

The Ring

THE JOURNAL OF THE CAMBRIDGE COMPUTER LAB RING

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Ring news

Changes to the Ring's Web site

Following the constitutional and operational changes to the Cambridge Ring (see *The Ring* Issue XXX), information about the association and answers to FAQs can now be found on the Computer Laboratory Web site at www.cl.cam.ac.uk/ring/. The Ring also has its own e-mail address: cam-ring@cl.cam.ac.uk.

The main change in the move to the Lab's Web site is the method by which members post job ads. Those wishing to advertise a job can post jobs within the Cambridge Computer Lab Ring group on LinkedIn. Or, for those who don't want to use this route, details of vacancies can be e-mailed to cam-ring@cl.cam.ac.uk for distribution in the weekly CamRing e-mail updates. Either way, letting fellow members know about job opportunities remains simple.

Join the 2013 celebrations

The Computer Laboratory will be holding a special event on April 24th 2013 to celebrate 75 years of the Computer Laboratory at the University of Cambridge and the centenary of the Cambridge computer pioneer Professor Sir Maurice Wilkes.

Master of Ceremonies, Professor Andy Hopper, will conduct the proceedings which start at 14:30 with the Wheeler Lecture. The Wheeler Lecture is an annual distinguished lecture named after David Wheeler, one of the early pioneers of Computer Science.

The lecture will be given by Professor Sir Tony Hoare.

Sir Tony received the ACMA Turning Award for "his fundamental contributions to the definition and design of programming languages." As a member of both the academic and industrial spheres, Sir Tony keeps a balance between scientific theories and practical applications. After his retirement from Oxford he started working at

Microsoft Research in Cambridge where he combines both worlds while promoting his Grand Challenges for computer science.

The lecture will be followed at 15:30 by refreshments and the launch of *Cambridge Computing: The First 75 Years*. The book, written by Professor Haroon Ahmed, is an extensively illustrated, readable and informative account of computing in Cambridge from Babbage to the present day.

At 16:30 Dr Mike Lynch will deliver the Innovation Lecture.

Dr Lynch OBE, FREng, the software entrepreneur whose company Autonomy Corporation was sold to Hewlett Packard in October 2011 for US\$10.3bn, is planning start a technology investment fund. It is said that the fund will be based in London but will invest in technology start-ups around the world.

The afternoon's event will culminate in an Innovation Discussion Panel with four distinguished speakers.

The day's celebrations will finish with the annual Ring dinner at Queens' College. If you have attended the dinner in the past, we hope to see you again. If you have not been able to join us for the dinner before, we hope you'll come. The dinner is a happy occasion and a chance to meet up with old friends and to make new contacts, knowing that everyone present shares a passion for Cambridge and computing.

While not everyone will be able to attend all events, we hope to see many of you throughout the day and in the evening.

As capacity is limited, please book for the events you wish to attend. See page 12 for details.

Events calendar

2012

October

Thursday 4th, 6.30pm
London Ringlet Bar
Venue to be confirmed

December

Tuesday 4th, 6.30pm
London Ringlet Bar
Venue to be confirmed

2013

April

Wednesday 24th, 14:30
75th Anniversary Celebrations
Booking details on page 12

Who's who

Mark Ashdown (CHU BA99 PhD04) is now working at Google as a software engineer.

Harry Barman (K PhD90) is a director at Credit Suisse where he runs a technology team in Fixed Income trading.

Ted Briscoe, Professor of Computational Linguistics at the University of Cambridge Computer Laboratory, and **Tony Robinson** (TH BA84 MPhil86 PhD) have co-founded Capito Systems Ltd. Capito Systems combines speech recognition and natural language processing to provide world-leading solutions in contextualised speech recognition applications.

Ted Briscoe is also on the advisory board of Hall of Fame company TouchType Ltd, which has developed the award-winning SwiftKey text entry app for smartphones.

Louis Budworth (HOM BA06) is working for Arcus Global as operations manager.

David Carter (K Dip80 PhD86) is working as a software engineer at Google in London.

Suranga Chandratillake (K BA00), founder, president and chief strategy officer of blinkx, has been elected a Fellow of the Royal Academy of Engineering in recognition of his contribution to multimedia content discovery.

