

### Inside this issue

Taking virtualisation further with Citrix - 04 Frontier Developments and the evolution of video gaming - 06 Transforming organisations with Arthur D. Little - 08 Viewpoint with Harriet Fear, Chief Executive, One Nucleus - 12

Cover: The shore of a frozen sea, north Sweden (full story page 8)

# parklife



### John Bradfield Centre set to create community of innovators

Trinity College celebrated a major milestone in the construction of one of the UK's largest innovation centres, delivered in partnership with the Department for Business, Energy and Industrial Strategy and Central Working. This summer's topping out ceremony, which saw the final roof girder fitted into place, marked the start of a new construction phase for the £20 million John Bradfield Centre at Cambridge Science Park, which is set to open in 2017. The state-of-the-art John Bradfield Centre, designed by architects Aukett Swanke, will nurture scalable, high-growth businesses in Cambridge to create a community of over 500 innovators. Central Working, the collaborative workspace provider, will create and run the three-storey, 40,000 sq. ft. building to galvanise Cambridge's booming tech sector, which historically has been driven by collaboration with the University and surrounding businesses.

The Department for Business, Energy and Industrial Strategy has donated £4.8 million to the project, which it is co-funding with Trinity College.

### For enquiries please contact Leo at sales@centralworking.com or call 07841 760 010

## Linguamatics and Sinequa join forces to deliver deeper insights in life sciences

Linguamatics, a world leader in natural language processing text mining, and Sinequa, a leader in cognitive search and analytics, have announced a partnership based on a tight integration between Linguamatics' I2E platform and Sinequa's ES platform. This integration will provide life sciences and healthcare organisations with deeper insights from their everincreasing volumes of enterprise unstructured textual data content across the entire enterprise.

Linguamatics' I2E text mining platform enhances the Sinequa Cognitive Search & Analytics platform with its advanced text mining capabilities, providing an unparalleled foundation to build upon in life sciences. The combined strength of both platforms helps users get more precise, actionable and contextual information in their field.

"The integration of I2E with Sinequa ES allows users to surface more relevant results and increase speed to insight. The semantically enriched data that I2E provides complements Sinequa ES, using key biomedical concepts such as drugs, diseases, anatomy, genes and genetic mutations, chemical structures, numerical data and many others," said Phil Hastings, chief business development officer, Linguamatics.



Linguamatics and Sinequa provide semantic search solution



To have won Red Dot Design Awards two years in a row is a fantastic endorsement of the world-class expertise of our product designers," said Dr Matthew Allen, head of drug delivery at Cambridge Consultants.

### World-beating design from Cambridge Consultants

Product design and development firm Cambridge Consultants has won a prestigious international Red Dot Design Award for the second year running. It has also been named one of the top design studios in the world – achieving fifth place in the design concept category of the Red Dot Design Ranking, which recognises the top 15 companies, design studios and universities that have continuously invested in design and innovation.

The 2016 award has been won by the Plug & Play wearable pump injector concept, which Cambridge Consultants has designed to make treatment with biological drugs safer and easier. It follows the success of the company's KiCoPen battery-free smart insulin pen concept in last year's competition.

The 'Red Dot' is one of the biggest and most illustrious design award



Dr Matthew Allen (left), head of drug delivery, and David Robinson (right) a principal industrial designer at Cambridge Consultants

schemes in the world. It is one of the most sought-after quality marks for excellent design – and regularly attracts around 5,000 entries from more than 60 countries for the design concept category.

www.cambridgeconsultants.com

## PragmatIC strengthens financial and commercial position with £18m strategic investment

PragmatIC, a world leader in flexible electronics, has secured £18 million of funding including a strategic investment from Avery Dennison, a Fortune 500 company with leading global positions in labelling and packaging materials as well as radio frequency identification (RFID). Avery Dennison joins existing shareholders Cambridge Innovation Capital (CIC) and ARM, who also participated in the round.

This investment in PragmatlC is expected to accelerate the mass deployment of intelligent packaging, with Avery Dennison leveraging the potential of PragmatlC's flexible integrated circuits (flexICs) in its inlays portfolio.

