



Quarterly Journal - June 2017

NEWS COMMENT and ANALYSIS on SPINOUTS from UK HEIs

The investment landscape

The spinouts sector is seeing investor consolidation and larger deals

The two trends are of course related, and have significant implications for future commercialisation models.

In recent months we have seen EV (Enterprise Ventures) acquired by Mercia Technologies, and Parkwalk Advisors become part of IP Group. The recent bid by IP Group to take over (not merge with) Touchstone Innovations, the investment fund separated from the Imperial Innovations TTO at the beginning of this year, intensifies this trend. The bid was rejected (see p11), but as it was backed by Woodford Investment Management, which together with Invesco and Lansdowne holds almost two thirds of Touchstone's shares, as well as having stakes in IP Group and Mercia, the pressure for consolidation is clear.

One result of this is the ability of these investors to make larger investments. These are presently dominated by companies in the life sciences sector, and it is no doubt the case that such investments in this type of company is necessary to give them the 'runway' to compete in global markets, where peer companies have access to this level of funding. Interestingly, Touchstone Innovations has invested recently in companies which do not originate in universities, Pulmocide being one recent example in the life sciences sector, and cybersecurity company Garrison Technology being another. Companies with university connections, but no transfer of IP, have also secured large investments recently, including Bicycle Therapeutics and Improbable (see p10) from Cambridge, representing the life sciences and ICT/digital sectors respectively.

These developments point towards a sharp focus on companies which have a promising commercial outcome by reaching large numbers of people – indirectly in the case of drug candidates, but directly in for example the case of digital consumer products. We can differentiate between 'science based' ventures, which may or may not have large populations to address but have enormous potential benefit in mitigating some the problems facing the world, and 'tech-enabled' ventures such as the food delivery companies which have featured amongst the unicorns in the USA. Current investment appears to favour the latter, leaving the former struggling to know how to fund development and reach market.

It is not always possible to feel intuitively how big a market might be, and some bets on market size will fail, while others unexpectedly succeed. It would perhaps be interesting to see an original investment pitch from the producers of the play The Mousetrap, first staged in 1952 and now in its 66th year; who had the foresight to judge the scale of this success?

- Jonathan Harris
Editor

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New spinouts

There is further information on the companies featured below in the listing on page 8. All are new to the Spinouts UK database.

PulmonIR

PulmonIR is a medical device company focused on the detection and monitoring of lung diseases, including Chronic Obstructive Pulmonary Disease (COPD). PulmonIR's proprietary technology is based on the work of Professor Paul Lewis at Swansea University.

Having secured a significant venture capital investment from IP Group, Finance Wales, and the Swansea University Innovation Fund, the technology is currently undergoing clinical evaluation through a collaboration involving Cwm Taf University Health Board. Following completion of these clinical trials, PulmonIR will seek the necessary regulatory approvals before launching its commercial products into the UK National Health Service and international healthcare markets.

SLAMcore

SLAMcore is a spin-out from Imperial College London that specialises in addressing the longstanding problem faced when a moving robot or device with outward-looking sensors is put in an unknown space where it must localise, navigate and understand in order to achieve a task, otherwise known as 'Simultaneous Localisation and Mapping' (SLAM).

This capability is key to several industries including autonomous vehicles, drones, mobile phones, and robotics. Current products enabled by SLAM suffer from motion blur, low dynamic range, high processing time and high power consumption. SLAMcore aims to deliver a solution which can track extremely rapid motion, cope with difficult real-world lighting conditions, consume less power, will be easy to use and integrate, and will scale and be cost efficient.

The SLAMcore founding team have been pioneering SLAM algorithms for over 20 years. They have built multi-sensor systems using standard cameras, depth cameras, inertial measurement units and, most recently, a next generation sensor known as the 'Event Camera'. A £900k seed investment from Amadeus Capital Partners will enable SLAMcore to grow its team and fully commercialise the application of these algorithms.

Cardian

Cardian has been formed to commercialise an implantable device that improves the monitoring and treatment of cardiac failure patients, by providing completely automated, continuous wireless monitoring of blood pressure in the pulmonary artery.

Its wireless pulmonary arterial pressure (PAP) sensor provides continuous, wireless monitoring of blood pressure in the pulmonary artery, with readings displayed on a portable reader in real-time 24 hours a day, providing significant benefits over the current approach of fine-tuning therapy doses based on the self-reporting of symptoms. Cardian's products should allow doctors to spot signals that existing technologies miss, further improving management of the condition, reducing hospitalisations and mortality rate.

Touchstone Innovations has provided £1.5m in seed funding to Cardian, as the company begins working towards commercialisation, with former Chief Operating Officer of Cardiomics, Sandeep Yandav, recently joining as Chief Executive Officer.

Dani Bach, Director of Healthcare Ventures, Touchstone Innovations, described Cardian as a 'classic' Imperial spin-out which will capitalise on over a decade of academic research. He commented "Our Technology Transfer Office, Imperial Innovations, has been supporting the founders for many years, working with the team on IP protection and market evaluation, and helping to secure initial funding, which enabled them to develop prototypes in an academic setting.

"We are assembling a strong management team to commercialise this compelling technology, which combined with the expertise of the founding academics, gives us a great opportunity to help to create a new company that could significantly impact the lives of millions of sufferers of cardiac failure."

Sorex Sensors

Sorex is manufacturing high sensitivity MEMS mass sensors to transform industrial and consumer products.

The sensors are based on film bulk acoustic resonator (FBAR) technology. The devices, fabricated on a silicon wafer, comprise a thin film of piezoelectric material that is made to resonate. Attachment of mass to the surface changes the resonant frequency and provides an extremely accurate measurement of the amount of mass on the sensing area.

Predictimmune

Predictimmune is a spinout company from the University of Cambridge which is developing prognostic tests for immune-mediated conditions to aid their management and improve patient outcomes.

