 2016. This new Series D equity issue will finance the clinical trials and commercial launch of a second test, for detection of both Chlamydia and Gonorrhoea, planned for regulatory approvals in the US around the end of 2017, as well as further development of additional diagnostics menu. The financing also provides funding to expand cartridge manufacturing capacity at Bespak, Atlas Genetics' cartridge manufacturing partner.

The io® system is a molecular diagnostic platform for the ultra-rapid diagnosis of a broad range of infectious diseases. The system offers a sample-to-answer time of under 30 minutes making it possible to carry out infectious disease tests in primary care clinics and physicians' offices that are as accurate as those carried out in hospital laboratories.

Wondfo Biotech, the new investor, is a well-established Chinese in vitro diagnostic company, with over 1,000 employees based in Guangzhou, Guangdong Province, that develops and manufactures a broad range of diagnostic assays including several POC tests. Existing investors include Novartis Venture Funds, Consort Medical plc, Johnson & Johnson Innovation - JJDC Inc, LSP, BB Biotech Ventures, RMI Partners, and Technology Venture Partners. This new financing follows on from the previously announced Series C fundraising of \$20 million in January 2015.

ApcinteX

ApcinteX, a University of Cambridge spinout company that is developing a new therapy for haemophilia, has secured a £14 million Series A funding co-led by Touchstone Innovations and Medicxi. Cambridge Enterprise helped in ApcinteX's formation, licensing key intellectual property to the company, and have also co-invested in this round.

ApcinteX is developing a drug that can be used in all patients, regardless of the type of haemophilia. The treatment is based on the work of Professor Jim Huntington (Cambridge Institute for Medical Research) and Dr Trevor Baglin (Cambridge University Hospitals), world-renowned experts in blood clotting disorders.

Around 400,000 individuals in the world are affected by haemophilia, a genetic disorder that causes uncontrolled bleeding as a result of patients having a deficiency in proteins required for normal blood clotting. Currently, the standard treatment is administration of the missing clotting factor, but this requires regular intravenous infusions and is not completely effective. In addition, about one quarter of patients develop an inhibitory antibody to the administered clotting factor which renders further treatment ineffective.

Apcintex has developed a new treatment that seeks to turn down the activity of a key natural anticoagulant pathway to produce normal blood clotting in patients with haemophilia. This means that the drug could potentially treat patients with all types of haemophilia, including those who develop antibodies to traditional blood clotting factors. Furthermore, the drug does not cause anti-clotting antibodies to form and could be administered every few weeks by simple injection under the skin.

Veryan Medical

Veryan is improving the performance of vascular stents using the principles of biomimicry. Veryan's BioMimics 3D® stent technology involves adapting traditional straight stent designs to a patented three-dimensional helical shape, which more closely mimics the natural geometry of the human vascular system.

On 6th February Veryan announced that it had received a further £13.5m of funding in the form of both equity and debt. The new equity funding has been secured from its existing

investors, including Touchstone Innovations, Invesco Perpetual and Seroba Life Sciences. The debt element of the round has been provided by Silicon Valley Bank in the form of a €5m capital term loan.

This new funding follows the achievement of several significant milestones in 2016, including: the completion of enrolment

into the MIMICS-2 IDE study in the US, Germany and Japan; the publication of the results from the Mimics Randomised Controlled Trial in Circulation: Cardiovascular Interventions; the first 50 subjects enrolled into the MIMICS-3D Registry; and continued strong commercial adoption in European markets.

