Summer 2013

CAMBRIDGE SCIENCE PARK

CATALYST

Cambridge Science Park Newsletter

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PARKLIFE

AUTOINJECTOR PUSHES LIMITS OF HIGH-VISCOSITY DRUG DELIVERY

Oval Medical Technologies has successfully tested a revolutionary new autoinjector which could transform the delivery of high-viscosity drugs to patients. The tests saw the delivery of a variety of 1,100 cPs solutions (the thickness of motor oil) through a 25G thin-wall needle in less than seven seconds.

The automatic delivery of high-viscosity drugs is an important milestone for injection delivery as there is currently no known automatic injection device, with a needle, on the market which can deliver these viscosities.

Louisa Harvey, Business Development Consultant at Oval, said: "Viscosity has been a huge problem for many biopharmaceutical formulators as many biologics are very viscous. There has been no effective way of delivering high-viscosity drugs through a prefilled syringe without extreme pain to the patient (due a large needle bore) and physical discomfort to the care-giver when administering the injection (due to high injection forces). Not only does this mean that these wonder drugs (often coined magic bullets) can be administered through the Oval device, but they can be administered by the patient in the comfort of their own home."

www.ovalmedical.com

Above// **Oval's standard and bespoke rheumatoid arthritis devices (photo by Oval Medical Technologies)**

NAPP CELEBRATES 30 YEARS WITH CHARITY BALL

Above// **Anton du Beke and Erin Boag from the BBC's 'Strictly Come Dancing'**

Napp Pharmaceuticals is celebrating 30 years in Cambridge this summer with a spectacular fundraising event in support of the local branch of the Teenage Cancer Trust (TCT). In partnership with TCT, Napp will host The Butterfly Ball on the lawns of its site at Cambridge Science Park on July 6th.

The black-tie event will feature a showcase performance by Anton du Beke and Erin Boag from the BBC's *Strictly Come Dancing*. Guests can enjoy champagne and canapés, live music, a three-course dinner, dancing, a casino, a charity auction and much more throughout the evening. The full amount of the £85 ticket price will go to support the TCT Unit at Addenbrooke's Hospital, which supports 14- to 24-year-old cancer patients from East Anglia.

The TCT Unit at Addenbrooke's Hospital was opened last year and cost more than £3.6 million to build, of which the local community helped raise £2.9 million. Ongoing support is now needed to maintain the Unit and fund specialist staff, which is why Napp is supporting TCT with The Butterfly Ball. For more information or to purchase tickets, please contact Judith Anderson on 07903 464678 or email judith.anderson@teenagecancertrust.org.

www.napp.co.uk
www.teenagecancertrust.org

ARECOR PATENTS HEAT-STABLE ADENOVIRUS VACCINE TECHNOLOGY

Arecor, a leader in the stabilisation of biologic molecules, has patented technology which could enable liquid stable versions of live-virus-containing products, which are used widely in vaccines and gene therapy products.

The technology enables the liquid storage of adenovirus, which would allow for the storage and distribution of next-generation vaccines and therapeutics at temperatures typically used in cold chain distribution, and also allowing for extended excursions outside the cold chain. Current products require a commercially challenging -80° C supply chain, or the expense and impracticality of freeze-drying live products.

Heat stability will be particularly beneficial for enabling the practical utility of liquid-stable live-virus products in the most advanced cancer therapies, gene therapies and vaccines against infectious diseases such as HIV.

www.arecor.com

Above// **Senior Analytical Scientist at Arecor (photo by Arecor Limited)**

ABCAM WELCOMES STUDENTS FROM CAMBRIDGE REGIONAL COLLEGE

Abcam Plc., a producer and distributor of high-quality protein research tools, welcomed a group of students studying for the BTEC Science Diploma at Cambridge Regional College to take part in a series of activities at its Cambridge headquarters on Cambridge Science Park in March. The visit was designed to give the students some experience of what it is like to work in a busy, successful working laboratory.

The students enjoyed a series of talks from Sarah Bolt, Head of Characterisation Services, and Wyn Forrest-Owen, Head of Production Sciences, during which they learned about the production of Abcam's products, and how scientists use the reagents in their research. Abcam's Resourcing Advisor Claire Warburton also gave the students some practical tips on writing a CV and applying for jobs in the science industry.

Claire Sellick, Biology Lecturer at Cambridge Regional College, said: "The visit has been really inspirational for our students and has helped them better understand the day-to-day running of a lab at a successful biotech company."

www.abcam.com

Above// **students from Cambridge Regional College visit the Abcam labs in March**

SENTINEL ONCOLOGY ACHIEVES MILESTONE IN HORIZON DISCOVERY AGREEMENT

Left// **Stuart Travers (left) and Bob Boyle (right), the scientific founders of Sentinel Oncology (photo by Sentinel Oncology)**

Sentinel Oncology has achieved a research milestone in its collaboration with Horizon Discovery to develop small molecule inhibitors of a novel oncology target. The collaboration was initiated in 2011, and the first milestone achieved following the delivery of a series of pre-clinical lead molecules.

The first-in-class kinase target programme, HD-001, is now partnered with a top 10 pharma company, as announced by Horizon on 22nd April 2013. Sentinel is entitled to further milestone payments and potential royalties based upon the continued success of the programme.