"Avery Dennison works with more than 10,000 converters, brand owners and retailers worldwide, making them an ideal supply



PragmatIC's flexible integrated circuits (© PragmatIC)

chain partner to deliver solutions based on our unique technology," said Scott White, Chief Executive Officer, PragmatIC.

The funding round supports PragmatlC's development and commercialisation of its FlexLogIC "fab-in-a-box" equipment. This modular system facilitates fully automated, high throughput production of flexICs, and is designed to fit naturally into the supply chain for a wide variety of intelligent packaging solutions. www.pragmaticprinting.com



500 dpi large area flexible fingerprint sensor

### FlexEnable and ISORG reveal highest-resolution flexible fingerprint sensor

FlexEnable, the leader in the development and industrialisation of flexible organic electronics, and ISORG, the pioneer in organic photodetectors and large area image sensors in printed electronics, are the first companies to jointly launch a flexible fingerprint sensor with 500 dots per inch (dpi) image resolution.

As the only flexible sensor technology that has achieved such high resolution, it is suitable for applications requiring standardcompliant fingerprint enrolment and/or identification. The optical sensor is ultra-thin, light and robust, and can be seamlessly integrated into products including fingerprint scanners, smartcards, mobile phones and wearables.

FlexEnable and ISORG have collaborated with Green Bit, a leading global provider of fingerprint scanners, to show that their flexible fingerprint sensor technology is ready for integration into products. The sensor has been paired with Green Bit's image enhancement software to prove its ability to create FBIcertifiable images. www.flexenable.com

Owlstone Medical and Imperial College collaborate to study underlying causes of asthma exacerbations

Breath analysis technology developed by Owlstone Medical will be deployed in an ongoing study led by Imperial College London to evaluate underlying causes of exacerbations in severe asthma patients.

Predicting and characterising patients who are likely to have an exacerbation despite optimal therapy is a critical step towards guiding patient management and improving outcomes for severe asthma sufferers.

Volatile organic compounds (VOCs) in breath have been shown to correlate to inflammatory subtypes in asthma, and can also discriminate between viral and bacterial infection, which are extremely relevant in treatment optimisation. Owlstone Medical uses the Respiration Collector for In Vitro Analysis (ReCIVA), in combination with the Field Asymmetric Ion Mobility Spectrometer (FAIMS) sensor platform, to accurately and



Owlstone Medical's ReCIVA Breath Sampler

selectively detect volatile organic compounds (VOCs) in breath.

Billy Boyle, co-founder and CEO at Owlstone Medical, said: "Characterising asthma exacerbations and predicting how patients will respond in certain situations will lead to improved treatment regimes, reduced hospital admissions and emergency treatments, and improved quality of life for asthma patients."

# Hyper active

# Exploring the power of virtualisation with Citrix

Ideas, innovations, new ways of working are

Staff at Cambridge Citrix are at the centre of IT

Innovating the technology behind the Cloud, Citrix is helping to shape the development of our virtual worlds. Catalyst talked to Senior Director of Development, Andrew Halley, to find out how.

"When you mention Citrix to people outside the industry, you usually get a momentary hesitation as they try to work out if they've heard of your company," says Andrew at Building 101 on Cambridge Science Park. "After a few second's delay, people most often say 'Oh yes, I use Citrix' and expand on how it has helped them in their work."

That's because Citrix is one of the world's leading enablers of the way we interface with our data and applications. Either through on-premises hardware or, increasingly, via the Cloud. Citrix technology allows people to work from home, or on the move, fast, with enhanced security and with all the information and apps they need. In fact, an estimated 75% of the world's Internet traffic passes through a Citrix NetScaler and XenServer at some point – a network acceleration box that can increase throughputs many times over.

"That speed-up is so powerful that no Internet company these days can afford to be without it," says Andrew. "It's opened up a half-billion-dollar market annual market for Citrix and uses an idea and components that come from Cambridge."

One of the core elements of the NetScaler is XenServer, an enabling technology that has driven the rapid growth of Cloud computing. The origins of this technology came out of XenSource, a local start-up from the Computing Laboratory at the University of Cambridge, which quickly evolved into a game-changer, as Andrew explains.