Recent spinouts

The following table includes companies new to the Spinouts UK database. We have given further details of some of these on page 2

company	university	sector	incorporated	web
Graphene Enabled Systems	Manchester	consultancy services	10-Dec-15	www.graphene-enabled.com
St Andrews Lean Consulting	St Andrews	consultancy services	29-Jan-16	standrewslean.com
Polypharmakos	Cambridge	drug discovery & diagnostics	16-Mar-16	www.polypharmakos.com
Uquant	Imperial	simulations consultancy services	26-May-16	uquant.com
Circadian Therapeutics	Oxford	drug discovery & diagnostics	18-Jul-16	www.circadiantherapeutics.com
EnzBond	Oxford	biotechnology	24-Oct-16	www.enzbond.com
Orbital Diagnostics	St Andrews	drug discovery & diagnostics, therapeutics	09-Nov-16	
Tarsis Technology	Cambridge	biotechnology	06-Dec-16	
Dietary Assessment	Leeds	healthcare	17-Jan-17	www.myfood24.org

Recent exits

exit date	company	type	incorp	university	value	acquirer/market
01-Sep-16	Phagenesis	trade sale	10-Jul-07	Manchester	n/d	Nestle Health Science
02-Sep-16	TDL Sensors	trade sale	26-Jul-99	Manchester	n/d	Environnement S.A. Group
09-Dec-16	Oxford Biodynamics	IPO	25-Apr-07	Oxford	£136m	AIM: OBD
20-Dec-16	Breathing Buildings	trade sale	16-Jan-06	Cambridge	n/d	Volution Group plc
20-Jan-17	Cambridge Graphene	trade sale	20-May-14	Cambridge	£200k	Versarien plc
21-Feb-17	Wrapidity	trade sale	05-Feb-15	Oxford	n/d	Meltwater

Recent investments

date	company	university	amount	investors (million)
12-Sep-16	Circadian Therapeutics	Oxford	£2.00	Oxford Sciences Innovation
03-Nov-16	MOFgen	St Andrews	£0.30	Mercia, Scottish Investment Bank
12-Dec-16	Oxford Nanopore Technologies	Oxford	£100.00	IP Group
15-Dec-16	Tangentix	Bradford	£1.23	Parkwalk Opportunities Fund
21-Dec-16	Cytora	Cambridge	£2.40	Parkwalk, Cambridge Enterprise, iLexIR, angels
21-Dec-16	Pneumagen	St Andrews	n/d	GIL Investments, Scottish Investment Bank, founders
21-Dec-16	PrOXisense	Oxford	£0.33	Parkwalk Advisors
03-Jan-17	Smart Antenna Technologies	Birmingham	£1.20	U of Birmingham Spinout Fund
04-Jan-17	Alfacyte	Strathclyde	£0.25	EOS Technology Investment Syndicate, SIB
06-Jan-17	Polypharmakos	Cambridge, Kew	£0.50	Cambridge Enterprise, Parkwalk
09-Jan-17	OxSonics	Oxford	£9.40	Longwall Venture Partners, Oxford Technology Innovation EIS Fund, U of Oxford, Winton Ventures, Perivoli Innovations, private investors.
23-Jan-17	Atlas Genetics	Bath	US\$35.00	Wondfo Biotech, Novartis Venture Funds, Consort Medical, Johnson & Johnson Innovation, LSP, BB Biotech Ventures, RMI Partners, Technology Venture Partners
02-Feb-17	ApcinteX	Cambridge	£14.00	Touchstone Innovations, Cambridge Enterprise
06-Feb-17	Veryan Medical	Imperial	£13.50	Touchstone Innovations, Invesco Perpetual, Seroba Life Sciences, Silicon Valley Bank

Database download, and subscriptions

The Spinouts UK online database of spinouts and start-ups from universities across the UK now contains over 2,200 companies. For details of how to subscribe to access the online database, or to download the complete database in spreadsheet format, please contact spinouts@ycf.co.uk

PraxisUnico and AURIL progress towards merger

Having set up a Working Group to explore the possibilities of creating a new organisation, the two organisations consulted their members, and received an overwhelmingly positive response to its proposals.

PraxisUnico, the national professional association for Knowledge Exchange & Commercialisation (KEC) practitioners, and AURIL, the Association for University Research and Industry Links, have been working together successfully and increasingly over the last few years, and believe that by advocating and working together on behalf of the sector they are creating benefit for members and stakeholders.

The proposed new organisation, expected to be incorporated as a Company Limited by Guarantee (CLG) governed by a volunteer Board, will provide pooled resources and a single voice representing the sector. Extraordinary General Meetings of the PraxisUnico and AURIL boards will take place in March which will formally agree the creation of the new organisation as a legal entity.