"We are delighted to have contributed to driving the programme forward," said Bob Boyle, CEO of Sentinel. "This milestone reflects the success of our collaboration and we are excited about future collaborations with Horizon Discovery."

www.sentineloncology.com

CAMBRIDGE CONSULTANTS COLLABORATES ON BRAND AUTHENTICATION TECHNOLOGY

Product development firm Cambridge Consultants has worked with Ingenia Technology to develop a high-speed laser scanner for use in brand protection, product authentication and 'track and trace' applications. The scanner is typically fitted above a production line and records a unique fingerprint based on the particular surface micro-structure of each item it sees.

Brand protection company Ingenia Technology established the laser-based technology – called Laser Surface Authentication (LSA™) – and recognised that, for continued business expansion, a high-speed and sensitive scanner was needed. Cambridge Consultants worked with Ingenia in a 12-month project to develop the next generation of the innovative technology.

Martin Cooper, project manager at Cambridge Consultants, said: "We see this breakthrough in high-performance authentication technology as being highly significant for brand owners and packaging companies in their supply chains, as well as government departments and agents who are on the front line of tackling counterfeit products."

www.cambridgeconsultants.com

Above// **high-speed laser scanner**

Every compound counts

HITTING THE TARGET WITH DOMAINEX

Reducing drug discovery timelines and helping to shape a new biotech landscape – Catalyst spoke to Domainex's Chief Executive Officer Dr Eddy Littler to find out how.

The ongoing global economic downturn. Pharma cuts and the closure of major UK sites. Fewer and more risk-averse venture capitalists. It's no wonder that, given the circumstances biotechs currently find themselves in, the process for taking promising compound leads from the lab into the clinic and beyond seems significantly more challenging than it might have done just six short years ago.

Above// **Domainex scientists discussing how to make use of new information in the literature to help their drug discovery efforts (photo by Domainex)**

In such a context, a company offering faster, more cost-efficient solutions to key drug discovery challenges is making quite a name for itself both at home and abroad. Formed as a spin-out from University College London (UCL) in 2001, Domainex started life in the capital before a merger with another UCL start-up, NCE Discovery, and a move to Cambridge established the company in its current form. Right from the start, Domainex has been pioneering new approaches not only to drug discovery, but also in its business model for the biotech sector, as Eddy explains.

"We're very different from the classical biotech model, which I think is going to become more of an exception nowadays. The days when a venture capitalist came up and dripped £40 million into a company, it's not as if it's never going to happen again, but I think it's going to be quite rare. They are looking for companies now which have more of a revenue stream.

> **"Over the last six years we've selected a candidate a year – that's a very high rate of success"**

"Our merger allowed two things. It meant we could offer clients a more comprehensive service, basically most of the technologies that you need for drug discovery. Some of it we do on a simple fee-for-service basis but some of it is done on a risk-sharing basis where we will take a percentage of the programme in return for offering better terms.

"That service business is doing very well and has been in profit each year. In turn, that has allowed us to use the same engine and take investment dedicated to developing our own internal pipeline. That is gradually maturing to the point where we're now talking to pharma companies about potential out-licensing."

With a track record of delivering five candidate drugs in five years and helping to reduce industry-average drug discovery times by 30%, the team has clearly found a technological approach that delivers results. One of the key platforms that has driven the company's success to date is known as Combinatorial Domain Hunting – or CDH – as Eddy explains.

"CDH is a technique that came out of some work of one of our founders, Professor Laurence Pearl, who was at UCL and also became Head of Structural Biology at the Institute of Cancer Research in London. He is an x-ray crystallographer and developed the first really good x-ray crystal structure model of a protein called HSP90, which is an important protein people have looked at intensively over a period of years as a cancer and information target.

"His group was the first to come up with a really high-definition model of HSP90 and the way they did that was by splitting the protein into three parts, getting an x-ray crystal structure of the different parts and then putting them back together. They had a brilliant model which opened up a whole drug discovery programme that in turn is now in the clinic with a company called Novartis.

Above// **scientific investigations take place at the Domainex laboratories on Cambridge Science Park (photo by Domainex)**

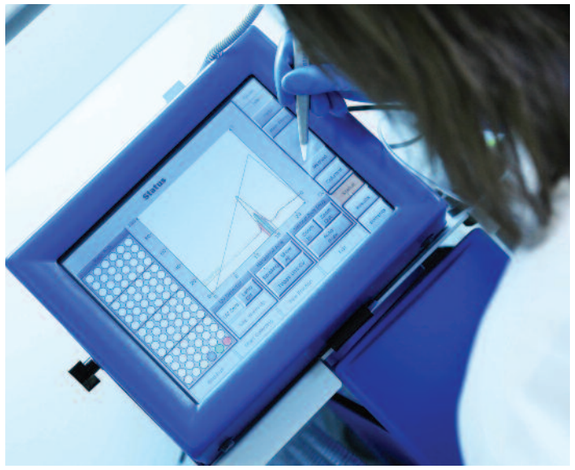
"It's not an entirely new approach: microbiologists already knew that if you can't get a whole protein, sometimes splitting it up into domains – or parts – and then reassembling them could work. The issue was that, in Laurence's group, it took them eight years to get a result. That's OK in academia when you're working on multiple programmes but it's not something that would work in a commercial setting.

"The reason why it takes so long is because you can't predict where the domains you are creating should start and finish. So what we've developed at Domainex is an approach which says, if there aren't any rules which govern how the domains should be situated, then make all of the possible combinations. That means we make between 20,000 and 100,000 clones of a protein and what our technology does is to look at that library to narrow down which ones are going to work well in x-ray crystallography."

