Winter 2014

CAMBRIDGE SCIENCE PARK

CATALYST

Cambridge Science Park Newsletter

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PARKLIFE

LINGUAMATICS PRODUCT HELPS STRUCTURE HEALTHCARE DATA

Drawing on its expertise in natural language processing-based (NLP) text mining and analytics, Linguamatics has launched a new healthcare product suite which helps to turn unstructured electronic health record data into actionable patient insights.

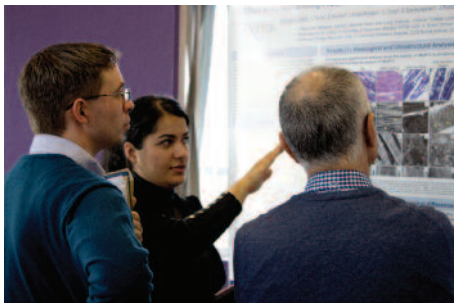
Linguamatics Health is the company's first healthcare-specific product, providing the technology that hospitals and research organisations can use to extract meaningful information from the mass of data located in complex patient documentation such as pathology and radiology reports, physician notes and discharge reports.

"While the rapid adoption of electronic health records in recent years has integrated many data silos together, healthcare providers are still faced with a large proportion of their data in unstructured form. To achieve the improvements in hospital efficiency and patient outcomes required to cope with rising costs and an aging patient population, hospitals, payers and other healthcare organizations need to make better use of unstructured text," said Phil Hastings, Senior Vice President, Sales and Marketing, at Linguamatics.

www.linguagmatics.com

Above// **Phil Hastings, Senior Vice President, Sales and Marketing, Linguamatics (photo courtesy of Cambridge News)**

PLACEMENT STUDENTS MAKE A DIFFERENCE



Above// **Student Mozhgon Jeddi showcases her research project to assessors as part of her Professional Training Year (photo by Jon Toomey)**

Highly motivated and capable students could make a significant contribution to companies on Cambridge Science Park companies thanks to an innovative placement scheme at the University of Exeter.

Undergraduate students studying the BSc in Medical Sciences at the University can elect to take a Professional Training Year (PTY) placement in the third year of their four-year courses. The placements are aimed at providing students with valuable professional and research experience; however, the scheme also offers a range of benefits to participating companies.

"Our students are well trained and motivated and could prove valuable to companies on Cambridge Science Park," said Dr John Chilton, PTY Lead for the BSc Medical Science programme at the University of Exeter. "They're enthusiastic and experience has shown they make a real difference in projects they work on. It's also a low risk and economical screening process for potential future employees."

Companies interested in finding out more about the placement scheme or advertising placement opportunities should email the PTY office at bclinsci-pty@exeter.ac.uk.

ENDOMAGNETICS WINS INTERNATIONAL NANOMEDICINE AWARD

Endomagnetics, which is developing a portfolio of products to improve the standard of breast cancer management, was named as one of two winners of the inaugural Nanomedicine Award in November 2013.

The awards, which were contested by entrants from around the world, were announced during the Nanomedicine Panel Session at the BIO-Europe 2013 in Vienna, Europe's largest biotechnology partnering conference.

Organised by the European Technology Platform for Nanomedicine (ETPN) with NANOMED2020, the Nanomedicine Award was set up to recognise excellence in nanomedicine in fields including diagnostics and imaging, therapeutics, and regenerative medicine.

Dr Eric Mayes, Chief Executive Officer of Endomagnetics, said: "Endomagnetics is very honoured to have been selected for an inaugural Nanomedicine Award, particularly given the global candidature and great promise of this convergent industry. This award enhances the medtech facet of nanomedicine and increases the visibility of our SentiMag® and Sienna+® system to potential partners as we develop further across the nanomedicine field."

www.endomagnetics.com

Right// **SentiMag® sensor developed by Endomagnetics (image courtesy of Endomagnetics)**

SPORTS COACHING TECHNOLOGY SHOWCASED BY CAMBRIDGE CONSULTANTS

Cambridge Consultants has demonstrated how technology can provide new advanced sports coaching tools for the athletes of the future.

The ArcAid basketball training system is a prototype which combines low-cost sensors with a smartphone app or laptop for advanced performance monitoring and technique teaching. As well as providing immediate feedback on individual technique or team performance, it can also store data to track training progression over time.