From April, the new organisation will come into being and a transitional period will begin, until the end of the year, when the new organisation, with its new name, will come into full effect. An Interim Board of 14 representatives, drawn from PraxisUnico and AURIL boards, will take over for the period from 1st April to 31st December 31.

Events and activities will be co-branded during the transitional period, but both the PraxisUnico and AURIL conferences will take place as planned (June 14-16 and October 5-6 respectively).

For further information go to:

www.praxisunico.org.uk

www.auril.org.uk

Imperial Innovations becomes Touchstone Innovations

Following shareholder approval, the change of name from Imperial Innovations Group plc to Touchstone Innovations plc took effect on 4 January 2017

Since 2011, Innovations has diversified its supply base across the so-called 'Golden Triangle', investing in opportunities from the University of Oxford, the University of Cambridge, and University College London as well as Imperial. Over two thirds of its new investments in the past five years have been into companies originating outside Imperial College London.

New initiatives including Apollo Therapeutics and Innovations' commitment to the UCL Technology Fund broadened the Group's access to IP arising from throughout the Golden Triangle.

The Group also felt that the use of 'Imperial' in its name often created brand confusion both for Innovations and the College.

Although the Group as a whole has been re-branded as Touchstone Innovations, and investments will be in this name, the name Imperial Innovations is being retained for the operations of the technology transfer office for Imperial College.

Touchstone has a new website (see below), but the Imperial Innovations website has been retained and refocused on the needs of the academic community at Imperial.

Regarding the choice of new name, the company has explained that touchstones were historically used by goldsmiths to test the purity of gold or silver, and the term 'touchstone' has also come to represent a standard against which the genuineness or quality of something is judged. It comments that "Touchstone Innovations thus has an interesting resonance with the Group's science focus and many positive connotations relevant to the Group's operations."

For further information, see:

www.touchstoneinnovations.com

www.imperialinnovations.co.uk

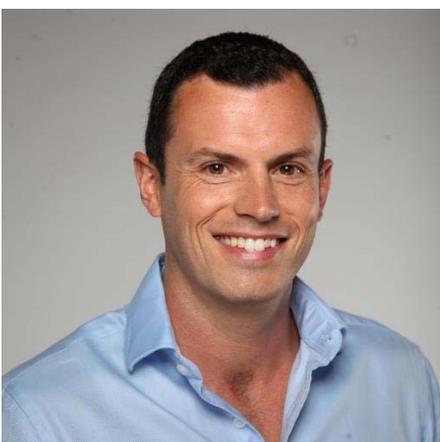
UMI3 appoints new chairman

The University of Manchester's Innovation Company (UMI3 Ltd) has announced the appointment of Dr Luke Hakes as its new independent chairman



The appointment follows a search exercise by the University (advised by nationally recognised headhunters Odgers Berndtson).

Luke commenced his role on 1st January 2017. A triple graduate of the University in biochemistry with biotechnology; bioinformatics; and computational genetics, Luke completed a PhD in 2006. He is currently Investment Director at venture capital firm, Octopus Ventures, based in the City of London. Over the last eight years Luke has advised and been a board member of a number of university spinout companies.



Dr Luke Hakes

In addition he has held numerous non-executive directorships at start up and growth companies and has considerable experience of building and exiting businesses in the disruptive technology arena.

Outside of Octopus, Luke is an angel investor and adviser to a number of early

stage companies with a particular interest in the Artificial Intelligence and Genomics spaces.

Dr Hakes commented "I am delighted to be joining UMI3 as chairman. Universities play a hugely important role in fostering innovation and talent and nowhere is this more true than at The University of Manchester. I am incredibly excited to work with the fantastic team at UMI3 to support its continued growth and success."

Clive Rowland, UMI3 CEO, added "Luke's appointment is an important step for us as we embark on a new business plan in an exciting time of development for the University and the Northern Powerhouse. Luke's enthusiasm for technology venturing, his commitment to help the University further enhance its standing in this area and his expertise and wide investor networks all bring a new and refreshing dimension to our approach which is crucial for our next phase."