Domainex has run its CDH platform over 40 times already, both for external programmes (largely for big pharma) and its own internal pipeline. It's a unique way of solving complex problems, as Eddy points out.

"Very often there is just one clone that will provide a perfect crystal structure. But if you go back to the old way of sticking your finger in the air and guessing where the domains start and finish, the chances that you'll find it are very small. So while there are whole new methods of solving the same problem, in terms of finding a domain, this is the technology that works."

Domainex's other technology platform is a system called LeadBuilder, a virtual screening process based on computational chemistry expertise. "When you've got a target in drug discovery, you need to find your very first chemical hits," explains Eddy. "If you go to big pharma, they might try high-throughput screening of a couple of million compounds – it's expensive and it's very time consuming.



Above// **data informs all decision making at Domainex (photo by Domainex)**

"What we've done is to take the 30 million possible chemicals and rather than screening them all, we eliminate computationally the ones that are not going to work very well. That usually leaves about a million. Then we look at the crystal structure of a target or other information and use computational chemistry to narrow it down even further, which brings us down to about 500 viable compounds. We've run the whole system about 20 times and it's worked very effectively; in fact it's been the basis for several programmes that have gone all the way into clinics for clients. Over the last six years we've selected a candidate a year – that's a very high rate of success."

Drawing on the strength of its two key technology platforms, Domainex has built up its own pipeline of novel drug compounds focussed on oncology and autoimmune disease. Its most advanced programme has identified small molecule inhibitors of the kinases TBK1/IKKε and is progressing these as potential therapies for breast and ovarian cancer.

Above// **Domainex's medicinal chemists all operate from its laboratories on Cambridge Science Park (photo by Domainex)**

"People were already interested in these kinases five or six years ago but had struggled to get potent inhibitors that were selective towards these targets," says Eddy. "We've used CDH to generate a very detailed crystal structure and nobody else has managed to do that. So it's turned out to be quite an exciting programme and a number of companies are interested in it. We're very focused on getting that licensed out, so that we can bring revenue back into the company to reinvest and move us forward.

"We think it's a validation of our approach. We have a bit of a mantra in the company which is 'every compound counts'. The industry as a whole is moving away from high-throughput screening. What we're doing is selecting more intelligently the compounds to be screened and dramatically reducing the number of irrelevant compounds that go through the process. Now more than ever, that makes a big difference."

www.domainex.co.uk

> **"What we're doing is selecting more intelligently the compounds to be screened and dramatically reducing the number of irrelevant compounds that go through the process."**

Magnetic attraction

THE FUTURE OF BREAST CANCER STAGING FROM ENDOMAGNETICS

By removing the reliance on radioactive isotopes, Endomagnetics is revolutionising lymph node localisation techniques for breast cancer. Catalyst spoke to Chief Executive Officer Dr Eric Mayes to find out how.

"If a woman – or less commonly a man – is discovered to have breast cancer, one of the most important questions that needs to be answered is whether the cancer has spread, because that determines the type of treatment that is given," explains Eric about the therapeutic challenge which inspired the team at Endomagnetics to develop its ground-breaking technology.

"In breast cancer in particular, the way the cancer spreads is that the cancer cells break off and get taken up by the lymphatic system where they are filtered out by lymph nodes. In the past, physicians would simply take out all of the lymph nodes – there are about 30 of these in armpit. By analysing these nodes, they could see whether the cancer had spread, and therefore whether chemotherapy and radiotherapy would be useful.