"Xen is what we call a hypervisor, which is a very specific piece of foundation technology that runs directly on top of an Intel chip for example," he says. "It's a very thin abstraction layer which allows applications and operating systems to be moved around, without those operating systems or applications knowing that they're being moved from one machine to another. What we do with XenServer is bring the power of Xen – running on individual chips – together into a hardened, missionall seen as part of the norm. The barriers for change are very, very low.



(image courtesy of Citrix)

critical product you can use to run rack after rack of servers collectively in datacentres and clouds.

"It was the crucial technology that actually enabled Cloud computing. It means you can have a datacentre with many different computers in it but you can manage it as a single combined computing entity. What it means is that you can have devices which don't have much processing power themselves, such as your smartphone, but which give you a feeling of depth, storage and processing power. That's because a lot of the heavy lifting, made easy by use of hypervisors, is done in the background in the Cloud or in a datacentre.

"You can use the analogy of multi-tenancy – where multiple people are using the same system, via separate operating systems running on the same computer. But critically, the tenants know nothing about each other's operating system – and never could. So, if one operating system is infected with a virus, it physically cannot attack the other one because the memories, devices, networks and storage are all separately partitioned."

Citrix was originally founded in 1989 with the mission of giving people access to their desktop computing functionality from wherever they were. This is done using their 'thin client' terminals – or low-processing-power computing devices. Nowadays those terminals are mobiles, tablets, laptops as well as desktops. Enabling the power of virtualisation is still at the heart of the Citrix offering, and was the reason behind the company's \$500 million acquisition of XenSource in 2009.

"It's really important for Citrix to have its own hypervisor and to have its own server virtualisation product," explains Andrew. "It gives us control over the complete stack, from the base (usually Intel or AMD) processors, right to the top, where the user interacts with our software. If you don't own the hypervisor layer, it's very easy for a competitor, who has their own, to sell their other products too which then sit on top. That's why Cambridge, with XenServer, is very, very important to Citrix as a whole – as a purveyor of a single stack of software – with customers who have just one number to call."

The ability to navigate and evolve with the market is critical in the fastmoving world of IT. For Citrix, it has meant, alongside acquisitions, partnerships with global giants such as Amazon, which uses the Xen hypervisor to run the Amazon Cloud as well as Rackspace and Softlayer who use XenServer, to name a few. Primarily an R&D centre for Citrix, Cambridge is at the forefront of the company's quest to remain one step ahead. One key area of current focus is graphics virtualisation, as Andrew explains.

"The graphics cards inside many devices are now very powerful," he says. "Almost all the animation effects that you see on your phones and your computers nowadays are powered by the graphics processing unit. We, in Cambridge, have managed to virtualise that function, which gives multiple users access to the single powerful graphics processors or cards that are in many high-end servers.

"We now have two companies in the Formula One business, who use that technology to design all their racing cars. They can be at trackside as the driver is going around the track and realise that they need to tweak a mechanical part. By accessing their high-end graphics functionality from wherever they are in the world, they can send a modification to a factory for a modified part and have it shipped, in the car and on the track the next day.

"So allowing multiple people to access graphics cards and chips in highend servers rather than you having a dedicated server all to yourself -I think this is something that's going to change everything from the gaming industry to high-end CAD/CAM three-dimensional modelling – bringing it from the specialist user to the masses."

Looking forward, the team in Cambridge is also focused on the continued evolution of the Cloud, in particular in relation to scalability.

"The big challenge is to manage that transition from on-premise to the Cloud in as smooth a way as possible," says Andrew. "Most of the world's IT products were written for running on your computer, but now it's no longer necessarily your computer they run on. You still want to keep all that functionality but you want it to be run on the Cloud and you need it to be elastically scaled and secured.



Designing software that people want to use – not have to use (image courtesy of Citrix)



Cambridge, through XenServer, is very, very important to Citrix as a whole – as a purveyor of a single stack of software.