The company's first offering, PredictImmune-CD, will be in the field of inflammatory bowel disease. Predictimmune has carried

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Starting out with IP Assist

Interview with Ani Earney, Head of IP Assist at IP Group plc.



Ani is Head of IP Assist, a 10-strong team she established in 2004 to support IP Group's portfolio companies with company secretarial, financial and administrative support. She has been with the Group for 13 years, joining from the venture capital firm 3i Group plc, where she worked primarily for the new business team, ensuring that the background administration for new investments was carried out accurately.



What is IP Assist and why do IP Group offer these services?

IP Assist is a team within IP Group which provides operational, business and company secretarial support with a view to minimising the most common administrative factors that can easily slow down the operations in the important early stages of a company. IP Group firmly believes that it's critical for academics and management teams to concentrate on developing their technology, and so IP Assist was set up to help with the day-to-day tasks involved in running a business.

When will IP Assist get involved in the spinout process?

After a commercialisation plan has been accepted by IP Group's Investment Committee, IP Assist will be introduced to the academic team involved, and the relevant Technology Transfer Office. We will then discuss what is required to prepare for incorporation of the new company and which services will be needed immediately afterwards. Factors to be considered include whether there will be employees, if a grant has been applied for and/or awarded to the company, and who will be managing the finances.

What is involved in setting up a new company?

IP Assist has all the expertise required to set up a new company. We co-ordinate all the director and shareholder information, including any anti-money laundering checks, and arrange incorporation at Companies House. Following incorporation, we ensure all subscriber shares are fully paid, arrange the first Board meeting and put together the company's statutory registers. Of course, incorporating a company is just the beginning and so we help with many other key functions too such as opening a bank account, putting the right insurances in place, purchasing a web domain, setting up accounting records and VAT registration - to name just a few.

Do you find it complex managing such a diverse team?

We have split the team into two primary functions, Business Support Managers and Business Finance Administrators. The

Business Support Managers each have a dedicated number of portfolio spinout companies for which they are the main point of contact. They will attend all Board meetings, deal with the co-ordination of investment paperwork, ensure all filings are made with Companies House, complete statutory books, arrange employment contracts for new staff, organise share option rules and deeds, liaise with HMRC regarding EIS investments, all alongside a wide range of other administrative tasks. The Business Finance Team look after the finance needs of the companies; this can include providing weekly finance positions, logging purchase invoices, salary payments and administration of grant claims.

How much variety is there in your daily operations?

No two days are the same for IP Assist and we are happy to help companies with all manner of issues. These range from updating statutory books to helping a company restructure its staffing to trying to rectify HMRC discrepancies. We pride ourselves on being pro-active problem solvers.

How long is IP Assist involved with spinout companies?

As a guide, we tend to be involved from incorporation to the point where the company has around fifteen employees and/or around £5m of investment. At this point, most companies are ready to employ their own in-house administrator - something we can also help with - finding the right person for the role and then training that person to provide a smooth transition.

How many spinout companies has IP Assist been involved with?

Since 2004, IP Assist has provided services to over 110 spinout companies from 15 different universities. This includes incorporating 83 of which 7 have gone on to list on London's AIM Market.

How should people get in touch with you?

We love hearing from all our partners and, indeed, non-partners with great ideas.

Please just email us at newbusiness@ipgroupplc.com.

out considerable market research into the medical need for the tests and the health economic benefits that they will deliver.

In May Parkwalk Advisors announced that the University of Cambridge Enterprise Fund IV and the Parkwalk Opportunities Fund had closed an investment in the company.

Omnigen Biodata

Omnigen, a spin out from the University of Cambridge and Wellcome Trust Sanger Institute, develops integrated genetic and population health biodata resources.

The company is based on the research of founder Manjinder Sandhu, seeking to improve our understanding of genomic diversity and the development of and susceptibility to complex diseases by integrating population genetics, epidemiology, and genomic wide technologies.

SpyBiotech

A spinout from the University of Oxford, SpyBiotech is pioneering a powerful new approach to generating vaccines.

The company, founded in early 2017 by Oxford academics Mark Howarth, Sumi Biswas, Simon Draper, and Jing Jin, gets its name from the bacterium *Streptococcus pyogenes* (Spy), the same organism behind a number of infections including strep throat and impetigo. The team behind SpyBiotech divided Spy into a peptide, SpyTag, and a protein partner, SpyCatcher. Naturally attracted to each other, the two form a covalent bond once combined. The company believes that this bond is the missing link to effective development and production of highly effective vaccines.

The company plans to target infectious diseases including major viral infections at first, with a view to developing the technology into a universal platform that can be adapted to target a wide variety of conditions.

SpyBiotech has raised £4m from Oxford Sciences Innovation and Google Ventures, and will use the funding to get its first candidates ready for Phase I trials.

The company's proprietary protein superglue technology, SpyTag/SpyCatcher, makes it possible to produce vaccines more quickly, cheaply and effectively. SpyBiotech is harnessing this platform to generate vaccines to major human and veterinary health challenges for Europe, the US and worldwide.

Roslin Technologies

In what is claimed to be "the largest agritech start-up in UK history", Roslin Technologies was launched in March to facilitate the commercialisation of research from the University of Edinburgh's Roslin Institute and Royal (Dick) School of Veterinary Studies.

The company is a partnership between the University, the agriculture-focused private equity advisers JB Equity (www.jbequity.co.uk) headquartered in Edinburgh, and the British Innovation Fund, a newly-formed fund that invests in leading innovation venture funds and companies from British universities.

Roslin Technologies has raised £10 million from The British Innovation Fund, with cornerstone commitment from The Royal County of Berkshire Pension Fund.

Among the first technologies planned for commercialisation by the company are a low-cost manufacturing system to produce therapeutic proteins in chicken eggs, allowing drug discovery for diseases; methods for biobanking poultry germplasm to preserve genetic diversity for future generations; and novel vaccines and diagnostics for veterinary markets to enhance animal welfare.