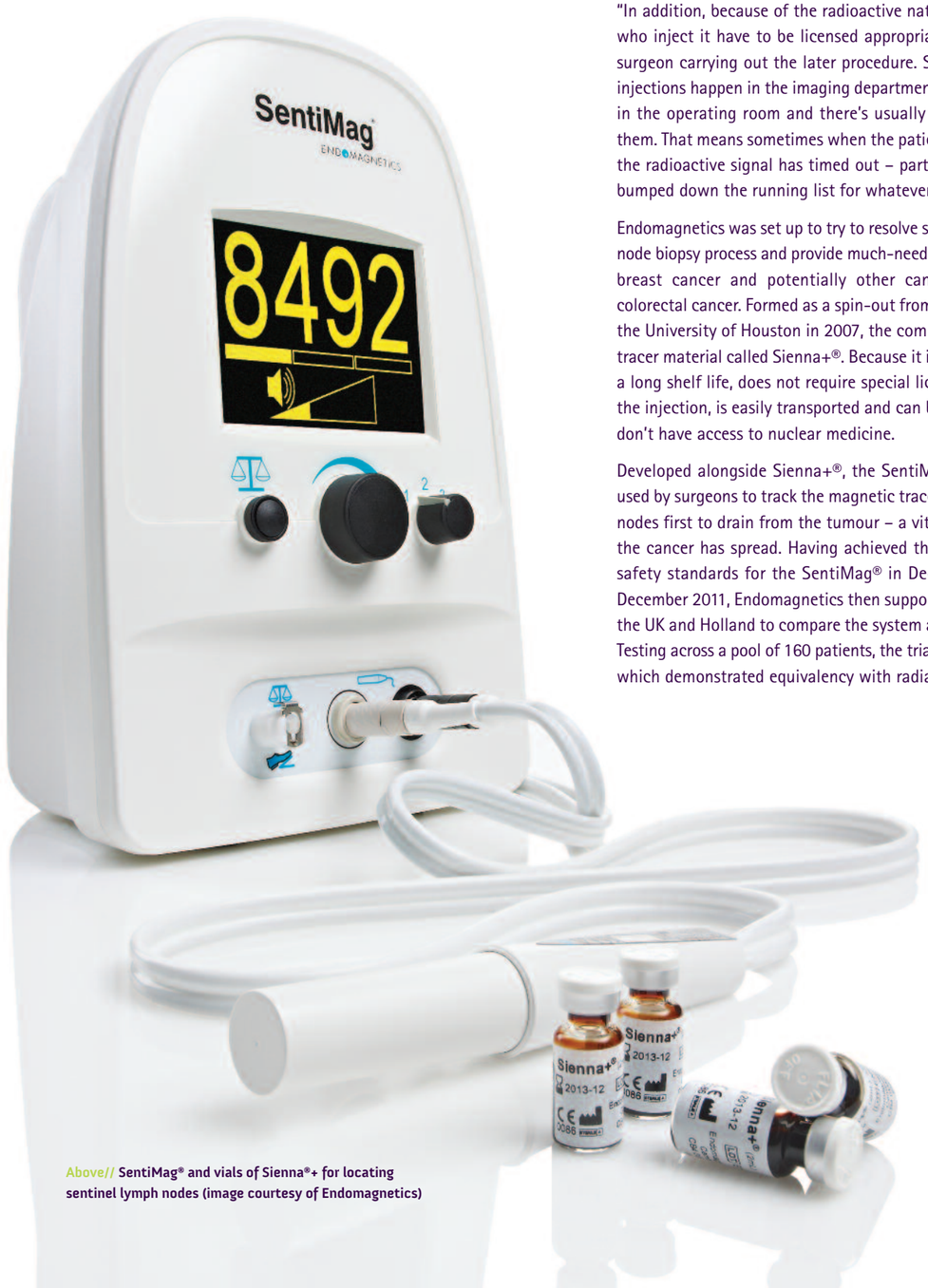
"But the problem with taking out all the lymph nodes is that the lymph cannot then drain the tissue, which then swells and patients may have to wear a compression bandage for the rest of their lives. Removing the lymph nodes also presents the risk of neurological damage from clipping a nerve during the procedure.

"However, in the 70s, the approach started to be modified. It was seen that initially the cells would get trapped in the first lymph node to drain from the tumour. So if you could identify the node that acts as the sentinel, then you could take it out and not have to remove the rest of the lymph nodes.

"That concept took off and over the last two decades has become the standard of care – find the lymph nodes that are first to drain from the tumour and only take out one or two in a minimally invasive surgery. Once you analyse these, if it turns out there is cancer, then you continue with radiation or chemotherapy, but if they're clear, you generally just remove the tumour. Thankfully these days, in three-quarters of the cases patients are basically fine at this stage and no further treatment is needed."

"We've been getting some very positive feedback from surgeons using the system – all of them like the ability to do the tracer injection themselves and set their own schedule"

To find the sentinel node – the one which acts as signal that cancer has spread to the lymphatic system – patients are injected near the tumour with a radioactive tracer (along with a blue dye). This then gets filtered through the lymphatic system and the surgeon uses a Geiger counter to find where the sentinel node is, makes an incision and takes it out. It's a very effective approach which has become the standard of care in many countries around the world, but is not without its drawbacks.



Above// **SentiMag® and vials of Sienna®+ for locating sentinel lymph nodes (image courtesy of Endomagnetics)**

"The problems with this technique are particularly to do with the use of radioactive material," says Eric. "Firstly, the radiation has a very short half-life – just six hours. So that immediately puts a limit on how long the patient can wait after being injected before seeing the surgeon, which can be a problem.

"In addition, because of the radioactive nature of the material, the people who inject it have to be licensed appropriately – generally that's not the surgeon carrying out the later procedure. So what that means is that the injections happen in the imaging department and then the surgery happens in the operating room and there's usually a bed stay overnight between them. That means sometimes when the patient reaches the operating room, the radioactive signal has timed out – particularly if the patient has been bumped down the running list for whatever reason."

Endomagnetics was set up to try to resolve such issues in the sentinel lymph node biopsy process and provide much-needed flexibility in the fight against breast cancer and potentially other cancers such as melanoma and colorectal cancer. Formed as a spin-out from University College London and the University of Houston in 2007, the company has developed a magnetic tracer material called Sienna+®. Because it is not radioactive, Sienna+® has a long shelf life, does not require special licensing for those administering the injection, is easily transported and can be used away from centres that don't have access to nuclear medicine.

Developed alongside Sienna+®, the SentiMag® is an ultrasensitive probe used by surgeons to track the magnetic tracer and thereby locate the lymph nodes first to drain from the tumour – a vital step in determining whether the cancer has spread. Having achieved the CE mark for European Union safety standards for the SentiMag® in December 2010 and Sienna+® in December 2011, Endomagnetics then supported a seven-site clinical trial in the UK and Holland to compare the system against the standard technique. Testing across a pool of 160 patients, the trial achieved some exciting results which demonstrated equivalency with radiation-based methods.

Building on these key milestones, the company signed a distribution agreement with Sysmex Europe GmbH in February this year, which gives Sysmex the exclusive right to provide sales and support for the Endomagnetics SentiMag® system across the Europe, Middle East and Africa region.