The Citrix stack reaches from the bare-metal to the Cloud (image courtesy of Citrix)

"So for example if you normally have 50 users running Citrix software in the Cloud, then you have a big rush on at Christmas, you might need to ramp up to another 10,000 users. You want to be able to to suddenly clone and duplicate all those services on that Cloud just for one month and then shut it down in January when the Christmas sales are over. The ability to move things to the Cloud and to scale elastically in a secure way – that's one of the greatest challenges we're working on now."

Certainly there seems to be a culture at Citrix that will allow its people to respond to such a challenge. "It's a very free and open company to work in," says Andrew. "Ideas, innovations, new ways of working are all seen as part of the norm. The barriers for change are very, very low. It's seen as a part of our daily job, to try and work out ways to do things better. The kind of conversations you have here are really stimulating – people build on your ideas and really make things happen."

Global interaction is also helped by the fact that, in Cambridge, the team is literally right in the middle of Citrix's global time zones. "Citrix is a global company but our R&D sites are mainly on the West and East Coasts of the USA, in the UK, India and China," says Andrew.

"Because we're in a central time zone here, we're one of the few sites where the time zone matches with all the others. We work with the Chinese in the morning, the Indians by midday, an hour later the East Coast Americans come online and we finish the day with the West Coast of the USA. It gives us a feeling of continued pace and excitement throughout the day. It's great when you arrive in the morning and see that some bright person in China has already been thinking about an idea for five or six hours. So here in the UK, we're a central part of that worldwide innovation."

www.citrix.com

## The games changer

# A new way of doing business at Frontier Developments

A lot has changed in the eight years since Catalyst last spoke to video game developer Frontier Developments. David Walsh, Chief Operating Officer, talks about the evolution of the gaming market, changing business models and the future of entertainment.

"In 2008, when we previously appeared in Catalyst, the global gaming market was worth around \$50 billion," says David. "This year its's predicted to reach \$100 billion, so it's effectively doubled in eight years. The market is booming." Alongside this rapid growth has come some inevitable changes in the ways people are now playing and accessing their games.

"If you look back to 2008, it was very much a console-dominated industry, so Xbox 360, PlayStation 3 and the Wii were flavour of the month," says David. "The iPhone 3G was launched in 2008, so it was really the beginning of what we now take for granted – connectivity for everyone.

"Connectivity has transformed things. There are obviously more gamers now on mobile devices – mainly they are more casual users. At Frontier Developments, we've always had a really strong expertise in PC and console games and they still make up the majority of worldwide gaming revenue via digital download. It's where our core expertise lies – the high production values and engaging gameplay that gets people sucked in and wanting to continue to play the game."

While the values remain the same, autumn 2016 marks a pivotal moment in the company's history. Previously, Frontier Developments had worked as a provider of games to publishers such as Microsoft and George Lucas' LucasArts, receiving a royalty share of the revenue after development costs were recouped. However, with the launch of Planet Coaster in November 2016, the company completes the transition from business-tobusiness to business-to-consumer model, as David explains.

"That change has been driven by the rise of the Internet, which has meant that distribution is far easier to do digitally. It's lowered some of the entry barriers for developers like ourselves in terms of not having to make a massive stock of silver discs and ship them around the world. I think there is an acceptance of digital download among consumers now which has probably been driven by the mobile phone industry with the App Store. That's really permeated the rest of the industry."

In 2013, the company was listed on the AIM market of the London Stock Exchange with the purpose of generating the necessary funds to take advantage of the self-publishing opportunity. "We've seen a

lot of changes, but the company's business is still the same because fundamentally what we're about is making great games," says David.

"We have a huge track record of very successful games in many different genres, but the difference now is that we're doing those on our own ticket. By taking that risk we get greater financial reward and total creative control of what we're doing. We are still doing what we know we are good at, plus we've also had to add to the organisation in some ways to take the step to self-publishing, for example adding customer support and marketing functions."

Building the Frontier Developments brand for a consumer market has been made easier in part in thanks to the huge success of Elite Dangerous. Described as "the definitive massively multiplayer space epic," players are in charge of their own starship in an "evolving, connected, cutthroat galaxy". The game is a 21st-century reboot of Elite, a space game co-developed in the 1980s by the founder of Frontier Developments, David Braben.