Recent exits

OxTox

University of Oxford spinout OxTox has been developing drug-testing kits for the police that are reliable and as easy to use as breathalysers for alcohol. The company's Drugsensor™ device can rapidly detect specific drugs. Just as a breathalyser measures how much alcohol a person currently has in their system, Drugsensor measures the amount of cannabis and the varieties of amphetamine, by analysing a small sample of saliva and returning a reading within 30 second

OxTox was acquired in February by Cleveland-based Alcolizer Technology UK, a subsidiary of Alcolizer Pty Ltd, an Australian alcohol and drugs testing business, for an undisclosed sum.

With the acquisition of OxTox, Alcolizer aims to produce the world's first all-in-one alcohol and drug testing device, using detachable clips to provide both alcohol breath testing and drug testing.

SkinBioTherapeutics

SkinBioTherapeutics has developed a proprietary platform technology, SkinBiotix®, based upon discoveries made by CEO Dr Catherine O'Neill and Professor Andrew McBain at the University of Manchester.

The company believes it has early mover advantage in using bacteria derived from probiotic organisms in order to modulate the skin. Proof of principle has been achieved for the

SkinBiotix technology in human skin models, successfully demonstrating the technology's three modes of action - skin protection, skin management, and skin restoration. SkinBio-Therapeutics is targeting three specific markets; cosmetic products for sensitive skin, infection control, and dermatological conditions, such as eczema. The business strategy is to partner and outlicense its programmes at proof of concept.

The technology uses lysates (extracts) of probiotic bacteria that have been shown to increase the skin's barrier integrity by enhancing the formation of multi-protein complexes called 'tight junctions'. Tight junctions seal the space between adjacent cells to prevent the passage of toxins, molecules and ions. The technique also protects the skin from infection by outcompeting harmful pathogens and increases the rate of skin healing in response to injury.

In April the company was admitted to the AIM market, raising £4.5 million gross with a market capitalisation of £10.7m.

Last month the company announced that it had secured an eight-month extension to its research contract with the University of Manchester, prolonging the contract until June 2018. Furthermore, the company said it has recently demonstrated activity of SkinBiotix at a range of doses in human skin models, and also completed the design of two human safety trials. If successful, these trials will allow the technology to be labelled 'dermatologically tested' for its cosmetic application.

Monica Healthcare

University of Nottingham spinout Monica Healthcare aims to improve birth experiences and obstetric care through wearable wireless foetal monitoring devices. The company, founded in 2005, was bought in March by GE Healthcare, an American pharmaceutical company and medical equipment manufacturer which is itself a subsidiary of General Electric, for an undisclosed sum.

GE Healthcare has been Monica's North American distribution partner for the Novii™ Wireless Patch System since 2015. The patch is a single patient use device that effectively monitors maternal heart rate, foetal heart rate, and uterine activity, even

on many of the most difficult to monitor patients. The Novii patch communicates through Bluetooth wirelessly to the foetal monitor, providing patients with greater mobility in labour.

The monitors are currently used at approximately 1,000 sites across Europe, Asia and North America, with over 100,000 patients benefiting from the technology just last year.

Allinea Software

Allinea is a University of Warwick spinout that creates development and performance analysis tools, enabling developers and users of software in high performance computing to create and deploy applications that achieve the most efficient use of their systems.

Allinea Software was acquired in December by ARM Holdings, which claims to be the world's leading semiconductor intellectual property (IP) supplier, for an undisclosed amount. Cambridge-based ARM was itself acquired by Japan's Softbank in July last year, for £24 billion.

Currently, 80 percent of the world's top 25 supercomputers use Allinea's tools, with key customers including the US Department of Energy, NASA, a range of supercomputing national labs and universities, and private companies using HPC systems for their own scientific computation.

"As systems and servers grow in complexity, developers in HPC are facing new challenges that require advanced tools designed to enable them to continue to innovate," said Javier Orensanz, the general manager of the development solutions group at ARM. "Allinea's ability to debug and analyse many-node systems is unique, and with this acquisition we are ensuring that this capability remains available to the whole ARM ecosystem, and to the other CPU architectures prevalent in HPC, as well as in future applications such as artificial intelligence, machine learning, and advanced data analytics."

Allinea will be integrated into the ARM business with all functions and Allinea's Warwick and Eastleigh locations retained. Allinea's former CEO David Lecomber will join the ARM development solutions group management team.

Recent investments

Some new spinouts received funding at start-up, and are included in the 'New spinouts' section on page 2

Dukosi

Dukosi has developed a battery management system that collects, processes and stores data directly at the cell. Using wireless technology the system transmits real-time information on cell performance to support master level control of the battery pack.

Following several years of research, development and testing, Dukosi is readying for production. In March, the company announced the completion of a £2 million investment round, fully subscribed by existing shareholders, including IP Group, Scottish Investment Bank, and members of the Par Syndicate. This funding takes the company through the final development and readiness of the semiconductor, including extensive

multi-industry certification. It also supports the expansion of Dukosi's team in Edinburgh with new roles in electronics design, software, cell modelling, and electrochemistry.

NovaBiotics

In March NovaBiotics announced that Woodford Investment Management had invested an additional £3 million in a private placement. This follows earlier investment of £5.0 million announced in January 2015.

The investment from Woodford will provide working capital to allow NovaBiotics to continue its research in anti-infectives.

NovaBiotics has a portfolio of antimicrobial assets targeting large and important markets with significant unmet clinical needs, and is also developing earlier stage compounds from its proprietary antimicrobial peptide drug design platform.

SAW Dx

SAW's *Acoustic-Flow* technology means that patient samples can be processed on-chip (with no preprocessing required), and complex microfluidics are avoided, providing clinicians with a faster, cheaper, and more portable way to diagnose a range of infectious diseases.