"The deal with Sysmex is a good fit for us because this is a global company which has a substantial presence in Europe," explains Eric. "Sysmex has developed a system called OSNA which analyses a lymph node that's been taken out of the body and tests if it is cancerous or not – in a sense it's an automated histologist. It's a product that's very compatible with ours and they already have a strong sales team in place right across Europe – we think it's a very good fit.

"Since Sysmex started selling SentiMag®, it's now in use in 13 countries so far, which is a great start. We've also been getting some very positive feedback from surgeons using the system. All of them like the ability to do the tracer injection themselves and set their own schedule. Some feel that it's even more selective and that they get a better sense positionally of where the lymph node is than using the radiation detector."

"We don't want our customers to feel that they've just bought one product, but that they've adopted a future that will change their practice"

Having begun to make an entry into the European market, there are plenty of opportunities to keep the team at Endomagnetics on their toes over the coming months and years, as Eric goes on to describe.

"The biggest challenge is ensuring good growth. We now have a partner out there who is selling our system for us in Europe, but we want to ensure that customers keep coming back for more. That means new development, next-generation technology and excellent customer care. In using magnetic technology, we don't want our customers to feel that they've just bought one product, but that they've adopted a future that will change their practice.

"We're extending our pipeline to include a product that marks the site of a breast cancer tumour and we're also looking at the ways in which our technology could be used in the management of melanoma and colorectal cancer.

"With the SentiMag®, there are significant opportunities beyond Europe, so we are seeking our US approvals as well as trying to get our systems into some of the large markets like India and China. On a global basis there are about 1.6 million new cases of breast cancer each year and that number is growing. Ultimately, we want to make sure all patients can have the best standard of care possible."

www.endomagnetics.com

Flexible thinking

FROM DESIGN TO MANUFACTURE WITH PLASTIC LOGIC

Pioneering the new market for flexible electronic displays, Plastic Logic is a home-grown hi-tech success story with a global influence. Catalyst spoke to Head of Marketing Communications Rachel Lichten to find out more.

It sounds like a vision for a brave new world of hi-tech gadgets – one where electronic screens bend, flex, wrap around objects and, crucially, don't break. What was previously flat, inflexible, heavy and power-intensive is now bendy, lightweight, robust and power-light – opening up a whole array of exciting new applications from wristbands to large-area signage. But this isn't the pipe dream of device manufacturers looking five or ten years ahead; it is, in fact, a commercial reality right now – one that Cambridge-Science-Park-based Plastic Logic is helping to shape.

Spun out of the Cavendish Laboratory at the University of Cambridge back in 2000, the company has been exploring the field of plastic electronics for more than a decade, developing the first new transistor in over 50 years and creating new possibilities in the manufacture and performance of electronic circuits.

"It's a revolutionary technique because it means you can create a display with the thickness and flexibility of a piece of paper"

"We use polymers to create our electronics," explains Rachel. "Because these can be processed in solution form, it means they can be printed or sprayed on to a surface. We've refined this technique to a very advanced level so that we can build up layers of polymers to create an array of organic thin film transistors.

"It's a revolutionary technique because it means you can create a display with the thickness and flexibility of a piece of paper. Because the process takes place at low temperatures, these transistor arrays can be built onto everyday plastic surfaces.

"With glass displays, one of the advantages of using a very rigid substance is that it is easy to align the various layers which make up a display. With plastic, that can be much more difficult, but this is one of the key technological challenges that we've overcome with our distortion-tolerant manufacturing processes. And our patterning processes mean we can achieve a high density of transistors in each backplane, so the display has a very high level of detail."

Combining all these different features, Plastic Logic is the world's first company to have fully industrialised the manufacture of flexible plastic displays, which it makes at its purpose-built factory in Dresden, Germany. From there, it produces a range of commercially available models in different sizes and specifications, including a 10.7" colour display driven by no less than 1.2 million plastic transistors. The displays, which are designed to be integrated into end products by manufacturers and technology companies, represent a shift in approach for the company, as Rachel goes on to explain.

Above// **Plastic Logic is world-leading in both R&D and manufacturing for plastic electronics (photo by Plastic Logic)**

"In May 2012 we announced a new strategy because we had decided to shift away from developing our own end product and instead open up our technology to be used in different markets by device manufacturers and OEMs. There is such a wide range of potential applications, so this was not only a logical but also a very exciting development for us.

"We're currently supplying to a number of partners and we will see products with our displays in them coming on to the market soon. Looking forward, the opportunities are huge and span really diverse fields. For example smart cards, where you could integrate a display with an ID card or perhaps a bank card. Or dual displays for mobile phones – one is a normal display, but the other is a plastic display. Because of the low-power qualities of the plastic display, it can be used to get information off your phone when the battery runs down and the main display doesn't function.

"The display material is so flexible it could be turned into a wrap-around smartwatch or a super-lightweight heart-rate monitor for athletes, for example. These lightweight and low-power capabilities also make it ideal for use in medical monitoring devices, which are not heavy or cumbersome for patients to wear and do not require large batteries or proximity to power sources.