"Elite Dangerous has been the first really successful game that is our own self-published franchise," explains David Walsh. "We initially started to bring the game through a Kickstarter crowdfunding campaign. Although we also then went to the stock market to get money to fund the rest of our transition, we haven't really touched much of it due to the success of Elite Dangerous. But the funding was still very important for us, because it's allowed us the confidence to make the decisions we needed to."





The UK has always produced some top people in software and computer science, but it's great that as time has gone on we've begun to see some top commercial people coming through as well.



Officially launched in December 2014 and having sold more than 1.8 million franchise units to date, Elite Dangerous is helping to redefine the way Frontier Developments approaches game development. "One of the fantastic things about the digital age that we live in is that the barriers have disappeared between us as the creators of games and our customers, the players," says David.

"One of the biggest innovations that we're trying to do in Elite Dangerous is with story. So rather than have a fixed story prescribed by us, the story is actually being driven by thousands of our players' actions and choices in the game. The interaction we've got with our community is huge, and I think we're right in at ground zero for this kind of technology, which we think will be important to the future of the entertainment industry."

More recently, Frontier Developments launched Planet Coaster on 17 November, which has been described as the "spiritual successor" to RollerCoaster Tycoon 3, Frontier's hugely popular game revolving around the management of an amusement park.

"The Planet Coaster launch really marks the end of Frontier's transition process," he says. "Our revenue is coming from two franchises that we have independently developed and published ourselves. We now want to substantially grow this company into one of the major players in the entertainment industry. The way we're going to do that is by building the number of franchises we have, as well as supporting Elite Dangerous and Planet Coaster going forward. These start life as games franchises, but



actually they ultimately are more broadly entertainment franchises."

Having previously worked for leading microprocessor technology experts ARM, David is aware of some of the challenges involved in such large-scale aspirations. "The UK has always produced some top people in software and computer science, but it's great that as time has gone on we've begun to see some top commercial people coming through as well," he says.

"I think the key for us is to have our heads up and have a global vision of what we're doing. Now that some of the barriers have come down, it's about seeing the opportunity and taking it. We've got demonstrably world-class game development skills, and I think we're building world-class publishing skills as well.

"We're really working on building our community, so we do a lot of live streaming each week. At a recent games show called Gamescom last August in Cologne, we did 30 hours of live streaming – we were almost like a temporary TV station. The way our audience can interact and influence what is going on with the game is a really interesting model for how the entertainment is going to develop in the future. You can see from shows such as *The X Factor* that there is a real appetite for interactivity, but I think we're developing much richer ways of doing this in the gaming industry.

As for inspiration, there is plenty to go around. "The people in the company are phenomenal," says David. "It's a really exciting mix of the technical and the artistic – it can be quite intoxicating. When I joined, we were 20 people working in a farmhouse outside of Cambridge and now we're around 300 on Cambridge Science Park. I'm very much a part of this team which is trying to deliver this amazing future for the company. And the future starts each morning, doesn't it?"

www.frontier.co.uk



The way our audience can interact and influence what is going on with the game is a really interesting model for how the entertainment is going to develop in the future.



All images © 2016 Frontier Developments plc.

### **Arthur D. Little**

# Who says it can't be done?

## Anticipating the future with Arthur D. Little

Arthur D. Little, the world's first management consulting firm, has been joining the dots between strategy, innovation and technology for 130 years. Catalyst spoke to one of Cambridge Science Park's longest-serving tenants to find out how.

"'Almost nothing is not our business.' I was told when I joined Arthur D. Little back in 1989, and that's certainly been true in my experience," says Richard Clarke, Director of the firm's Risk Management Practice based on Cambridge Science Park.

"Looking at our global service offerings, there are broadly speaking four: strategy and organisation; operations management; technology and innovation; and risk, which we run from our office here in Cambridge and an office in Milan. Vertically, we tend to specialise in technology-intensive sectors, for example: telecoms, information, media and electronics; energy and utilities; automotive and manufacturing; chemicals; healthcare; and travel and transportation."