SAW Dx is spinout from the University of Glasgow, built on technology developed at the University's School of Engineering. Samples of patients' blood, swabs, or urine are placed on a disposable chip. The interaction between the sound waves and the chip enables the release of DNA and its amplification, enabling test results in as little as 10 minutes.

The company recently closed an investment round of £750k with IP Group and the Scottish Investment Bank. The funding agreement comes just weeks after SAW Dx also secured £1.1m from the Biomedical Catalyst fund.

This £1.85m injection of capital will help secure the company's route to market for new products in infectious disease diagnostics, with a prototype SAW Dx system expected to be completed over the next 18 months.

Cell Medica

Cell Medica, a spinout from Imperial College London, is a cellular therapeutics company engaged in the development, manufacturing and marketing of cellular immunotherapy products for the treatment of cancer. The company recently raised £60 million in a round with investors Touchstone Innovations, Invesco Asset Management, and Woodford Investment Management.

Cell Medica is developing a range of cell-based immunotherapy products using three proprietary technology platforms including activated cytotoxic T cells, chimeric antigen receptors (CARs) and engineered T cell receptors (TCRs).

The company's lead oncology product (CMD-003) is an investigational therapy in which the patient's T cells are activated to kill malignant cells expressing EBV antigens. The product is being investigated in two Phase II clinical trials.

Russ Cummings, CEO of Touchstone Innovations, said "The use of human T cell subset as therapeutics has the potential to revolutionise the way cancer is treated and we are delighted to be supporting Cell Medica in this round.

"Over the last six months or so Cell Medica has significantly broadened its product portfolio through striking new partnerships with Baylor College of Medicine and UCL, and through the acquisition of Delenex Therapeutics. The business now has a pipeline addressing both liquid and solid cancers and this new funding will put it in a great position to drive forward these development programmes."

Neuro-Bio

Neuro-Bio is a spinout from the University of Oxford, the result of over 40 years of basic research by Baroness Professor Susan Greenfield's group that points to a previously unidentified mechanism underlying the continuing cycle of cell death that characterises the neurodegenerative process. The company has been exploring whether activation of this brain mechanism could be halted by pharmaceutical intervention and how these changes are reflected in a biomarker present in blood.

In March Neuro-Bio closed a Series A funding of \$3.2 million from US-based Kairos Ventures, which will allow it to develop the biomarker into a diagnostic tool and to make substantive progress towards identifying a lead compound with promising therapeutic potential in Alzheimer's disease.

Elasmogen

Elasmogen, a spinout from the University of Aberdeen, is a drug discovery and development company developing soloMERs, fully humanised single chain biologics for auto-inflammatory diseases, ophthalmology, oncology and intracellular delivery.

Current treatments for ocular diseases such as uveitis and macular degeneration require either systemic dosing or direct injection into the eye. The small size and highly robust nature of soloMERs make them ideal for delivering topically applied sight saving therapies while reducing systemic side effects and eliminating the need for injections.

In March Elasmogen announced that it had received a Biomedical Catalyst Grant from Innovate UK and matching investment from Deepbridge Capital and Scottish Investment Bank (the investment arm of Scottish Enterprise), totalling £1.2 million. The funding will be used to prepare Elasmogen's first drug candidates for phase I clinical trials.

More recently, Elasmogen together with Feldan Therapeutics (www.feldan.com), a Canadian company focused on intracellular delivery of proteins, announced a research collaboration with

Amgen, to develop and deliver novel intracellular biologics. The collaboration combines the capabilities of Feldan's Shuttle platform and Elasmogen's soloMER technology to develop the delivery system and binding domains to two undisclosed intracellular targets for Amgen.

Ultrahaptics

Ultrahaptics completed in May a series B round of £17.9 million. The new funding comes from existing shareholders, IP Group plc and Woodford Investment Management, as well as new investors, including Cornes and Dolby Family Ventures.

The funding will support the company through its global expansion and its entry into virtual and augmented reality markets.

Ultrahaptics' technology uses ultrasound to project sensations through the air, directly on to a user's hand. The technology enables entirely new user interfaces and experiences, making it possible to interact with virtual objects and applications in innovative yet intuitive and natural ways. Users can 'feel' buttons and interact with virtual objects in mid-air, using gestures to interface with technology. The technology is aimed at a variety of different applications in which touchless interfaces are being developed; from automotive, where the company has developed concept vehicles with both BOSCH and HARMAN, to industrial controls, medical interfaces, and AR and VR environments.

Z Factor

Z Factor, a University of Cambridge spinout company, completed last month a £7 million Series A investment led by existing investor Medicxi. Cambridge Enterprise and Cambridge Innovation Capital have also joined in the founding round.

Founded by Jim Huntington, Professor of Molecular Haemostasis at the Cambridge Institute for Medical Research, Z Factor previously raised undisclosed seed funding from Medicxi.

The Z Factor team is engaged in the discovery of new drugs to treat Alpha-1-Antitrypsin Deficiency (AATD). "AATD, which is a significant cause of liver and lung disease, results from a defect in the gene encoding Alpha-1-antitrypsin" said Professor Huntington. "Individuals with two defective copies of the gene, making up around 1 in 2,000 of the Western population, typically develop emphysema starting in their 30s. They are also at an increased risk of developing liver diseases such as cirrhosis and cancer. Around 2% of people have one defective copy of this gene, and are at 5-fold increased risk of developing Chronic Obstructive Pulmonary Disease (COPD) as they age."

The most common mutation causing AATD is called the Z mutation, which disrupts the normal folding of the protein. Professor Huntington and his team obtained the crystallographic structure of this mutant form of Alpha-1-antitrypsin, which allowed for the first time the rational design of drugs that

could correct folding and prevent the development of associated diseases. The company has already identified dozens of molecules that can correct the folding defect caused by the Z mutation, and shown that some of these drug candidates can increase Alpha-1-antitrypsin levels in an in vivo model of AATD. Z Factor is now working to select the best molecules for use as a drug in human trials.