Luke succeeds previous chairman Dr Krishnamurthy Rajagopal, who died in November after illness.

As a result of the high commercial impact of its patents, The University of Manchester has climbed to 87th place in the world in this year's Reuters Top 100 Most Innovative Universities, and is 17th in Europe and 4th in the UK.

This is the second year of the Reuter's list, which is once again topped by Stanford University in the United States. Manchester is one of only five UK universities to make the top 100 and has moved up from 95th in 2015.

Midlands universities showcase spinouts to investors

The University of Birmingham and the University of Nottingham are the largest in the Midlands, and have an established agreement to collaborate on research, business engagement and internationalisation.

They also have an outstanding pipeline of Intellectual Property which rivals that of the universities in the Golden Triangle.

At the end of January the two universities presented some of their spinouts as investment opportunities at an invitation-only event held by Mercia Technologies PLC, a leading investor in early-stage technology companies, including university spinout companies.

Dr Mark Payton, CEO of Mercia Technologies PLC, said "This year, Mercia is bringing together its entire Group to celebrate the wealth of investment opportunities that exist in the Midlands, the North of England and Scotland. With university partnerships across what we refer to as the capital-underserved regions of the UK, we have invested in spinout businesses from both Birmingham and Nottingham universities. We are confident that these exemplary research institutions will provide

further evidence of their ability to create innovative technology businesses that are capable of boosting the economy and creating jobs.”

Referring to “a vibrant and diverse sampling from the two spin-out portfolios”, Dr James Wilkie, CEO of Alta Innovations, the technology transfer company for the University of Birmingham, said “Many of the companies have disruptive technologies and all address areas of high unmet need in their respective sectors. They also benefit from the guidance and support provided by the experienced technology transfer teams at the two universities.”

Dr Susan Huxtable, Director of IP and Commercialisation at The University of Nottingham, added “The joint portfolios from the two universities have attracted over £200 million in investment in recent years. Successes such as the flotation of Oncimmune in May 2016 for £66 million are a concrete example of the high quality of our portfolio companies. Through this joint initiative we hope to attract even more investment, resulting in more successful flotations in the near future.”

The **University of Birmingham** has a portfolio which includes -

Smart Antenna Technologies

www.smartantennatech.com

a single antenna system for mobile devices that can fit in the hinge of a laptop, reducing mobile device size, boosting battery life and reducing production costs. In January, Mercia Technologies led a £1 million investment round in Smart Antenna Technologies – see separate article in this issue.

Linear Diagnostics

www.thebiohub.co.uk/linear-diagnostics-ltd-case-study

A handheld device that identifies antibiotic resistant bacteria in body fluids

Cytox

www.cytoxgroup.com

A blood-based test to predict whether an individual with Mild Cognitive Impairment will develop Alzheimer’s disease

Irresistible Materials

www.irresistiblematerials.com

Unique carbon-based materials that deposit a layer of material at the nanometer scale, to overcome roadblocks in development of next generation of semi-conductors

Biovici

www.biovici.com

A blood-based, diagnostic test that shows whether an individual with a head injury should be treated for Traumatic Brain Injury.

www.spinoutsuk.co.uk

The **University of Nottingham** has a portfolio which includes -

SurePulse Medical

www.surepulsemedical.com

A highly accurate heart rate measuring technology designed specifically for babies who need resuscitation at birth

Locate Therapeutics

www.locatetherapeutics.com

A unique, thermally-active, injectable tissue scaffold that provides support for tissue repair before dissolving away

Azotic Technologies

www.azotictechnologies.com

A seed coating that enables plants to fix nitrogen from the air reducing the need for nitrogenous fertiliser and the associated pollution from run-off

Footfalls & Heartbeats

www.footfallsandheartbeats.com

Smart knitted fabrics made with electrically conductive yarn which can measure compressive and tensile force. Applications include sports clothing, compression bandages and hospital beds.