The firm first opened its doors in 1886, founded by Arthur Dehon Little – the world's first chemical engineer and a former lecturer at the Massachusetts Institute of Technology. Now with 33 offices worldwide, it was more recently the first management consultant to move back into Tehran. Richard explains how the Cambridge operation came into being.

"For about 60 years, Arthur D. Little has been operating in the environmental, health and safety and risk space," he says. "We helped the US Environmental Protection Agency develop many of their protocols for auditing corporations worldwide. And it was our firm which conducted the investigation into the Bhopal gas disaster in 1985.

"Originally, in the UK, Arthur D. Little was based solely in London. In the

our expertise and those of Cambridge Consultants – we were in common shareholding at that time. So in 1989 we relocated a team to Cambridge and we were originally located on their site. Our common shareholding continued until 2012 and we continue to work in partnership with Cambridge Consultants from time to time." "Our work here is focused on helping clients to assure risk or unlock the benefits of risk in terms of strategy or operations. Progressively, it's been the safety work which has fuelled much of our work up to the present day. But we also work very much as part of the global operation. Increasingly our staff here are engaged with other parts of Arthur D. Little all over the world to help them with broader risk assignments within their client work. So we look at and help clients work on the risks that would prevent them from reaching their business goals."

The scope of the Risk Management Practice's work is vast. For example, it developed the prototype railway safety case for the UK rail industry when it was privatised and has since drawn on this expertise to undertake rail projects worldwide. In Hong Kong, for example, it has been contracted to assure the safety of the Mass Transit Railway Corporation's signalling systems for the last 27 years – and also for the next ten. It is currently working with one of the world's top ten oil and gas producers to provide strategic and operational assurance to the integrity of its onshore refineries, plants and equipment. In Europe, it is also helping a Belgian utility provider to strengthen its risk management processes and better ensure that it can meet its strategic goals.

"We've got a team of 20 people here in Cambridge," explains Richard. "More than half of them have some kind of engineering degree or background, whether that's chemical, mechanical, electrical or civil engineering, as in my case. The way engineers think is important to the work we do here not only in Cambridge, but also across Arthur D. Little globally. But beyond that we have some diverse skill sets – we have psychologists, geographers and biologists as well, for example."

A management buyout of the firm in 2012 marked the beginning of a new phase for Arthur D. Little. Rick Eagar, Partner and Global Leader Technology and Innovation Management, describes how this has developed.

There's just a huge variety in the clients we work with, the people we meet and the services we provide. Richard Clarke, Director, Risk Management Practice



"I think consulting firms generally work much more effectively as true partnerships rather than as subsidiaries of bigger corporations," he says. "That's because if you want to be global, you need to have a really good culture of co-operation and a partnership is one way to achieve that.

"In terms of profit margin, we've grown every year since 2012. Revenues are also up almost 15% this year. We want to accelerate the growth of the firm and in particular we have something called the Breakthrough Programme which is all about making step changes in some of the things we do – how we operate, how we work with clients, the types of products and services that we offer. One of my roles is to ensure that we have a pipeline of innovative products and services that drive growth.

"We're expanding particularly in the US, with a new office in San Francisco, and we're also now in Istanbul and Tehran, as Richard mentioned earlier. If we look at how businesses operate these days, it's all about speed and agility. It's about being first into new technology areas and being able to adapt quickly to very rapidly changing needs.

"Looking at our consulting business, a lot of what we do is about anticipating future technology trends, understanding where R&D is going, and applying that knowledge to help companies innovate. In a sense, we're co-innovating with them – in many cases, transforming organisations. 'Anticipate, innovate and transform' – this is something we talk a lot about. Digital transformation is an increasingly large part of our business. For example, we've done a huge amount of the smart city strategy for Dubai, which is one of the most forward-looking cities in the world." For the Risk Management Practice, the newly reinvigorated ambitions of Arthur D. Little are evident. "We see two big opportunities for us going forward," says Richard. "The first is to expand our services beyond our core expertise in safety risk consulting. That still occupies around 80% of the work we do, but we're building our experience and credentials in other kinds of risk. The second opportunity is to work more closely with our colleagues worldwide, so that we can deliver risk-based strategic advice in tandem with them. We're helping companies bring risk management into some of their broader processes, enabling them to foresee their material risks and to manage and assure them effectively."