The system has been developed to highlight how you can deliver a system with the accuracy and results of an advanced professional training aid – but at a fraction of the cost. The technology and principles of system design could be customised for other sports and fitness applications.

"We hope this cost-effective technology will encourage young people from a wide range of backgrounds to strive for excellence in sport," said Ruth Thomson, head of consumer product development at Cambridge Consultants. "By teaching proper technique and muscle memory at a younger age we can help develop the athletes of the future."

www.cambridgeconsultants.com

Above// **The ArcAid basketball training system developed by Cambridge Consultants (image courtesy of Cambridge Consultants)**

VIBEHUB™ AUDIO PLATFORM LAUNCHED BY CSR

The VibeHub™, an intelligent networked audio platform for the home, was launched by CSR plc at the 2014 Consumer Electronics Show (CES) in Las Vegas in January.

The platform's Bluetooth® capabilities enable users to stream audio from a wide range of mobile devices, making it easy to share music over the home network to any room without the Bluetooth audio source device having to join the home Wi-Fi network. The VibeHub™ platform gives developers a way to create whole home audio systems that are quick and easy to bring to market.

"Consumers want networked audio products that accommodate any input and music source they want to use, and allow them to listen to different content in different rooms without any effort," said Anthony Murray, Senior Vice President, Business Group at CSR. "Building on CSR's strong audio heritage, we have developed a flexible platform that enables manufacturers to offer consumers cost-effective whole home audio systems that 'just work' – giving them the experience they desire."

www.csr.com

EMERGING TECHNOLOGIES COMPETITION 2014 LAUNCHED BY THE ROYAL SOCIETY OF CHEMISTRY

The Royal Society of Chemistry has launched its Emerging Technologies Competition 2014, which seeks to identify the latest technologies in chemical sciences with significant potential impact for the UK economy.

Applications are invited from university researchers and small companies working in applied research in the chemical, life and materials sciences for a chance to turn their research into commercial success. The prize consists of ongoing mentoring and support from multinational companies, up to £10,000 as a cash prize and more. Procter and Gamble, GlaxoSmithKline and Catalent Applied Drug Delivery Institute have been announced as the first mentor companies and more will be joining soon.

The applicants can be individuals or teams and they must submit a brief online application to the Royal Society of Chemistry by 1 March 2014. The entries will be judged by an independent panel of science and business experts and the shortlisted applications will be invited for the second round of the competition. Each team will pitch to a specialist panel at a public event and up to five teams will be crowned as winners.

www.rsc.org

Right// **Emerging Technologies Competition 2013 winners AQDOT were presented with the award by Science Minister David Willetts and Royal Society of Chemistry Chief Executive Dr Robert Parker (photo courtesy of the Royal Society of Chemistry)**

SOCIAL MEDIA AND THE CAMBRIDGE SCIENCE PARK

From January 2014 the Science Park will be actively using social media to keep in touch particularly with tenants based on the Park and others who want to know more about what is going on. Look out for us on Twitter cambridgesciencepark@csp, on Facebook and LinkedIn. In addition to Catalyst a new briefing newsletter which will focus on activities taking place on the Park will come out twice yearly. We will be looking for topical items such as fundraising activity to feature within it. If you'd like to put forward any ideas email Caroline Shutter at cshutter@bidwells.co.uk, otherwise watch this space.

PARKLIFE continued

CAMBRIDGE CONSULTANTS NAMED ONE OF THE BEST COMPANIES TO WORK FOR

Product design and development firm Cambridge Consultants has been named one of the best companies to work for in the UK. It has achieved a coveted place in the list of The Sunday Times 100 Best Mid-Sized Companies to Work For – the annual ranking of the cream of Britain's motivated workforces. Although it was the first time the firm had entered the awards, it received 2-star accreditation for 'outstanding' workplace engagement.

"We are thrilled with this public recognition of our work to create an environment in which staff can develop and reach their full potential – we aim to be the platform for their ambitions," said Alan Richardson, CEO of Cambridge Consultants. "The feedback we get from our employees is that this is an exceptional place to work – and that's now reflected in these results."