Promethean Particles

www.prometheanparticles.co.uk

a manufacturing process to produce nanoparticles of defined size and morphology in wet dispersions – the wide variety of applications includes nano-copper for printed electronics.

NU Vision

www.nu-vision.co.uk

High quality, affordable biotherapies for treating ‘front of the eye’ disease and trauma

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LAB282 makes first awards

Launched in November 2016, LAB282 is a partnership between Oxford University, Oxford University Innovation, drug discovery company Evotec, and Oxford Sciences Innovation

The £13m drug discovery partnership aids the rapid translation of research outputs into new drug discovery and development programmes, combining Evotec's expertise with pre-clinical proof-of-concept grant funding to accelerate projects to a point where they can be commercialised and scaled up effectively.

LAB282 recently announced its first awards, backing two research projects chosen out of a wide range of proposals:

'Drugs from bugs'

This project, securing the larger £250k award, will be looking to develop evasins, which are peptides derived from the saliva of

ticks, and use these peptides to target chemokines that cause giant cell myocarditis (GCM), a rare autoimmune disease with no cure.

DarTG

The second project, receiving £25k, looks to validate translational research on DarTG toxin-antitoxin system, a pathway found in tuberculosis, and pave the way for a new class of antibiotics.

The next round of grants is due in June 2017.

Is there really nothing between London and Manchester?

The Midlands provides the heartbeat to the UK economy with Birmingham at its heart.

Since 2012, over a quarter of the jobs created in the UK's Enterprise Zones were created here. With a Midlands Engine commitment to "...converting the great research from our universities and wider research community into commercially successful products and processes for the economic benefit of the country..." this is a great place for business startups. Drawn by a vibrant business support network, low commercial rents and excellent connectivity, Birmingham is now the city of choice for young businesses emigrating from London.

The region is no stranger to opportunity and investment. The Midlands Engine Investment Fund, announced by the Chancellor in the March 2016 budget, will provide £250m funding to boost the local economy and help small businesses in the region whilst an additional £392m local growth funding was announced in the Autumn statement.

These large-scale opportunities are complemented by many smaller, grass-roots initiatives, which provide a network of support that is accessible to all entrepreneurs on a city-wide level. Recently Alta Innovations and Innovation Birmingham together secured £2.05m to continue their business support and incubation services to the City's hi-tech entrepreneurs and SMEs.

altainnovations

It may also come as a surprise that the Midlands is home to 30% of UK medical technologies businesses, with around 14,000 life science jobs here. Large clusters such as that around the University Hospital in Birmingham have been growing steadily since the 1930s and as a result this is one of the leading places in the world where clinicians and companies translate their latest research directly into improved outcomes for patients.

And the future is bright. 2017 will see news from the Midlands Innovation universities about initiatives that will further strengthen the business eco-system in the region.

So next time you whizz by on the M6, or travel through New Street station on your way 'up North', why not break your journey and have a closer look at Birmingham - who knows, you might even move your business here!



Dr James Wilkie
CEO Alta Innovations
University of Birmingham

www.birmingham.ac.uk/generic/alta-innovations

IP Group acquires Parkwalk

On 16 December IP Group plc announced that it had agreed to acquire Parkwalk Advisors Ltd for an initial consideration of £10 million.

Founded in 2009, Parkwalk is the largest EIS growth fund manager focused on university spinouts, having raised over £100m to date with the majority of funds coming from leading private wealth platforms, and having backed over 60 companies across its managed funds since inception. In 2016 alone, Parkwalk committed over £40m to UK university spinouts and has been a long-term co-investment partner of IP Group, having co-invested over £17m in 14 investment rounds during 2015/2016.

Parkwalk, which is a profitable business, has significant assets under management, an experienced team, and strong links to many of IP Group's existing university partners. Its investment vehicles include the evergreen Parkwalk Opportunities Fund, the University of Cambridge Enterprise Funds, the University of Oxford Innovation Funds, and the University of Bristol Enterprise Funds.

Parkwalk will retain its existing investment team and investment decision-making independence post-acquisition.