Having been with the firm for the best part of three decades, Richard and Rick are well placed to understand what makes it different. "Nobody is pigeon-holed here, there is a very collaborative culture and it's incredibly varied and fantastically interesting," says Rick. "A lot of people who have left the firm come back later. I think it's to do with the fact that we're quite entrepreneurial, so there's a lot of freedom. If you have a passion to pursue something, and you can make a decent business case for it, you can probably pursue it."

Richard is quick to agree. "We used to have a brochure for our staff which said 'There's no such thing as a typical day,' he says. "There's just a huge variety in the clients we work with, the people we meet and the services we provide. Looking back over 27 years, I've had this wonderfully rich exposure to different countries, cultures and challenges. There is a famous question posed by our founder that our current Chief Executive is also keen on asking: 'Who says it can't be done?'. That kind of says what this firm is all about." www.adlittle.com



Above: Working with MTR CrossRail to optimise peak passenger flows. Photography credit: Stephen Watson (Arthur D. Little staff member) Main: International prequalification of rail business located on the shore of a frozen sea, north Sweden. Photography credit: John Barker (Arthur D. Little Cambridge staff member)



If we look at how businesses operate these days, it's all about speed and agility. It's about being first into new technology areas and being able to adapt quickly to very rapidly changing needs.

Rick Eagar, Partner and Global Leader Technology and Innovation Management

# Darkite



### 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 twitter: @camawise linkedin: http://www.linkedin.com/groups?gid=43043

### 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 the leading student-run technology and entrepreneurship society at Cambridge University. Supported by advisors in the local business community, we nurture and enhance the entrepreneurial spirit amongst academics and students and host an annual Technology Ventures Conference that brings together over 300 students, researchers and professionals. Founded in 2003, CUTEC now boasts 4,000+ members worldwide

#### web: www.cutec.org email: info@cutec.org twitter: @CUTEC

### 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 more than 470 member organisations 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 Twitter: @CamSciencePark Facebook: Cambridge Science Park LinkedIn: Cambridge Science Park

### Management

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

PR & Marketing **Julie Bushell** 

Julie.Bushell@bidwells.co.uk Tel: 01223 559331

Catalyst is designed by Simpsons Creative



#### Companies based on Cambridge Science Park

Abcam 330/200/204 Agenus 315 Amgen 240 Arthur D. Little Ltd 18 Astex Pharmaceuticals 436 AstraZeneca 310 Aveillant 300 Bard Pharmaceuticals Ltd 191 **Bayer Crop Science 230** Beko Plc 12 Bright Horizons 319 British American Tobacco 210 Broadcom 406 Cambridge Assessment 332 Cambridge Business Travel 325 Cambridge Consultants Ltd 29 Cambridge Electronic Design 4 Citrix 101 **Cryptomathic 327** Dassault Systémes 334-335 DisplayLink (UK) Ltd 140 Dr Reddy's 410 Eight19 9a Esaote 14 Espial Ltd 406 FlexEnable 34

Frontier Developments Plc 306 GHX UK Ltd 326 Grant Thornton LLP101 Hawkins & Associates Ltd 120 Heraeus Noblelight Ltd 161/163 Huawei UK Research Centre 302 Huber+Suhner Polatis Ltd 332 Jagex Game Studio 220 John Bradfield Centre 184 Johnson Matthey Catalyst 28 Linguamatics 324 Modern Water 15-17 Mundipharma International Ltd 194 Mundipharma IT Services Ltd 194 Napp Pharmaceutical Ltd 196 **Owlstone Ltd 127** Philips Research 101 Pragmatic Printing 322 **Revolution Health & Fitness Club 24** Ricardo UK Ltd 400 Roku Europe Ltd 205 Royal Society of Chemistry 290 Sigma Aldrich International Ltd 328/329 Spiral Software Ltd 101

Takeda Cambridge Neuroscience Ltd 418

**SRG 11** 

The Innovation Centre 23 The Trinity Centre 24 Toshiba Research Europe Ltd 208 Twist DX 181 Vectura Delivery Devices Ltd 21 Vix Technology UK Ltd 406 Worldpay Ltd 21 Xaar Plc 316

STOP

CITY CEI

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

One of the strengths of the region is the massive opportunity in the convergent space between life sciences and tech.