In June 2012, Suranga was awarded a coveted Silver Medal from the Royal Academy of Engineering for advancing the cause of British engineering through the development of blinkx, the world's largest and most advanced video search engine.



Suranga Chandratillake receives his RAE Silver Medal

The Silver Medal awards celebrate the strength and diversity of UK engineering and are given to those who have achieved significant commercial success in their fields.

Chris Charlton (Q BA93 PhD99) works for Hall of Fame company SwiftKey where he is senior software engineer.

Peter Cowley (F MA77) and **Nat Billington** (Q BA92) were mentors at the Qi3 Accelerator Bootcamp in July 2012. The Cambridge-based Bootcamp centred on Qi3 Accelerator's rigorous investment evaluation process and challenging interaction with mentors. The Bootcamp attracted over 30 expert mentors with specific backgrounds in high-value manufacturing and advanced engineering.

Shaw Chuang (K PhD00) is Executive VP of engineering at Virtustream in the San Francisco Bay Area.

Geoffrey Cross (CHU MEng96) is a senior quantitative developer at a hedge fund.

Akber Dattoo (EM BA00) is a partner at D2 Legal Technology, a company he founded in 2011. D2 Legal Technology advises and implements document generation and data

extraction from large document portfolios consisting of ISDA Master Agreements, other relationship-level legal agreements and transactional documentation.

Saar Drimer (PhD09) has recently started at BERG where he is a hardware design consultant.

John Garbutt (CC MA06) is a senior software engineer at Citrix Systems. John is also a founding member of the Corona Brass Quintet, for which he plays the tuba.

Liam Goddard (CHU BA04) is a private equity executive at Fusion Investments Ltd, an Africa-based private equity firm.

Alex Howard (EM BA03) is working in strategy development for the Royal Mail Group.

Henry Hughes (JE BA11) is working at Hall of Fame company Acunu, where he is a software engineer.

Alan Jacobs (CAI MA76) is working as a technical consultant at Comply Serve Ltd.

Laura James (CC PhD05) writes "After a very busy 2011 at True Knowledge (now Evi Technologies) designing and building Evi (www.evi.com/app/), this year I'm devoting myself to getting Makespace (makespace.org) off the ground. It's a slower process so far than I'd like, but I hope to have the lease for our premises sorted by early September. I'm also supporting the operations of the Open Knowledge Foundation and helping Dr Sue Black to set up the <Goto> Foundation (gotofdn.org), a new organisation created to promote technology as a vital part of our society and our economy, by changing the public perception of computing."

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The Ring is the journal of the Computer Lab Ring, which is the graduate association of the University of Cambridge Computer Laboratory.

Chi Keong Lee (T BA99) is a portfolio manager at GAM, an independent investment management firm.

Henry Jong-Hyeon Lee (W PhD00) is a senior manager in the office of the Chief Information Officer for the Province of British Columbia, where he is responsible for the development of the information security programme, the management of the information security policy and security research.

Angus Lepper (Q BA12) has recently joined Cisco Systems as a software engineer.

Anton Lokhmov (R PhD08) works at ARM where he is the GPGPU compiler team lead.

Derek McAuley (F Dip85 PhD90) is Professor of Digital Economy in the School of Computer Science and Director of Horizon at the University of Nottingham. Horizon is a research institute in digital economy research.

Ahsan Mir (ED Dip03) works in security and risk management at Autodesk in the San Francisco Bay Area.

James Montgomery (EM BA) works for TomTom International BV in the Netherlands where he is head of testing for the TomTom Consumer Business Unit.

James Moore (DOW BA05) sits on the board of Red Gate Software Ltd's US subsidiary, where he helps to oversee Red Gate's US sales operation.

Lars Nielsen (CHU BA87) is working at NHS Dudley PCT as a consultant SharePoint developer.

Leon Palm (CTH BA09) has left Google and now works as a strategy developer at Virtu Financial in Santa Monica, California.

Valeria de Paiva (LC PhD90) is a lecturer at Santa Clara University.

Christian Richardt (CAI BA07 PhD12) is now working at Disney Research in Zurich.

Chris Salt (F MA02) is a project manager within Finance Technology at RBS Markets and International Banking.

Glen Slade (JN BA87) is working at Oxitec as head of business development.