The 400 employees at Cambridge Consultants get free lunches and refreshments – as well as a comprehensive healthcare package and a performance-related bonus scheme. An active social club gives the company a 'family feel' and half a million pounds a year is invested in training. Unsurprisingly, staff turnover is less than 5% a year.

www.cambridgeconsultants.com

Right// **Cambridge Consultants headquarters on Cambridge Science Park (photo courtesy of Cambridge Consultants)**

CSR FUSES FASHION AND FUNCTION WITH LAUNCH OF BLUETOOTH® SMART JEWELLERY

Right// **CSR Bluetooth Smart jewellery concept combines attractive design with hi-tech features (photo courtesy of CSR)**

CSR plc has developed a range of connected jewellery, powered by its latest Bluetooth® Smartsolution, to demonstrate the future of wearable technology. The pendant-style connected necklaces contain integrated electronics that enable the user to customise the colour and brightness emitted to suit their mood or to coordinate with a particular outfit. The electronics integrated into the jewellery have been designed to support a range of functions and so they can also alert users to new notifications on their smartphones, an application that would be suited to a connected bracelet.

CSR recently surveyed consumers on their views on wearable technology and found that 72% agree that it's important that wearable technology devices look good and 67% admit that it's important that they fit with their personal style.

"Many of the wearable technology devices hitting the shelves today offer great features but don't take into consideration that consumers want beautiful, cutting-edge devices that complement their personal style," said Paul Williamson, Director of Low Power Wireless at CSR. "If wearable technology is to reach its potential it needs to appeal to more than just technology lovers. Devices like these connected pendants will help wearable tech go mass market."

www.csr.com

ASTEX ACQUIRED BY OTSUKA

Astex Pharmaceuticals, a company dedicated to the discovery and development of novel small molecule therapeutics with a focus on oncology, was acquired by Otsuka Pharmaceutical in a deal which was completed on 11th October 2013.

The Japanese-based Otsuka Pharmaceutical paid US $8.50 per tendered share in a deal worth approximately US $866 million. As a result of the merger, Astex's common stock ceased to be traded on the NASDAQ and is no longer listed.

Astex Pharmaceuticals, a leader in fragment-based drug discovery, developed and licensed DACOGEN® (decitabine) for Injection, which is indicated for treatment of patients with myelodysplastic syndromes (MDS). The company has its European Corporate & Research Centre on Cambridge Science Park.

www.astx.com

Above// **Astex Therapeutics' European Corporate & Research Centre on Cambridge Science Park**

DOUBLE WIN FOR CAMBRIDGE SCIENCE PARK COMPANIES AT UK TECH AWARDS

Cambridge Science Park was proudly represented at the UK tech awards 2013, with both Xaar and David Braben of Frontier Developments picking up prestigious prizes.

Xaar, a world leader in the development of inkjet technology, was named as winner of the tech growth business of the year award at a ceremony which took place at the Lancaster London on 20th November.

David Braben, founder and CEO of video game developer Frontier Developments, was voted joint winner of the tech personality of the year award, alongside Vin Murria, CEO of Advanced Computer Software Group.

The voting panel brought together industry experts from a variety of organisations including PwC, finnCap, Fidelity Investors, Barclays and ECI.

Right// **(left to right): Jass Sarai, UK Leader – Technology Industry Group, PwC; Sam Smith, CEO, finnCap; David Braben, CEO, Frontier Developments plc; Vin Murria, CEO, Advanced Computer Software Group plc (winners); and Lara Lewington (awards presenter).**

MEDIATION PILOT SCHEME OPENS TO CAMBRIDGE SCIENCE PARK TENANTS

Above// **Mediation can help resolve workplace disputes**

The Department for Business, Innovation and Skills has launched a pilot scheme in Cambridge offering free mediation training to small and medium enterprises (SMEs) with the aim of resolving workplace disputes early.

The scheme, which is also being run in Manchester, has involved the training of local employees to become accredited workplace mediators. Mediation is a very effective technique and impartial, external, mediators can help to resolve workplace disputes that can have a disproportionate effect on SMEs in terms of time and money, especially if a dismissed employee decides to take an employer to an employment tribunal.

Employees at two Cambridge Science Park companies have been trained as workplace mediators as part of the pilot. These mediators are now available to the wider business community and the first three mediations requested by SMEs will be offered free to companies looking to resolve workplace disputes. To find out more or to register interest, contact Rod Newbery at Hawkins (tel: 01223 420400, email: rod.newbery@hawkins.biz).