NuNano

NuNano is a University of Bristol spinout specialising in the design and manufacture of probes for atomic force microscopy and cantilever-based sensor devices.

In March the company secured an investment of £400k from the University of Bristol Enterprise Fund managed by Parkwalk Advisors, and the Bristol Private Equity Club.

NuNano started out manufacturing bespoke cantilever sensors for research projects at the University of Bristol, and the company was spun out in 2011 by Dr James Vicary and Professors Heinrich Hoerber and Mervyn Miles

Atomic force microscopy (AFM) is an imaging technology that can achieve resolutions 1,000 times higher than the limits of optical microscopy. The technology uses probes consisting of a microcantilever and a microscopic tip which interacts with the surface being imaged. The technology has applications in many different industries, including the manufacture of semiconductors and research in microbiology.

NuNano's core technology enables it to manufacture silicon AFM probes (the industry standard) to the highest dimensional tolerances on the market. The company is also developing a new range of silicon nitride probes to extend its capacity to measure low forces.

Linear Diagnostics

Rainbow Seed Fund, an early-stage venture capital fund focused on building technology companies from the UK's research base, has invested in University of Birmingham spinout Linear Diagnostics. The investment was match-funded with an award from the University's Spinout Investment fund, and the company received a total investment of £300k.

The investment will enable Linear Diagnostics to develop a handheld device that can rapidly detect the presence of bacterial infection and simultaneously identify the risk of resistance to the most commonly prescribed antibiotics, without the need for laboratory facilities. The device will provide a readout within minutes of sampling.

The technology is based on a novel application of a technique called linear dichroism, which uses polarised light to measure the alignment of detector molecules. Linear dichroism has a number of advantages over current techniques: it can identify several different target types (bacteria, proteins, genes) in the

... continued on p10

Recent spinouts

The following companies are new to the Spinouts UK database, irrespective of the date of incorporation. As universities provide further information, we can 'back-fill' the database, making it more complete and up to date.

company	university	sector	incorporated	web
PulmonIR	Swansea	medical devices	02-Feb-16	
SLAMcore	Imperial	sensors, robotics	11-Feb-16	www.slamcore.com
Cardian	Imperial	medical devices	21-Dec-16	
Sorex Sensors	Cambridge	sensors	03-Jan-17	sorexensors.com
Predictimmune	Cambridge	diagnostics	13-Jan-17	
Omnigen Biodata	Cambridge	bioinformatics	16-Jan-17	
SpyBiotech	Oxford	therapeutics	02-Mar-17	www.spybiotech.com
Roslin Technologies	Edinburgh	agritech	11-Mar-17	

Recent exits

exit date	company	type	incorp	university	value	acquirer/market
16-Dec-16	Allinea Software	trade sale	06-Apr-09	Warwick	n/d	ARM Holdings
13-Mar-17	Monica Healthcare	trade sale	06-May-05	Nottingham	n/d	GE Healthcare
10-Feb-17	OxTox	trade sale	26-Sep-06	Oxford	n/d	Alcolizer Technology UK
05-Apr-17	SkinBioTherapeutics	IPO	10-Jun-15	Manchester	£10.7m	AIM:SBTX

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

Recent investments

date	company	university	amount (million)	investors
03-Mar-17	NovaBiotics	Aberdeen	£3.00	Woodford Investment Management
10-Mar-17	SAW Dx	Glasgow	£1.85	IP Group, SIB, Biomedical Catalyst grant
14-Mar-17	C4XD	Manchester	£7.00	placing
16-Mar-17	Cell Medica	Imperial	£60.00	Invesco Asset Management, Woodford Investment Management, Touchstone Innovations
23-Mar-17	Neuro-Bio	Oxford	£2.60	Kairos Ventures
23-Mar-17	Roslin Technologies	Edinburgh	£10.00	JB Equity, The British Innovation Fund, The Royal County of Berkshire Pension Fund
24-Mar-17	SLAMcore	Imperial	£0.90	Amadeus Capital Partners
28-Mar-17	Elasmogen	Aberdeen	£1.20	Deepbridge Capital, SIB, Biomedical Catalyst grant
31-Mar-17	SpyBiotech	Oxford	£4.00	Google (GV), OSI
03-Apr-17	Cortexica	Imperial	£2.00	Touchstone Innovations
06-Apr-17	Cardian	Imperial	£1.50	Touchstone Innovations
06-Apr-17	MGB Biopharma	Strathclyde	£0.92	Archangels Investors, TRI Cap, Barwell, SIB
03-May-17	Ultrahaptics	Bristol	£17.90	IP Group, Cornes Group, Dolby
03-May-17	Z Factor	Cambridge	£7.00	Medicxi Ventures, CIC, Cambridge Enterprise
05-May-17	NuNano	Bristol	£0.40	U of Bristol Enterprise Fund (Parkwalk), Bristol Private Equity Club
11-May-17	Improbable	Cambridge (startup)	£390.00	SoftBank
16-May-17	Predictimmune	Cambridge	n/d	Parkwalk Opportunities Fund, U of Cambridge Enterprise Fund IV
24-May-17	Linear Diagnostics	Birmingham	£0.30	Rainbow Seed Fund, U of Birmingham Spinout Investment Fund
26-May-17	UltraSoc	Cambridge, Essex, Kent	£5.00	Atlante Ventures
31-May-17	Alesi Surgical	Cardiff	£5.20	IP Group, Finance Wales, Panakes Partners
01-Jun-17	Bicycle Therapeutics	Cambridge (startup)	£40.00	Vertex Ventures HC, Cambridge Innovation Capital, Longwood Fund, Atlas Venture, Novartis Venture Fund, SR One, SV Life Sciences
05-Jun-17	Scenic Biotech BV	Oxford, Netherlands Cancer Institute	£5.66	BioGeneration Ventures, INKEF Capital

same test, and provide a quantitative reading for each, from the same test sample.