Emma Smith (T MSci10) is a senior engineer at Audio Analytic in Cambridge.

Charles Southey (T MA90) is CTO at Sprint Enterprise Technology Ltd.

James Steele (F MA04) is a senior software engineer at Riverbed Technology.

Mark Stringer (RA04) is helping Fry-IT with its Agile project management processes.

David Thompson (Q BA05) is a developer at the Government Digital Service. The Government Digital Service is a team within the Cabinet Office tasked with transforming government digital services.

Andy Twigg (K PhD06), founder of Acunu, is a Junior Research Fellow at the University of Oxford.

William Walker (CTH Dip04) is a senior technical product manager at Amazon in Seattle.

Vince Woodley (DAR Dip89) is deputy head of User Services at the University of Cambridge Computing Service.

Health2Works



Roger Marlow (CHU BA91), co-founder of Health2Works, explains how he is helping the NHS move into the 21st century.

TR: Roger, before we discuss Health2Works, can you tell me a bit about your career? You've worked for some large corporations (Logica and Credit Suisse among others). What made you go it alone and start your own company?

RM: I have spent all my career in software development, doing lots of interesting things but under the banner of other people's companies and mainly on projects that were buried inside large corporations that were of limited visibility or use to the wider world. I wanted to see if I could put what I knew to use and make a bigger difference.

TR: Where did the idea for Health2Works come from?

RM: It came from Steve Pashley, Health2Works' co-founder. He worked for over 20 years with the NHS, mostly as an independent consultant facilitating conversations between NHS Chief Executives and senior clinicians and managers. He had no technology training but was finding it easy to use the Web in quite sophisticated ways to run his own business. It occurred to him: why wasn't the NHS doing the same? Yes the NHS was spending money on IT — lots of it — but it was not resulting in the kind of differences for patients and front-line staff that Steve was experiencing in his business.

We hear a lot about the "Great Firewall of China" but a fair proportion of the 1.7 million NHS employees have such restricted Internet access that they cannot get anything like its full benefits

For many in the NHS IT was something done "over there" in seemingly endless programmes with clouds over them. IT was what other people had. Steve wanted to make a change but needed to team up with someone with technology experience, and so we started Health2Works together, to find ways of helping the NHS catch up in its use of the Web.

There was a proliferation of Web 1.0 sites which were effectively on-line leaflets but the real difference for end users comes with Web 2.0 — interactive web applications with user-generated content. We also wanted to demonstrate that good software projects can be run in ways that do not cost a lot of money, nor need a lot of process and bureaucracy, but can still make a big difference.

Another influence, which gave us the company name, is the Health 2.0 movement in the US where people are applying Web 2.0 principles to healthcare and changing the balance of power with big US healthcare providers. Steve went to San Francisco to meet the person at the centre of the Health 2.0 movement, Matthew Holt, who we were amused to learn was a Brit too. Inspired by what was happening in the US we set out to replicate it in the UK but in a way that was appropriate for the UK and the NHS in particular. We wanted to do it less adversarially, *with* the NHS rather than *to* the NHS.

TR: At the BCS Health Informatics Conference in April 2010, you said that "A typical NHS manager has less freedom on the Web than a Chinese farmer. What did you mean? Were you confident at the start that the NHS would embrace web-based tools?"

RM: Since starting Health2Works we have seen a lot of the NHS and we have been staggered at how disconnected it is from the Web. It is often seen by informatics departments as being risky and pernicious and therefore to be kept away from NHS employees and patients. Clinicians making life-changing decisions or managers running £100m budgets are not trusted to read Wikipedia, watch anything on YouTube or contribute to forums where patients discuss their conditions. And outside the NHS, if you want to enquire about your relative in an NHS bed, forget e-mail or social media: you have to ring the ward and hope someone will pick up the phone and take a message. We hear a lot about the "Great Firewall of China" and the ills of restricted freedom of expression and access to information, but a fair proportion of the 1.7 million NHS employees have such restricted Internet access (with the added hindrance of IE6) that they cannot get anything like its full

benefits. The specious justifications of “safety” or “information governance” or “risk management” give the same sorry outcome as the Great Firewall.