Harriet Fear, Chief Executive, One Nucleus and UK Business Ambassador for Life Sciences and Healthcare

Viewpoint

I first joined One Nucleus seven years ago and the time has flown! We're an international membership organisation for the life science and healthcare sector based in Cambridge. About 80% of our members are across the Cambridge – London corridor – Europe's largest life science and healthcare cluster – and the other 20% are from other parts of the UK and overseas.

The reason we exist is to deliver practical and tangible services to the membership, and our mission is to help our members maximise their global competitiveness. If you look at the dynamic of the life science and healthcare sector, most companies are SMEs and many need some sort of support in terms of making the right connections, meeting the right partners or getting the right funding. So we aim to act as the catalyst to support them with their international endeavours.

This region is really punching above its weight globally in this sector. There's so much happening. For example, the Wellcome Genome Campus is obviously a world centre for excellence in genomics and bioinformatics. It has big expansion plans and it recently opened a brand-new innovation centre. It already has a number of companies that have set up there and it's going to be a magnet for more.

One of the strengths of the region is the massive opportunity in the convergent space between life sciences and tech. Fascinating work is going on here into the personalisation of healthcare and the use of apps to help people manage their health better. What's interesting is that in Cambridge, and more generally, you have huge tech companies such as Google and Microsoft who are now developing a strong and clear interest in healthcare. We're focusing a fair bit at One Nucleus on that convergent, digital healthcare space right now, e.g. with a full stream of talks at our annual Genesis conference in December (www. genesisconference.com).

Each January, One Nucleus is a supporter of a major finance event at the London Stock Exchange, aiming to encourage generalist investors to take notice and invest in the sector. George Freeman, then Minister for Life Sciences, declared at the event that if we look back in 20 years' time, we'll see this as a golden age for life sciences. In many ways, the sector is in rude health at the moment. But, of course, there are uncertainties, not least the impact of Brexit on the UK economy. What I would say is that this is a sector that is extremely resilient and used to overcoming adversity. It's always been a challenge to find sufficient funding, to attract the right talent and to keep it. So I believe that the people who are leading many of these companies are very wellpositioned to deal with challenges that arise

At a rough estimate I would say that between 30 and 40% of the staff in many of our member organisations come from outside they UK. The pressure on the chief executives of these organisations is how to make these people feel valued and secure despite the current political uncertainty in the



UK. In terms of my role as a UK Business Ambassador for Life Sciences and Healthcare, one of the things that ministers have stressed to me is that they're really keen for investors and overseas companies to know that the UK is still very much open for business. In fact, because of the exchange rate, some of our contract research organisations are doing particularly well at the moment. But obviously there are also challenges to be overcome.

At One Nucleus, we can respond by making sure that we're always delivering the highest quality services for our members. The sector is constantly changing and so we need to reflect that and keep apace. We are very mindful that we need to constantly refresh and make sure that we're ahead of the game for our membership.

My vision when I came into the company seven years ago was for us to be the top membership organisation in Europe in our sector. The team, our board and I were therefore delighted when we won two international

"

awards this September – 'Best Global Life Sciences Membership Organisation' and 'European Life Sciences and Healthcare Not for Profit Organisation of the Year 2016', awarded by *Global Health & Pharma* magazine – so it would seem we're doing something right!

It's still really exciting to play a part in supporting our sector. Our members are working on groundbreaking therapies and healthcare outcomes for patients. It's thrilling to be able to witness that, to see companies growing and to be able to support them with their endeavours. www.onenucleus.com

Harriet Fear, was appointed a Member of the Order of the British Empire (MBE) in the Queen's Birthday 2016 Honours List. The award is in recognition of Harriet's services to the 'healthcare and life sciences' sector.

Our members are working on groundbreaking therapies and healthcare outcomes for patients. It's thrilling to be able to witness that, to see companies growing and to be able to support them with their endeavours.