Alesi Surgical

Alesi Surgical, which is developing minimally invasive surgery technologies, has raised a further €6m (£5.2m) funding from both new and existing investors.

The new investment comes from two leading med tech European venture capital firms, Panakes Partners and Earlybird, with continued support from Alesi Surgical's existing shareholders, IP Group and Finance Wales.

The funds raised will be used to drive commercial expansion of both Alesi Surgical and Ultravision into the United States and other key markets worldwide, and to undertake additional research and development around the new Ultravision technology.

The Ultravision™ system is the world's first use of electrostatic technology to clear the vapour and particulate matter – so called 'surgical smoke' – that is generated by modern surgical cutting instruments during abdominal keyhole (laparoscopic) surgery.

The device produces a low-energy electrostatic charge and can greatly improve visibility for surgeons by actively eliminating surgical smoke as it is created by the cutting instrument.

Two of the largest investments in companies associated with universities over the past few months have been in the start-ups Improbable and Bicycle Therapeutics, and have been widely reported elsewhere. Here we give a broad summary of each deal for the record.

Improbable

In May Improbable announced that it had raised \$502m in a round of Series B funding led by SoftBank.

All the funds from the investment will be invested in developing Improbable's technology, including its SpatialOS distributed operating system. Improbable's plans include accelerated recruitment in its London and San Francisco offices, and investments to develop a vibrant ecosystem of developers and customers.

Improbable uses cloud-based distributed computing to enable the creation of virtual worlds for use in games and massive-scale simulations of the real world.

Alongside the investment, Improbable will explore and identify opportunities for mutually beneficial relationships with SoftBank, its partners and portfolio companies.

Existing Series A investors Andreessen Horowitz and Horizons Ventures also made follow-on investments as part of this round,

Scenic Biotech BV

Scenic Biotech is an international collaboration between Oxford University and the Netherlands Cancer Institute which aims to unlock genetic potential in tackling cancer and other diseases. The company was founded by Prof Thijn Brummelkamp and Prof Sebastian Nijman.

The company has raised €6.5m in Series A financing, which will be used to develop its 'genetic off-switch' for cancer and rare genetic diseases. The round was co-led by Netherlands-based life sciences investor BioGeneration Ventures (www.biogenerationventures.com) and peer INKEF Capital (www.inkefcapital.com), with the participation of Oxford Sciences Innovation (OSI), the university venturing investor for Oxford University.

The underlying technology behind Scenic focuses on disease suppressing genes, which until recently have proved problematic to uncover.

Professor Brummelkamp explained: "With this technology we can experimentally assess nearly all genes that impinge on any cellular process with high precision and sensitivity. For the first time, we can now systematically identify genes that suppress processes that go awry in disease. These genes can serve as starting points for drug development and discovery to rebalance a variety of diseases. Our first in-house lead program that resulted from the Cell-Seq technology [Scenic's propriety technology platform] is in the immuno-oncology space and we will add additional programs in other indications, in particular in rare genetic diseases, in the next two years."

and will continue to offer advice and guidance to Improbable, along with Temasek, the Singapore investment company, which was also involved in the Series A funding.

Bicycle Therapeutics

Bicycle Therapeutics is pioneering a new class of therapeutics based on its proprietary bicyclic peptide (Bicycle®) product platform, that can combine properties of several therapeutic entities in a single modality.

The company recently completed a £40 million Series B financing round. Proceeds will be used to further the development of multiple drug candidates, including Bicycle's lead molecule, BT1718, a first-in-class drug for cancers of high unmet need. New investor Vertex Ventures HC led the financing round with participation by additional new investors Cambridge Innovation Capital (CIC) and Longwood Fund. Bicycle's existing investors – Novartis Venture Fund, SROne, SVLS, and Atlas Venture, also participated.

Investor news

Frontier IP

In March Frontier IP Group plc raised £3 million in a placing of new ordinary shares on the AIM market.

Frontier IP, established in 2009, provides consultancy services to assist universities and other research organisations in the commercialisation of the intellectual property arising from their research. The company takes an equity stake in spinout companies and also assists in building a network of sources of capital to assist its portfolio companies in securing funding.

Frontier IP works with a number of universities across the UK, and is also partnering with Evora University in Portugal and the Faculty of Science and Technology within the Universidade NOVA de Lisboa, Portugal.

The funds raised from this placing will support the further expansion of the Frontier IP team and the expansion and development of its portfolio of IP-rich companies.

IP Group and Touchstone Innovations

In May IP Group made an all-share offer to acquire Touchstone Innovations. The offer of 307p was rejected by Touchstone's board, but IP Group has received 'irrevocable undertakings' and letters of intent in acceptance of the offer from shareholders owning 74% of Touchstone's capital, including Woodford, Lansdowne and Invesco who also own approximately half of IP Group.

In his letter to shareholders on 1st June, Touchstone chairman David Newlands explained that the IP Group bid had been rejected for a number of reasons, but highlighted in particular that the offer undervalued Touchstone, and that in what IP Group sees as a takeover rather than a merger, it could be difficult to retain staff in what he describes as "people-based businesses, not just assets". He also added that there had been no further discussions between the two companies since his phone call with Mike Humphrey, chairman of IP Group, on 19th May.

IP Group

On 23rd May the IP Group board announced its intention of raising approximately £200 million (approximately £195.7 million net of costs and expenses) by way of a placing and an open offer. The board has the ability to increase the size of the share issue to raise further gross proceeds of up to £66.6 million should there be sufficient demand.

The Group has also announced the launch of IP Group Australia, a wholly-owned private company incorporated in the State of Victoria, Australia, focused on the creation and support of companies in Australia and New Zealand. IP Group and IP Group Australia have entered into commercialisation agreements with nine leading Australian and New Zealand research universities (the 'Go9 Universities').