Alastair Kilgour, co-founder of Parkwalk, said "The acquisition of Parkwalk by IP Group gives our underlying investors the

security of being part of a larger organisation which also brings with it specialist resources and expertise around developing businesses formed around hard science. The strength of IP Group will allow Parkwalk to expand and enhance its EIS fund offerings, helping to boost the UK technology base and returns to investors."

The total maximum consideration payable for Parkwalk by IP Group is £20m over a three-year period. The initial consideration comprises £5.0m payable in cash, £2.5m payable in the form of newly-issued IP Group ordinary shares, and £2.5m of cash payable in two equal tranches over two years, subject to certain conditions. The remaining £10m consideration is payable as £5m in cash and £5m in IP Group ordinary shares over a three-year period, subject to Parkwalk achieving certain business performance targets.

For further information go to:

www.ipgroupplc.com

www.parkwalkadvisors.com

Oxford Sciences Innovation

In December it was announced that Oxford Sciences Innovation has raised £230 million in a new financing round via a private placement of ordinary shares, taking its capital base to £580m.

OSI provides capital and scaling expertise to businesses driven by intellectual property developed at the University of Oxford. Its mission is to build on the University's position as one of the world's leading research institutions, and further to enhance its track record for developing globally successful businesses.

The investment round included both new and existing investors. These include some of Asia's leading technology companies such as Chinese international conglomerate and investor Fosun, and the sovereign wealth funds of Oman and Singapore (Temasek), as well as European industrialists.

Major corporate investors in OSI include Invesco Asset Management, IP Group, Lansdowne Partners (UK), Oxford University Endowment Management, the Wellcome Trust, and Woodford Investment Management. Its individual investors include the entrepreneur Sir Charles Dunstone and artificial intelligence pioneer Demis Hassabis of Google Deep Mind.

For further information, go to:

oxfordsciencesinnovation.com

Oxford's upward momentum

OUI's new CEO Matt Perkins reflects on the TTO's strongest year to date.



Oxford University Innovation reaches its 30th birthday later this year. I consider myself lucky to have joined the company at a time when there is huge potential for helping Oxford University translate its excellent research into commercial activities that will have a highly positive impact on society.

Over those 30 years, OUI has established itself on a par with any technology transfer office

globally. Its performance is world-class, launching over 150 spinouts based on Oxford's intellectual property and conducting countless licensing deals. That performance has allowed OUI to become one of the most developed TTOs on the planet, taking our headcount from around 20 at the turn of the millennium to around 100 today and integral to Oxford University's evolving story on innovation.

OUI shows no signs of slowing down. During 2016, the OUI team recorded astonishing levels of growth in our innovative output. The headline was our increase in spinout generation, which more than doubled from 10 companies in 2015 to 21 spinouts in 2016. At the same time, three new startups were incorporated in the OUI incubator.

The 2016 cohort highlights the best of Oxford. **Circadian Therapeutics** builds on the pioneering research of Russell Foster into circadian rhythms and looks to correct the detrimental toll modern life is taking on our body clocks. **OxStem**, which is delivering Oxford University's regenerative medicine technology to the world, secured the largest spinout seed round in OUI's history. **DiffBlue** brings machine learning solutions to computer coding problems and has the potential to be Oxford's next big company.

An important enabler in this step up in performance has been the massively increased investment activity surrounding Oxford University. In 2015, we saw over £1bn flood into the local ecosystem in the form of venture capital, and the knock-on effect has been a sudden spike in early-stage capital available to Oxford spinouts.

Ten spinout companies launched in 2015 raised £9.5m. The 2016 cohort secured £52.6m, spread over 16 investments. This brought our average seed round up from £954,060 to £3,282,490 in the space of 12 months.

Many in the ecosystem are aware of the creation of Oxford Sciences Innovation (OSI). Managing the largest university

venture fund in the world, OSI is clearly a strong vehicle for driving entrepreneurial activity in the Oxford cluster. The increase of early-stage financing is a testament to the OSI team's ability to catalyse innovation.