ABCAM WINS MOST ADMIRED COMPANY AWARD

Abcam Plc, a leading provider of protein research tools and services, was voted as Management Today's Most Admired Company in the Healthcare and Household sector in December 2013. Abcam was also 2013's overall highest new entry, taking position 13 in the league table of 247 British businesses. The Britain's Most Admired Companies Awards are an important indicator of the highest performing companies in British business that embed excellence throughout their organisation, and are unique in that the results are arrived at via a rigorous and independent process of peer review.

"It's an exciting time for Abcam as we celebrate 15 years of supporting researchers with their scientific discoveries," said Dr Jonathan Milner, Chief Executive Officer of Abcam. "We credit Abcam's success to talented and passionate employees across the globe. Their skills and dedication to deliver the best customer service and highest quality products has helped Abcam achieve continued growth."

Abcam had already been recognised in 2013 for its successful business model, strong growth and innovation in the market, winning the AIM 2013 Company of the Year award. Abcam continues to help researchers discover more by attracting the best talent and bringing to market innovation such as RabMAb® (rabbit monoclonal antibodies) technology.

www.abcam.com

Above// **A scientist at work at the Abcam laboratory in Cambridge (photo courtesy of Abcam)**

A formula for success

BREAKING NEW GROUND IN DRUG FORMULATION WITH ARECOR

Arecor is revolutionising the formulation of biological medicines for the benefit of patients, healthcare professionals and the pharmaceutical industry – Catalyst spoke to CEO Tom Saylor to find out how.

The growth in use of biologic drugs since the turn of the millennium is clearly set to continue. In fact, a report by Evaluate Pharma in October 2013 suggested that more than half the sales in the top-100-selling drugs would be biologics as opposed to conventional small-molecule drugs by 2018.

The therapeutic value of these biologics is undeniable, and yet they present a range of formulation challenges in comparison with conventional drugs, as Tom goes on to explain.

"When you think of a biologic, it's a hugely complex system," he says. "Proteins, vaccines and peptides tend to be very fragile entities. They can be affected by temperature, agitation and they can lose their efficacy in high concentration. Compared to the small molecules that characterised most of the pharmaceutical industry previously, it is much more difficult to come up with stable formulation biologics."

Above// **Arecor CEO Tom Saylor**

Having spun out of Unilever Ventures in 2007, Arecor was formed to exploit some of the revolutionary technology developed by Chief Scientific Officer Jan Jezek. It has developed a novel approach to formulation design, built upon fundamental new insights into the way proteins degrade during storage, at high concentration or in the presence of ionising radiation. And in just six years, it's already been working with pharmaceutical big hitters such as GlaxoSmithKline Biologicals, Genzyme and Eli Lilly, to name just a few.

Compared to the small molecules that characterised most of the pharmaceutical industry previously, it is much more difficult to come up with stable formulation biologics

Above// **A scientist at work in the Arecor laboratory**

"One key area of our work is to make stable forms of biologics that have previously been unstable in aqueous forms," says Tom. "So, for example, Factor VIII is a blood-clotting protein that's used in the treatment of haemophilia for the prevention of bleeds. In its current form, it's provided as a powder which then has to be reconstituted with water, drawn up by needle into a syringe before being injected. This can be inconvenient and leads to dosing errors. In contrast, our technology allows you to develop a very stable aqueous form which could be incorporated into a pre-filled syringe – quicker, easier and more accurate to administer.

"Another example of our technology is in the development of higher concentration formulations of biologics. A large proportion of the drugs in development today are based around antibodies. These can have a remarkable effect in terms of their therapeutic value but, in many cases, they are currently only available in low concentrations. This is because when you try to concentrate a protein-based drug, a very common problem is that the proteins stick together – known as aggregation. And so they are produced in low concentrations, which means they need to be administered in the hospital by long, slow infusion – the patient might sit there 90 minutes to get his or her medication.

"The industry would like to see higher concentrations of these antibodies that would potentially allow you to have a simple injection instead – something that could even be done at home, saving time and money. And we have a range of tools that can be effective at minimising the aggregation of proteins at higher concentrations.

"Alongside aggregation, the other problem of producing antibodies in high concentrations is viscosity – the formulation can become very syrupy and hard to inject. So we're developing more stable high-concentration formulations to reduce viscosity across a range of leading antibody drugs such as Herceptin®, Cimzia®, Remicade® and Rituxan®."

Arecor continues to develop its technologies to address issues such as degradation and viscosity. Its outstanding record in the field was one reason for the award of £785,000 in November 2012 from the Biomedical Catalyst programme, which is managed by the Medical Research Council, to support further research.