IP Group has committed to invest at least A\$200 million over a 10-year period to fund investments in spinout companies based on the intellectual property (IP) developed by academics at the nine universities, generated from research in areas such as digital medicine, new medical therapies, and quantum computing.

Northern Powerhouse Investment Fund (NPIF)

In February the British Business Bank launched its £400m Northern Powerhouse Investment Fund (NPIF), aimed at boosting the North of England's economy and helping the region's businesses realise their growth potential.

Based in Sheffield, the Northern Powerhouse Investment Fund will work with ten Local Enterprise Partnerships (LEPs), combined authorities and Growth Hubs, as well as local accountants, fund managers and banks, to provide a mixture of debt and equity capital to SMEs at all stages of their development. NPIF will provide funding to fund managers who will offer Microfinance (£25k - £100k), Business Loans (£100k - £750k) and Equity Finance (up to £2m).

The fund managers appointed to manage the Northern Powerhouse Investment Fund are:

- Microfinance: Business Finance Solutions & MSIF, Finance for Enterprise & Business Enterprise Finance
- Business Loans: FW Capital and Enterprise Ventures
- Equity Finance: Maven Capital Partners and Enterprise Ventures

Oxentia's legacy of innovation impact

For those not in the know, Oxford University is currently riding a tidal wave of innovation. Oxford University Innovation (OUI), the University's research commercialisation office, has seen its spin-out rate double in one year, reaching 21 spinouts in 2016. Seed stage funding has increased fivefold to £52.6m. External fund-raising for spinouts since 2011 now stands at £1.4bn.



by Sapan Gandhi, Consultant, Oxentia

Already an ecosystem that attracts international attention, interest in Oxford's innovation scene has exploded over the past few months. With the University getting more firmly behind its innovators with new initiatives and facilities to support them on the horizon, we fully expect both our output and those looking to learn from it to expand over the coming years.



OXENTIA

**Oxford's Global
Innovation Consultancy**

For this reason, OUI is creating its own spinout this year: Oxentia. Born from Isis Enterprise, the international innovation consultancy arm of OUI, Oxentia will become its own company in August this year while retaining close links with Oxford University and OUI.

Since launching in 2004, Oxentia has become internationally recognised for identifying, developing and spreading best practice in tech transfer and entrepreneurship across the globe. Demand for Oxentia's business has grown exponentially during its time as part of OUI, and it now has a worldwide client base of both public and private organisations in over 60 countries. As Oxentia's services continue to be sought globally, it is becoming an independent entity to give it the growth potential and flexibility of delivery that it requires to serve its diverse client base.

Oxentia started by establishing relationships with several UK institutions and research centres, providing technology transfer services to clients such as Natural Environment Research Council (NERC), Oxford Brookes University,



and the Carbon Trust. Around the turn of the decade, Oxentia expanded its activities internationally, working with clients from Asia and Latin America, helping institutions in these regions to establish technology transfer operations. In 2015, its work was recognised with the Queen's Award for Enterprise – the UK's highest accolade for international business success.

Oxentia sees university innovation as a rich source of societal and economic impact. By tapping into the growing entrepreneurial appetite in the student body and by translating researchers' ideas into real-world technologies, it helps both developed and developing regions of the world to unlock the innovative potential of their organisations. In working with universities, governments, and companies of all sizes, Oxentia continues to create both jobs and new businesses, turning concepts into reality and building thriving innovation ecosystems.



Oxentia focuses its efforts on four broad areas of innovation management:

- Training and mentoring in entrepreneurship and technology transfer
- Management consultancy and strategy development for innovation managers and Higher Education institutions
- Advising on, establishing, and managing technology transfer infrastructure
- Technology commercialisation.

With growing demand for professional development in the technology transfer sector, Oxentia is the only commercial organisation to be able to offer accredited technology transfer training. An introductory 'Theory to Practice' technology transfer course is currently available offering 15 points towards RTTP status, and two further courses are under development covering commercialisation of digital knowhow and marketing

& valuation. These will be offered for the first time in September of this year.

The future presents a number of exciting challenges to Oxentia, as the company transitions from a division of Oxford University Innovation to a separate entity. Oxentia is increasingly engaged in the convergence of technology transfer and knowledge exchange, highlighting the growing global trend of social innovation, in its own right and also magnifying the social and economic impact from STEM innovation.

At the same time, the growing number of university venture funds and associated patient capital funds are providing the

financial bridge necessary to enable universities' innovations to stimulate societal and economic impact.

Oxentia keeps a keen eye on these, and other, evolving trends, actively engaging with clients and responding with a range of new services including the roll out of the Oxentia Accelerator Programme, the introduction of range of accredited technology transfer courses held in various international locations, and expansion in technology fund management and support. Oxentia's longer term vision is to establish a global proof of concept fund, aimed at advancing innovative technologies from around the world for social and economic benefit.

Oxford University to save memories of World War One

Lest We Forget, a mass digitisation project funded by the public, looks to preserve the memories and memorabilia of World War One for future generations.

Few people in Britain were unaffected by the War. Millions served in the conflict or transformed their lives to contribute to the war effort; most who survived lost loved ones, family and friends. Yet, the sacrifice made by these men and women on a daily basis increasingly slips from living memory.

That's why the team at Oxford University Innovation is supporting the launch of Lest We Forget (LWF), a crowdfunding campaign that will support local community endeavours to digitise memorabilia and personal accounts of World War One ahead of the 2018 centenary of Armistice Day.

Lest We Forget will capture stories and personal memories of the Great War before they are lost to history, preserving them for future generations. The LFW team plans to do this through a unique, large-scale digitisation project that will collect and make publicly available, in digital form, memorabilia and personal accounts of war-time experience. The programme will help local communities organise and run digitisation days to gather personal stories of World War One told through photographs, diaries, letters and mementos, and the memories and oral histories passed down through families. Once collected, these stories will be made available to the public through a large, free-to-use online database, which will be launched in November 2018 to complement projects and events nationwide commemorating the centenary of

the end of the war. The database and its contents will be freely accessible, opening these stories and experiences from the past to researchers and educators today.