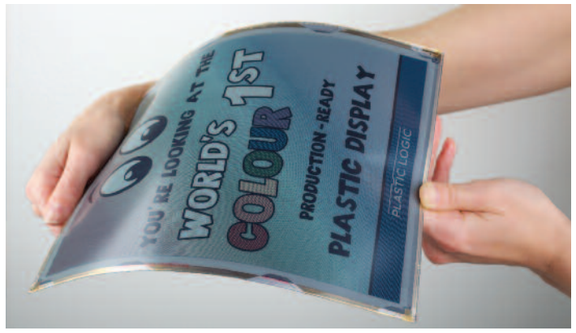
"Larger mobile devices such as e-readers are also an interesting application area. The current generation of electronic reading devices use electronic ink, as do our displays, but the backplane technology is different. All other displays are based on silicon and glass, which makes them much heavier per square inch. The plastic displays Plastic Logic has developed are much lighter and quite literally unbreakable."

Another key market for the technology is signage applications, which is why Plastic Logic has been working in partnership with TOPPAN Printing, a Japanese printing technology company. Together they exhibited a large-area, flexible digital signage prototype at the RETAILTECH JAPAN event in Japan in March this year – the first time that a reflective digital signage module over 40" using organic thin-film transistors has been publicly shown.

"The complete display is made up of 16 of our 10.7" monochrome flexible plastic displays which have been tiled together," explains Rachel. "It's very thin and lightweight so it's easy to transport and can be hung on a wall, for example, and it's got a much higher resolution than the current solutions out there. The display is also reflective, which means that it can be read in any lighting condition, just like paper, making it an ideal signage solution both outdoors and inside."

Although the company has championed the potential of plastic electronics since its inception in 2000, it seems that the time has arrived where the possibilities are starting to be appreciated by a much wider audience. In the last year, Plastic Logic and its technology has been featured on the BBC and the Discovery Channel and in *The Huffington Post*, *The Guardian* and *The Wall St Journal* among other publications.

"This is certainly a very exciting time for Plastic Logic," says Rachel. "Flexible displays are very much in the public eye. Previously, people were not familiar with the concept and each person had their own interpretation of the term 'flexible'. However, having been able to showcase several different concept designs recently means that people are now beginning to understand what this technology can offer. It's great for us to be at the forefront of the field at a time like this.



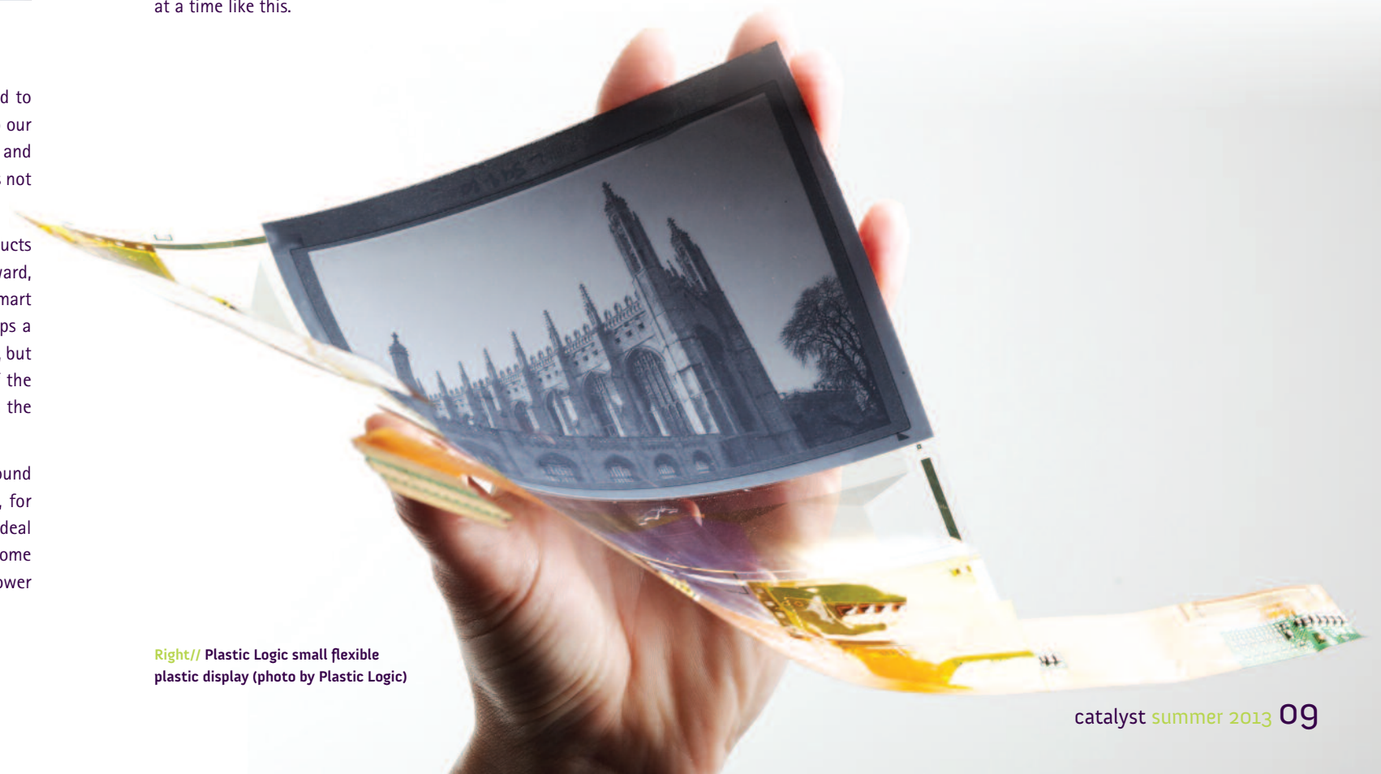
Above// **Plastic Logic flexible colour plastic display (photo by Plastic Logic)**

"You'll start to see the first products enabled by our flexible plastic displays coming on to the market over the next six to twelve months. Some of them will be next-generation versions of an application that already exists – for example, there is the potential to make an e-reader much lighter and much more robust.