"The other area that we get involved in is vaccines," adds Tom. "One of the problems of vaccines is that they become unstable in warm climates which limits their distribution. Our work is focused on enabling heat-stable vaccines so they can be more readily distributed, particularly in developing countries lacking a reliable cold chain."

Arecor is also increasingly working on technology that facilitates the use of protein-based drugs in medical devices, helping companies to improve efficiencies in the manufacturing process.

"The use of ionising radiation is a very common method for sterilising medical devices at the end of the manufacturing process," says Tom. "However, it has a limited use with biologic-based medical devices because the general view is that if you irradiate a protein, it's going to fall apart.

"If you have a drug delivery device such as a patch, for example, you have to maintain an aseptic processing environment. So you do all your processing in highly sterile facilities, and there's a huge cost to that. But we've been able to develop a set of technologies to allow you to safely irradiate proteins so that they maintain their structure following irradiation. In turn, that means you minimise the need for aseptic processing and therefore greatly reduce costs – we think this is a major advance in being able to implement new products and make them cost effective."

The focus on cost-effectiveness, evident across all of Arecor's technology solutions, is no surprise given Tom's longstanding involvement in the Cambridge biotech scene – he set up the first of five biotech companies, Cell Systems, on Cambridge Science Park back in 1988.

"Having been in the biotech sector for 25 years, one of the things that strikes me is that there is a tonne of good science out there, but very often the cost can be prohibitive to actually implement that science," he says. "The pharmaceutical world is generally pretty conservative and they want something they can stick in their manufacturing process relatively easily and something that is not going to add significantly to regulatory burdens.

"Our approach is really to manipulate the environment of a protein in aqueous solution for the most part using chemicals that are already approved for use in drugs and to make it as easy to implement as possible, so it can all be incorporated in standard manufacturing processes. As companies move increasingly into biosimilar proteins, the cost of manufacturing and the pressure from payers is going to make the issue of cost efficiency ever more important."

Above// **Image of a successful antibody product with enhanced shelf-life**

Above// **Oxyzyme and Iodyzyme wound healing products, commercialised using Arecor's biological medicine sterilisation technology**

There is a clear focus on self-sustainability which has underpinned the upwards trajectory Arecor continues to enjoy. "What I wanted to do when I started out Arecor was to balance near-term cashflow with long-term value," says Tom.

"We continue to generate near-term cashflow through feasibility studies for our clients – we work with ten of the top 20 pharmaceutical companies in the world. If the client likes that feasibility study, it can then take a licence in the technology. On top of that, we also work in house researching a range of molecules. We have a proprietary database on probably 40 to 50 proteins, peptides and vaccines which will help deliver some exciting solutions for the future.

"I'd like to think that we have established ourselves and are building our reputation as the world leader in the formulation of biologics. We're the only company that I'm aware of that has been able to take some special insights, primarily from physical chemistry, and apply those to the many pathways that lead to instability of the protein – I think that makes us relatively unique in pharmaceutical formulation."

www.arecor.com

We're the only company that I'm aware of that has been able to take some special insights, primarily from physical chemistry, and apply those to the many pathways that lead to instability of the protein

Printing the future

XAAR AND THE CHANGING SHAPE OF INKJET PRINTING

Xaar is at the forefront of new era of inkjet applications – Director of Marketing Mark Alexander spoke to Catalyst to share the story.

The figures alone are impressive. Xaar, the inkjet technology specialists which spun out of Cambridge Consultants back in 1990, has recently picked up the pace. Revenue has more than doubled in the last three years and it's anticipated that 2013 will see revenues 50% higher than the previous year.

Nevertheless there is no hint of complacency at the company's headquarters at 316 Cambridge Science Park. Xaar is already the world-leading supplier of industrial inkjet printheads, but there are still many new innovations and markets to explore. At the heart of Xaar's extraordinary success, which saw it enter the FTSE 250 for the first time this year and pick up the tech growth business of the year award at the UK tech awards 2013, is its piezoelectric industrial inkjet printhead technology. Director of Marketing Mark Alexander is on hand to explain the principles behind it.

"Although most people are familiar with the notion of inkjet printing, industrial piezoelectric drop-on-demand printing is quite different," he says. "Starting with the basics, the printhead is the section of a printing system that contains the nozzles for jetting ink. Piezoelectric printheads include some electronics, a fluid path and an actuator (the active element of the printhead that contains the channels in which pressure waves are generated to eject the ink from the nozzle). The channel walls are made from a ceramic (piezoelectric) material.