In order to support this ambitious project, and the training of local 'digital champions' able to capture and preserve these precious stories, Lest We Forget aims to raise at least £80,000 through a campaign hosted on OxReach, the University's crowdfunding platform.

The campaign will be run through June with a view to the LWF team rolling out its digital champions training programme and organising digitisation events from autumn 2017.

To find out more or to support the campaign, please visit this link:

<https://oxreach.hubbub.net/p/lestweforget/>



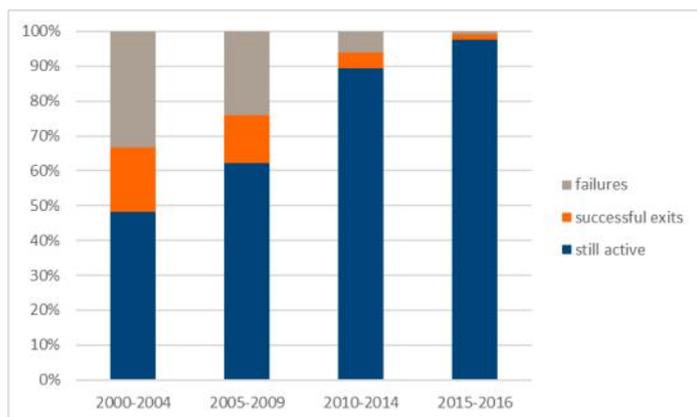
Spinout survival rates

The Spinouts UK 2017 Annual Report, just published, analyses the current population of spinouts, trends in the rate of company creation and successful exits, outcomes for the '10 year cohort' started in 2007, and more.

With over 2,200 companies in the database, we are able to analyse trends over a range of different metrics.

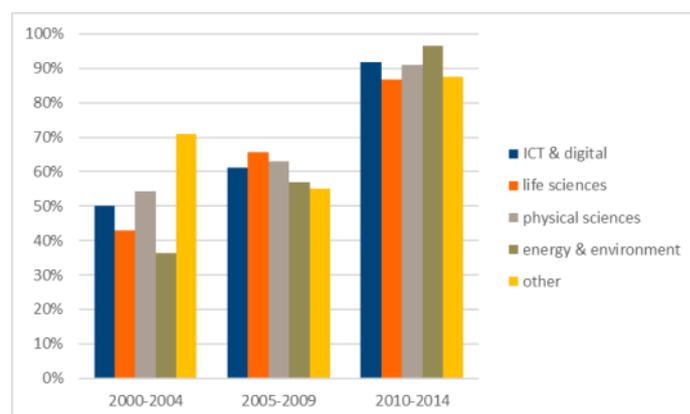
The database includes companies which have reached an IPO or trade sale, and those which are no longer trading, so we can look at the time it takes to reach an exit, or, as in the charts included here, the survival rates of spinouts from different years of incorporation.

In these two charts we have grouped spinouts in five year periods, so as to even out minor fluctuations from year to year (the two most recent years are grouped together as a shorter period, as the majority of companies are still trading and therefore give less indication of any trends).



The first chart shows the proportion of companies by different outcomes. It is to be expected that the older the company, the more likely it is to have reached an exit, whether successful (IPO or trade sale) or unsuccessful (wound up, or liquidated). Less expected is the longevity of these companies. With caveat that there may have been some exits which we have not yet tracked, the survival rate of almost 50% of companies formed between 2000 and 2004 contradicts those commentators who believe that most university spinouts fail within a few years of start-up. When successful outcomes are added in, the failure rate of companies from that period is approximately one in three, again lower than many industry commentators appear to believe.

Not all the surviving spinouts are in good shape, however; our Annual Report analyses the '10 year cohort' in some detail to see how the surviving companies are faring.



The second chart breaks down the data by broad sectors, and shows for each five year group the rate of survival, in this case assuming that companies that reached a successful outcome continue to survive. This is probable but difficult to establish in the case of trade sales, where the original entity has been subsumed into a usually much larger operation. In the case of IPOs it is possible to check whether or not the quoted company is still in operation, and the numbers have been adjusted accordingly.

By far the largest sectors in terms of number of spinouts are the ICT/digital and life sciences categories. Older life science spinouts (in the first group) were below par for survivability, but companies in the next period fared relatively better. ICT/digital spinouts did better than those in other sectors across all the year groups.

The 2017 Annual Report will be sent to all Spinouts UK partners and subscribers, and we will be happy to answer questions about any of the information in the Report, or in this article. If you are not a partners or subscriber, but would like to see the Report (costing £25 incl p&P), please email:

spinouts@ycf.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 spin out 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



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.

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Mercia Technologies is a leading UK technology investor with a particular emphasis on the Midlands,

North of England and Scotland. We focus on high growth sectors leveraging the team's deep expertise across four fields including digital & digital entertainment; software & the internet; electronics, materials, manufacturing & engineering; and life sciences & biosciences.

www.merciatech.co.uk

imperial
innovations

Imperial Innovations is focused on commercialising the best in UK academic research, drawn from academic centres within the 'golden triangle' formed by Cambridge, Oxford and London. We have end-to-end capability, taking research at the earliest stage and working with it right through to commercialisation

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



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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. Isis was

ranked 1st in the UK for spinouts over three and ten year periods in the 2013 Annual Report for the Spinouts UK survey.

innovation.ox.ac.uk



PraxisUnico.

www.praxisunico.org.uk

PraxisUnico is a world-leading national professional association for public sector

knowledge exchange and commercialisation practitioners. We develop knowledge exchange and technology transfer professionals with our training, connect members and stakeholders at our events, promote best practice for our sector and facilitate interactions between the public sector research base, business and government.

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Spinouts UK is published by Edinburgh House Publishing Ltd, t/a Young Company Finance
8 Oxford Terrace EDINBURGH EH4 1PX
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