"However, there is also a whole host of potential applications for flexible displays which haven't even been thought of or realised yet. So that's one of our big challenges right now – getting product designers, industrial designers and manufacturers thinking about how flexible displays can be effectively integrated. It's a very different proposition these days because you can do so much more with a flexible display – it's not just a piece of glass."

www.plasticlogic.com

"There is a whole host of potential applications for flexible displays, which haven't even been thought of or realised yet"



Right// **Plastic Logic small flexible plastic display (photo by Plastic Logic)**

New arrivals

Kiss Communications

Kiss Communications is an award-winning agency dedicated to delivering insightful and creative communications without unnecessary complexity.

www.kisscom.co.uk

SybreLabs

SybreLabs is the experimental side of Sybre Investments, aiming to experiment in a number of different niches, to pivot against the norm and to create useful, interesting start-ups.

www.sybrelabs.com

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.

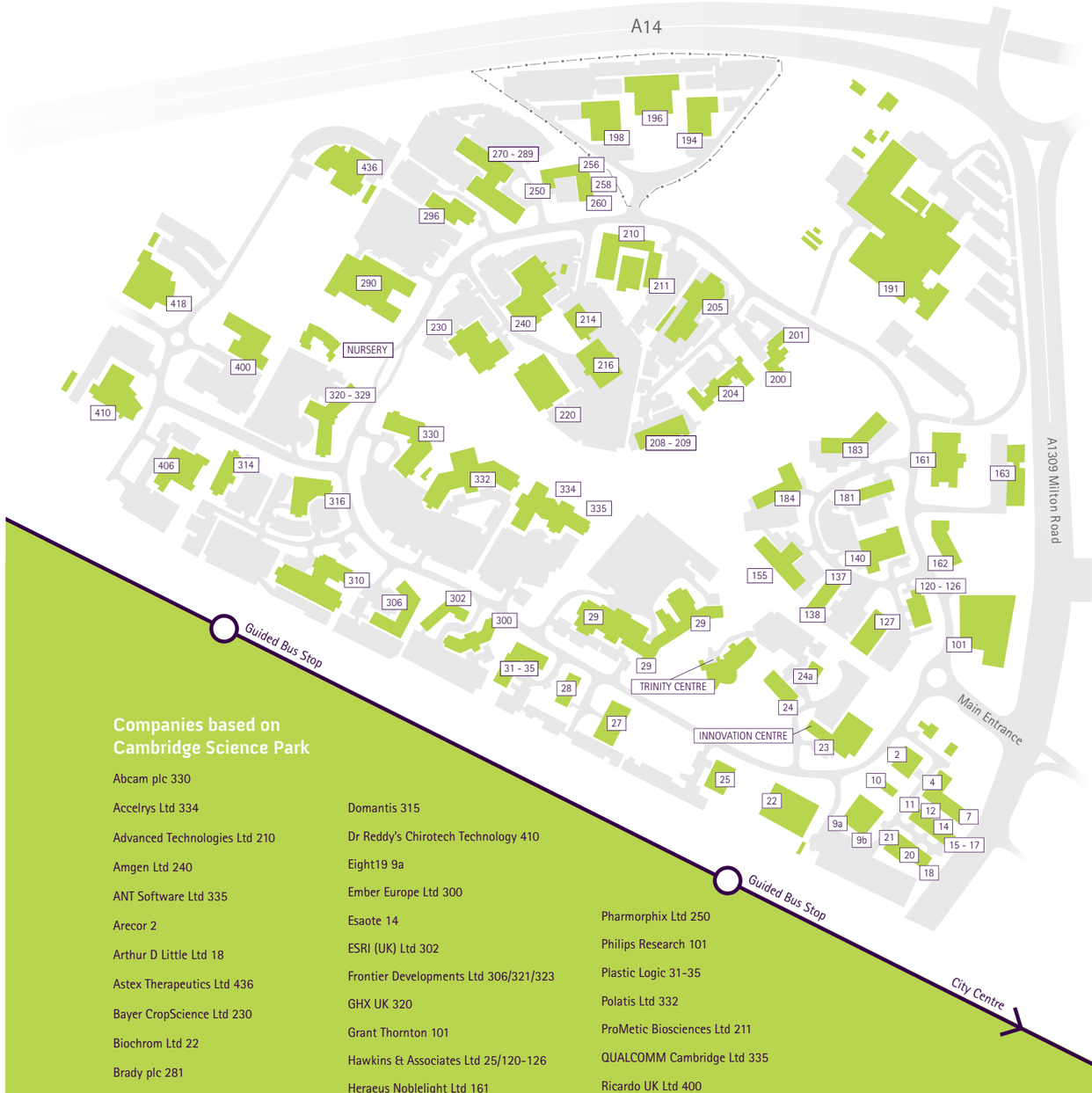
Web: www.stn-international.com

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

Management:
Jeremy Tuck
Email Jeremy.tuck@bidwells.co.uk
Tel: 01223 559333

PR & Marketing:
Julie Bushell
Email: Julie.Bushell@bidwells.co.uk
Tel: 01223 559331