Were we confident that the NHS would embrace Web-based tools? We could not be sure, but we knew that it had been adopted by every other industry and sector so we took the view that it was a case of when, not if, it would take off in the NHS. There were pockets of innovation and a handful of insightful leaders, such as Mike Farrar, now Chief Executive of the NHS Confederation, that showed that progress was possible. We also knew that the Web was so well established in common culture that far from being new or specialised it was now almost boring. This meant that commonly used arguments against its use based on novelty or lack of evidence were becoming weaker. And we also knew that increasingly NHS employees were getting around restrictions at work by simply using the Web from home or on their mobile phones. At the same time, quite apart from the rise of the Web, the NHS was, and continues to be, under pressure to reduce costs, support self-care for long-term conditions and modernise the way it offers its services. We knew that the Web could play a significant part in all of these. We couldn't be sure — no business can — but we saw a lot of influences at a whole system level all pointing in the right direction.

TR: Can you tell me about Health2Works's Web 2.0 Accelerator Programme?

RM: It is easy to complain about use of the Web 2.0 in the NHS but at some point you have to say what you are going to do about it. The Web 2.0 Accelerator Programme is our answer. Its first incarnation was sponsored by NHS North West and ran in four stages: Idea Solicitation, Validation, Construction and Adoption. We were not trying to find the one “killer application” but rather demonstrate how broadly the Web could be applied to healthcare. We ran several Idea Solicitation workshops in a variety of settings, each with a different theme and with a varied audience, usually about 50 members of the public and NHS employees. One was themed “Young People and the NHS” run in a school in Preston; another titled “End of Life” at a care centre in Liverpool; another on “Primary Care” in a GP surgery in Cheshire; and another on “Saving Money” with finance directors and managers at a large hospital in Salford. In total we collected over 250 ideas from 8 workshops. In the Validation phase we distilled those ideas down to 19 potential applications and brought them to life with wireframes and simple HTML or even PowerPoint mock-ups. These were presented back to potential users for feedback and validation. Essentially we needed to know, from the people who would use them, whether they would make a difference but without having to go through the expensive business of writing software to find out, especially if the answer was No! Eleven ideas went forward to the Construction phase. We used Ruby on Rails, deployed onto the cloud-based Heroku service, and used a process based on Agile methods to involve the users and

build the applications rapidly and with the minimum of bureaucracy but still producing well-engineered, scalable software. In the Adoption phase the users involved in Construction took the applications back to their work places for piloting. The overall programme was delivered in just 18 months. It has subsequently been repeated with a focus on mental health and delivered another five applications in seven months.

TR: How big are the projects? Can you tell me about some of them and how they have offered benefits not only to NHS organisations but also to clinicians and patients?

RM: We purposely kept the projects small — each typically spending £5k–£30k and delivered in 2–5 months. We also preferred ideas for citizen-facing applications as we felt this played to the strengths of the Web. And because the NHS had funded them they should be free at the point of use where appropriate. Consequently you can try out some of them for yourself. For example RallyRoundMe.com supports family and friends who are caring for a loved one and helping them to stay independent for longer, especially frail elderly relatives with dispersed friends and families. CCG-Connect supports GPs in their new roles as commissioners by giving them a platform for communication with the public they are commissioning on behalf of through polls, surveys, blogs and forums. You can see examples at South-

We see enormous opportunities for Web-related productivity gains in the NHS. It is easy to find literally hundreds of ways to usefully apply the Web in healthcare

CheshireHealth.org.uk and SandbachGPs.co.uk. A favourite of mine is “Ollie”, a tool for Speech and Language Therapists working with children. This could have been a high-tech speech recognition system but it turned out that what Speech Therapists really needed was a way to encourage the children to do their exercises between appointments. Ollie is therefore a Web-based homework diary where parents record the exercises they have done with their children, with the reward for the child of a quick play on a CBeebies game at the end the practice, and the benefit to the therapists of being able to see who is doing well and who needs help or attention without having to wait six weeks until the next face-to-face appointment. Ollie gave rise to a similar application, “Howie”, for psychiatrists to monitor the recovery of their patients by having them answer questions about their mood on a validated scale every day. You can see a selection of the applications at health2works.com/products.