Digital printing has reduced costs, streamlined production processes, and made possible new products and business models

"The Xaar 1001 family of printheads uses two pieces of piezoelectric material, one on top of the other, to form the channel walls. When a voltage is applied to the ceramic material, it flexes at a very high frequency in the middle, making a chevron shape. This happens because the two pieces of material are oppositely poled. The chevron design used by Xaar is very energy efficient, reducing the required driving voltage and therefore reducing power. This solution also delivers a more consistent performance, better drop uniformity and high print quality. When the channel walls are flexed (actuated) in chevron mode at a high frequency, an acoustic wave is created. This pressure wave forces the ink droplets out of the nozzles."

The conventional design of inkjet printheads uses end shooter architecture. This means that these printheads have nozzle orifices at the end of each channel through which the ink is ejected. Xaar's Hybrid Side Shooter™ (HSS™) architecture, however, is different and unique. The HSS™ has an inlet and outlet for the ink as well as a separate nozzle. The nozzle is in the side of the ink channel and the drop is fired perpendicular to the flow of the ink.

Above// **Xaar 1001 printhead**

Left// **Xaar Director of Marketing, Mark Alexander**

The Xaar 1001 combines the HSS™ architecture with the company's revolutionary, patented TF Technology™ – the best ink recirculation technology available. This powerful partnership has transformed a number of manufacturing processes, in particular ceramic tile decoration. TF Technology™ delivers an unrivalled level of reliability and a very high print quality, meaning printers can run for a full production shift with minimal maintenance.

The other key element of the Xaar 1001 technology is its greyscale printing capability. "What this means," explains Mark, "is that it can print variable-sized drops from the same nozzle. Greyscale capability provides an effective resolution of over 1000 dpi, so that images are amazingly life-like and printing pale shades and fine detail is possible."

Having initially established itself in the wide-format graphics printing industry, Xaar introduced the 1001 printhead in 2005 and in 2007 opened its manufacturing plant in Huntingdon, which produces the Xaar 1001. This world-class manufacturing facility has grown from one to four fully operating lines working at full capacity, while the company's overall headcount has more than doubled to over 750.

Above// **Xaar cleanroom**

Much of this growth has been fuelled by Xaar's significant entry into the global ceramic tile manufacturing industry, which was estimated to produce approximately 9.5 billion m2 of tiles in 2012. The Xaar 1001 has offered a step change in quality, flexibility and cost efficiency, as Mark goes on to explain.

"Digital inkjet printing has revolutionised ceramic tile manufacturing in a very short time. Just over a decade ago, the only way to decorate ceramic tiles was using traditional printing methods, the most common of which was screen printing," he says. "This was a mature technology with little scope for innovation; it was difficult for ceramic tile manufacturers to make their products stand out from the competition and differentiation was mostly down to price. The process had other disadvantages, including high set-up costs, long production runs, and the difficulty of exactly matching tile colours on repeat orders."

Above// **Ceramics printed using Xaar 1001 printhead**

Today, digital inkjet is the "must-have" technology for ceramic tile manufacturers. It is no longer a case of offering digital tiles as an "optional extra"; digital capability is expected, and digital inkjet is the only viable option. In Europe the majority of ceramic tile manufacturers in the major producing countries, Spain and Italy, have already converted to digital inkjet printing. By doing so, they have cut production costs, reduced waste, work-in-progress and stocks of finished products, and slashed turnaround times. And these are just some of the advantages.

"These ceramic tile manufacturers are also producing higher-quality tiles that offer more realistic reproduction of marble and other natural materials," says Mark. "They are doing so in the short runs that buyers demand – using digital, a single ceramic tile can be produced cost-effectively. Instead of competing on price, these manufacturers can compete on creativity and innovation, and do so in new markets. So digital printing has reduced costs, streamlined production processes, and made possible new products and business models.

"Because it's a digital technology, it means that every tile can be printed differently – that's revolutionary from a creative point of view. For example, if someone wants a box of 20 natural-stone-style tiles, it's possible to print each one differently to give that really natural feel. You can make much smaller, individualised print runs according to demand and avoid the need for storing a large inventory."