Companies based on Cambridge Science Park

Abcam plc 330
Accelrys Ltd 334
Advanced Technologies Ltd 210
Amgen Ltd 240
ANT Software Ltd 335
Arecor 2
Arthur D Little Ltd 18
Astex Therapeutics Ltd 436
Bayer CropScience Ltd 230
Biochrom Ltd 22
Brady plc 281
Broadcom 406
Cambridge Assessment 332
Cambridge Business Travel 325
Cambridge Consultants Ltd 29
Cambridge Electronic Design Ltd 4
Cambridge Online Systems Ltd 163
Cantab Biopharmaceuticals Ltd 155
Citrix Systems UK Ltd 101
Cryptomathic Ltd 327
CSR 400
Discuva Ltd 260
Domainex 162
Domantis 315
Dr Reddy's Chirotech Technology 410
Eight19 9a
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
ProMetic Biosciences Ltd 211
QUALCOMM Cambridge Ltd 335
Ricardo UK Ltd 400
Royal Society of Chemistry 290
Science Recruitment Group 11
Smart Holograms 200
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

SIR GREG WINTER, MASTER OF TRINITY COLLEGE

There is clearly a very vibrant hi-tech community in Cambridge right now that has built up over many years. We've got a really wide range, from multinationals through to mid-sized companies and right down to very small start-ups. It also goes across different sectors such as biotech, computing, medical and physical sciences. That kind of diversity is very much a good thing and one of Cambridge's great strengths.

As a cluster, it continues to develop. For example, there is the imminent arrival of AstraZeneca. This decision may have its roots in a start-up company called Cambridge Antibody Technology (CAT) which I founded in 1989. CAT developed a new way of making antibody therapeutics – back then still a relatively new field. The field exploded – antibodies have a number of advantages over chemical-based pharmaceutical drugs; in fact, six out of the world's top ten selling drugs are now antibodies. This includes a drug called HUMIRA, which CAT developed in partnership with BASF Pharma and is now marketed by AbbVie (formerly Abbott Laboratories) – this achieved about $9 billion in sales last year and it is the world's top selling pharmaceutical drug.

> In my experience, business tends to happen as a result of personal interactions

As interest in biologics grew, CAT was acquired by AstraZeneca in 2006 and was subsequently folded into MedImmune, AstraZeneca's newly acquired biologics arm. Now we learn that AstraZeneca itself is relocating to Cambridge. We don't know exactly the reasons for this and we can assume that there are a number of them. But it's probably safe to say that the presence of CAT/MedImmune was a contributory factor.

The point I'm trying to make is really about the importance of small start-up companies to a location. Firstly, it's possible that they themselves may develop into big companies, like ARM has done. But even if they don't, they may eventually help to reel other companies or new talent into the Cambridge area. It's partly why one of my interests for years has been to try to support small companies in Cambridge and I currently advise a couple of Cambridge-based companies called F-star and Bicycle Therapeutics.

We've seen some really interesting new companies grow and develop on Cambridge Science Park and we're trying to think of ways in which we can support new start-ups even more. We already have the Innovation Centre which provides flexible work space. We're also looking into the viability of further multi-occupancy building; it might help to attract start-up companies if we could get some kind of seed fund involved, so these new companies could get investment at this crucial early stage. There's nothing we can promise yet, but we're certainly exploring several ideas, including how to improve informal networking between the companies.

Trinity has also started to talk more to the companies on Cambridge Science Park. Sir John Bradfield, who was the driving force behind the foundation of Cambridge Science Park in the 1970s, provided companies with introductions to respective academics in the University. I think we can look back and see that was a very good model, something we could make more of today. So, for example, we now have a meeting once a term at which selected Cambridge Science Park tenants give a talk about their businesses to each other and to Fellows of Trinity. There are usually a couple of talks and I know it's been a real eye-opener for some of the Fellows involved.

> The broader we can make the interface between science and industry at a local level, the better chance we have of attracting enterprise the Cambridge area

Clearly getting ideas out of a university and turned into successful commercial applications is actually quite difficult. Of course we have technology transfer institutions which are focused on supporting this kind of activity. Here we have Cambridge Enterprise, which is probably one of the best organisations of its kind in the UK.

Nevertheless, I think one of the dangers is that technology transfer is becoming rather formal and institutionalised. In my experience, business tends to happen as a result of personal interactions and this is a model that I'm very much supporting. It's also very cost effective – relatively small sums of money can be spent to build good connections between individuals in academia and individuals in industry. If a company knows that coming to Cambridge means it's going to have a very wide range of personal interactions, it certainly helps to make it an attractive location. So I believe the broader we can make the interface between science and industry at a local level, the better chance we have of attracting enterprise to the Cambridge area as a whole.

Sir Greg Winter, Master of Trinity College

Sir Greg Winter is a genetic engineer and is best known for his research and inventions relating to humanised and human therapeutic antibodies. He is a graduate of Trinity College and was a Fellow before being appointed Master in October 2012. His research career has been based almost entirely in Cambridge at the Medical Research Council's Laboratory of Molecular Biology and the Centre for Protein Engineering. He has founded three Cambridge biotech companies based on his inventions: Cambridge Antibody Technology (acquired by AstraZeneca), Domantis (acquired by GlaxoSmithKline) and Bicycle Therapeutics.