You may think that with a £580m fund, OSI would be the only game in town. Instead, they have acted as a magnet for other investors. The presence of OUI has helped to secure a four-fold year-on-year increase in investment cash to £22.6m from other external investors. They provide a clear signal to the outside world that Oxford is serious about fuelling its spinouts, and giving them the resources they need to turn world-class research into world changing, billion-pound companies.

This strategy is beginning to pay off. **Oxford Nanopore**, our handheld DNA sequencing spinout has consistently found significant investment, closing a £100m deal last December and is now valued at £1.25bn. Our pool of investors outside of Oxford-related funds last year include IP Group, Statoil, Legal & General Capital, Invesco, Lansdowne Partners, Woodford Investment Management, Parkwalk Advisors, the Institute of Mechanical Engineers, Human Longevity, GT Healthcare, and many more private investors.

The role of OUI is to provide support to all members of Oxford University. Consequently, we are stepping up our engagement with the Humanities and Social Science Divisions. We held the inaugural Humanities Innovation Challenge to stimulate entrepreneurial thinking across the division, and have similar plans for Social Sciences in 2017.

We have also continued an upward trajectory with our bread and butter metrics. OUI closed 117 licence deals in 2016. This may be only a minor increase from 2015 but it underlines our positive momentum augmented by the number of patents filed jumping from 99 to 118.

Looking ahead, OUI at 30 finds itself at the epicentre of booming levels of entrepreneurial and innovative activity here in Oxford. It is my hope and ambition that when OUI turns 40, Oxford is recognised as the leading innovation ecosystem on the planet.

innovation.ox.ac.uk



www.spinoutsuk.co.uk

Project partners

We are very grateful to the following organisations for their support

Alta Innovations is the commercial arm of the University of Birmingham. The company develops, promotes and commercialises the University's IP through licensing and the creation of spinout companies. It has recently secured a £5 million investment from the University to co-invest in spinouts and early stage companies.

www.birmingham.ac.uk/generic/alta-innovations

Cambridge Enterprise is the commercialisation arm of the University of Cambridge. It handles the management and licensing of patents, proof of concept funding, access to angel and early-stage capital, business planning and mentoring, and support for staff and researchers providing expert advice to organisations.

www.enterprise.cam.ac.uk

Imperial Innovations is the technology transfer office for Imperial College London, working exclusively with Imperial scientists to support the protection, development and commercialisation of their novel technologies.

www.imperialinnovations.co.uk

IP Group works with leading universities to develop and commercialise some of the world's most exciting technology innovations. Offering more than traditional venture capital, IP Group provides its companies with business building expertise, networks, recruitment and business support. The Group's portfolio includes early stage to mature businesses across the biotech, healthcare, technology and cleantech sectors.

www.ipgroupplc.com

Oxford University Innovation is the technology transfer company of the University of Oxford; it promotes commercialisation of IP through licensing, consultancy, and formation of spinout companies. OUI was ranked 1st in the UK for spinouts over three and ten year periods in the 2016 Annual Report for the Spinouts UK survey.

innovation.ox.ac.uk

UMIP, a division of The University of Manchester IP Ltd, is the University's agent for IP commercialisation. UMIP brings the University's ground-breaking inventions and software into the commercial world by attracting entrepreneurs, investors and corporate venture partners to our campus and engaging with academic colleagues to license or spin out companies.

umi3.com

Marks & Clerk is the UK's largest firm of patent and trade mark attorneys and advises companies on their intellectual property across a full range of sectors worldwide.

www.marks-clerk.com

MFL Science & Technology is a specialist insurance broker risk management adviser to many of the UK's leading spinout businesses.

www.mfl.co.uk

Scottish Enterprise helps translate ideas and research into more spinout and start-up companies, and encourages Scottish companies to make use of technology and research being developed.

www.scottish-enterprise.com

UCLB is a technology transfer company commercialising on the research and innovations developed by UCL. Offering world-class expertise in areas from life sciences to engineering and from the arts to the built environment, we work to make commercial connections between the expertise and innovations of UCL's academics and the needs of industry and the wider marketplace.

www.uclb.com



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