In the last 12 months, we invested £12 million in R&D – so we're always looking forward

Around 50% of the global ceramic tile industry has converted to digital printing, and Xaar has in excess of 70% of that market share. Initially the European markets converted, but now there is also a massive adoption of the technology into China. Of course, applications for the Xaar 1001 are not just limited to the ceramics industry. Laminates is another application, as well as the extensive possibilities the technology offers to the packaging industry.

"We can print direct on to a bottle or can, including into the grooves, which means you can decorate parts of the container which you can't with a label," explains Mark. "So not only do you remove the cost of a label, the digital technology means you can be much more creative through personalisation and localisation. We're currently in customer trials and the brand owners are very excited."

Having enjoyed strong share performance through 2013, Xaar continues to shine as a paradigm of Cambridge hi-tech success on a global scale.

"Ultimately, the opportunities are limitless," concludes Mark. "We've built a global business on the basis of our success in printing for wide-format graphics and ceramics, but there are so many markets where the introduction of piezo drop-on-demand inkjet could transform current analogue manufacturing processes. In the last 12 months, we invested £12 million in R&D – so we're always looking forward."

www.xaar.com

Above// **Bottle printed 'direct-to-shape' by Till SmartPrint system with Xaar 1001 printheads**

PARKLIFE connections

Cambridge AWiSE (Association for Women in Science & Engineering) is a multidisciplinary membership networking organisation composed of individuals from institutions, businesses, associations and other organisations all of whom share the common goal of advancing the interests of women in science, engineering, technology, maths and medicine. Cambridge AWiSE holds regular meetings and events; for details see the website or get in touch.

Web: www.camawise.org.uk
Email: info@camawise.org.uk

Cambridge Enterprise exists to help University of Cambridge inventors, innovators and entrepreneurs make their ideas and concepts more commercially successful for the benefit of society, the UK economy, the inventors and the University.

Web: www.enterprise.cam.ac.uk
Email: enquiries@enterprise.cam.ac.uk

Cambridge Network is a membership organisation. We bring people together – from business and academia – to meet each other and share ideas, encouraging collaboration and partnership for shared success. With over 1,200 corporate members, including start-ups, SMEs and global corporations, Cambridge Network represents the majority of the technology businesses in Cambridge.

Web: www.cambridgenetwork.co.uk
Email: Claire.Ruskin@cambridgenetwork.co.uk
Tel: 01223 300148

Cambridge University Technology and Enterprise Club (CUTEC) is a leading student-run organisation that seeks to nurture and enhance the entrepreneurial spirit amongst academics and students. The club is mainly run by students who are passionate about science and entrepreneurship, supported by advisors drawn from the local business community.

Web: www.cutec.org
Email: info@cutec.org

CHASE (formerly the Cambridge Hi-Tech Association of Small Enterprises) is a lively networking group for entrepreneurs, start-ups, small firms and people interested in business and hi-tech, based in Cambridge.

Web: www.chase.org.uk

One Nucleus is the largest membership organisation for life science and healthcare companies in Europe. A not-for-profit company with members across the world (mainly Cambridge and London based), its mission is to maximise the global competitiveness of its members. Its core activities include networking events (from eight to 800 delegates), training, a Group Purchasing Consortium which saves its members £4 million per annum, special interest groups and an international strategy.

Web: www.onenucleus.com
Email: info@onenucleus.com

Science Technology Network (STN) is an online database service that provides global access to an integrated network of the most important and comprehensive chemistry, sci-tech and patent databases from the world's most respected producers.

Web: www.stn-international.com

The Cambridge Science Park
is managed by Bidwells on behalf of Trinity College.

Cambridge Science Park tenants can post news, events and jobs free on www.cambridgesciencepark.co.uk

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Front cover// **(photo David Porter)**

Companies based on Cambridge Science Park

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Advanced Technologies Ltd 210

Amgen Ltd 240

ANT Software Ltd 335

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Ember Europe Ltd 300

Esaote 14

ESRI (UK) Ltd 302

Frontier Developments Ltd 306/321/323

GHX UK 320

Grant Thornton 101

Hawkins & Associates Ltd 25/120-126

Heraeus Noblelight Ltd 161

Jagex 220

Johnson Matthey Catalysts 28

kidsunlimited Day Nursery 319

Lab21 184

Linguamatics 324

Mundipharma International Ltd 194-198

Mundipharma Research Ltd 194-198

Napp Pharmaceutical Holdings Ltd 196

Novus Biologicals 12

Oakland Innovation Ltd 328

Oracle 296

Owlstone Ltd 9B/127

Pharmorphix Ltd 250

Philips Research 101

Plastic Logic 31-35

Polatis Ltd 332

QUALCOMM Cambridge Ltd 335

Ricardo UK Ltd 400

Royal Society of Chemistry 290

Science Recruitment Group 11

Spiral Software 101

Takeda Cambridge Ltd 418

The Trinity Centre 24

The Trinity Health Club 24

Toshiba Research Europe Ltd 208

Twist DX 181

Vectura Delivery Devices Ltd 21

WorldPay Ltd 270

Xaar plc 316

Innovation Centre, unit 23, home to over 30 companies, for a full list of occupants go to www.cambridgesciencepark.co.uk

VIEWPOINT

DAVID HALSTEAD,
HEAD OF TECHNOLOGY PRACTICE, DELOITTE

There's no doubt that the Cambridge hi-tech cluster, here as everywhere else, was hit hard by the global recession. Some companies have been well placed to weather the storm, in particular larger and more established businesses which already had mature technologies and market presence. But the fast-growing start-up scene has shrunk considerably as the availability of finance contracted.

Nevertheless, when I talk to people in the field, they are more optimistic than I've seen them in a number of years. Basically it's because they can see the light at the end of the tunnel with regards to the economic downturn.

I'm the Sponsoring Partner of the Deloitte Fast50, which provides perspectives on Britain's fastest-growing technology companies. That means I talk to a diverse range of technology companies in different fields right across the country and the general impression I get is that there is more talk of IPOs and a greater interest in investment from venture capital and private equity firms than for a long time. In 2013, the Cambridge cluster is represented in the Fast50 by internet company AlertMe and Horizon Discovery, a biotech based on Cambridge Science Park.

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In fact, it might be that the economic downturn has brought a necessary reality check for the Cambridge hi-tech scene. Many companies have had to cut costs and downsize, forcing them to focus on what they're good at and where their markets really are. Because there are so many fascinating and good ideas that come out of Cambridge, I think in the past some companies have been guilty of working on what was exciting, rather than what was actually marketable. Great science and technology is of course interesting, but if you are a commercial company, selling products has got to be more interesting.

As we come to the end of the more difficult economic times, I think it's going to be a really exciting time for the Cambridge cluster. It still has all its key strengths, which include the University as a centre of excellence, its global reputation, the many existing companies which have developed here, and of course a highly talented and skilled workforce.

The sector has learnt a lot from the economic downturn, but there are still many challenges ahead. I think it's fundamental that Cambridge hi-tech companies, particularly new start-ups and smaller businesses, absolutely focus on the markets right from the earliest stages of their development. That means not expending resources on things that won't work or sell – as far as can be determined – and not trying to do too much, too soon, with too little. The clearer focus on the markets is something that is very much in evidence when you look at US hi-tech start-ups.

The type of funding companies secure is also very important. Very often, risk-averse investors will drip-feed investment into a company over a number of years. This might be understandable from an investor's point of view but for a new company, it means it is constantly in the process of fundraising rather than concentrating on developing and selling its technology. If companies could work harder to secure more funding at the beginning, it should be better for all parties concerned.

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Cambridge has so much going for it and of course as a brand it is known around the world. However, apart from a handful of companies, very few of its hi-tech businesses are recognised globally. What's more, it's going to face increasing competition from other parts of the UK and in particular London, which dominated the Deloitte Fast50 2013. While the diversity and innovation of the technologies coming out of London may not compete with Cambridge, it has such a strong infrastructure in terms of corporate finance, executive personnel, and PR and marketing, that its companies perform strongly in these competitive markets.

That said, the Cambridge cluster has all the pieces in place to move forward and thrive – if it develops and maintains an unrelenting focus on the market. I'm looking forward to being involved with it for many years to come.

David leads the Deloitte's UK based technology practice. Graduating with a Chemistry degree from Manchester University, David has spent over 20 years based in Cambridge and in 2013 he relocated to the St Albans office to lead the corporate practice. David is a member of Deloitte's national Technology, Media & Telecommunications executive group and Deloitte EMEA Fast500 initiative lead. David is a board member and audit committee chair for the Cambridge Network and his experience covers audit, due diligence, public offerings and fundraising.