There was a variety of benefits. RallyRound helps people to live independently for longer which gives them a better quality of life, peace of

mind for their friends and family and also has a financial benefit from reduced need for residential care. Ollie has allowed Speech Therapy units to change the way they provide their service and thereby reduces waiting lists. It also gives the children using their service a better experience because it is more interactive, modern and fun. GPs tell us that CCG-Connect will lead to better-informed commissioning decisions. Our initial aim was to demonstrate how widely Web 2.0 technology could be applied to UK healthcare and we have seen a similarly wide set of benefits, and not just financial ones.

TR: You've also said that there are "enormous opportunities for Web-related productivity gains" in the NHS. Can you give me some examples?

RM: If you consider how much you use the Web both at home and at work — doing shopping, keeping in touch, looking something up, sharing all manner of documents and data, using specialised Web applications at work — and now imagine that all of that was taken away, think how much less productive you would be. That is where the NHS is, at a scale of 1.7 million employees and tens of millions of patients and carers every year. And that is why we see enormous opportunities for Web-related productivity gains in the NHS: reducing unnecessary visits; reducing paperwork; speeding up communications (why do you always have to ring for test results?) improving access to every kind of information in a variety of languages with low-cost Web video; sharing of experiences from patients and carers; reducing isolation and loneliness; increasing flexibility around how and when you can get access to healthcare (why do you so often have to phone for appointments, and during office hours too?) all the way out to public health and social care. As we found during our workshops it is easy to find literally hundreds of ways to apply the Web usefully in healthcare including numerous opportunities for improvements to productivity, service experience and quality of care.

TR: How was the Web Accelerator Programme funded? Are you looking for other investors?

RM: The programme was funded through a combination of NHS Regional Innovation Funding from Strategic Health Authorities: NHS North West and NHS Yorkshire & Humber, plus Hywel Dda Health Board and smaller grants from a dozen Primary Care Trusts and Mental Health Trusts. We are now looking for investors from outside the NHS.

TR: For most of us, the Web is an integral part of everyday life. What have been the challenges of working with an institution that has been slow to embrace new technologies?

RM: In many cases the technologies we are introducing are over 20 years old (around the time I graduated in fact!) so the issues are

cultural rather than technological. The cultural resistance has many layers. Perhaps the deepest is a desire to not "rock the boat" and perpetuate the status quo, expressed variously as aversion to "risk", "protecting" the NHS, a preference for governance over action, evidence-based policies, not being seen as partisan to commercial or technological interests, and so on. At a meeting with commissioners in Sheffield, a panel listened cross-armed to our presentation about supplementing paper leaflets with multi-lingual Web videos. At the end they pronounced: "Well it sounds very interesting, but we are convinced there is a problem with it, we just need to work out where." We asked when they last produced a leaflet: they hadn't managed to in the last two years as they couldn't agree on the wording. So in some cases adoption of Web technology is in a queue behind the adoption of even the printing press. This is not to say there are not pockets of innovation and some insightful and inspiring managers and clinicians — they are certainly out there — but given the immense size of the NHS, the world's fifth-largest employer, sporadic glimpses of innovation are not enough.

TR: What are your plans going forward? Where would you like to see Health2Works in two years' time?

RM: Through our Accelerator Programmes we have a pipeline of applications, many of which can be commercialised to the public and the NHS through a variety of models. Some may be spun off as separate companies in themselves. This is exciting but we are also cognisant of our strengths and weaknesses. We are good at finding ideas for the application of technology and bringing them to life as v1.0 validated applications. Large-scale commercialisation of those applications is probably best handled by others.

We are therefore looking to partner with other organisations that can handle the commercialisation end of our application pipeline. In particular we want to work with organisations that can operate at the size and timescales of the NHS which are a strain on a small company like Health2Works. One of the influences at our genesis was the Health 2.0 movement in the US and we see opportunities in the US and European healthcare markets too. Again we would hope to capitalise on this through partner organisations. In two years' time we would like to see the widespread use of Health2Works applications such as Rally-Round, applications which started life on Post-It notes in workshops in Manchester, Merseyside and Lancashire. Hopefully they will be widely used because people feel they make a difference to their lives.

For more information about Health2Works go to www.health2works.com/

Tadas Baltrušaitis



Automatic tracking and understanding of facial expressions

Facial expressions and head pose play a huge role in our everyday lives. Our faces reveal our inner emotional states. We use them to display intent and affection. When talking to others we use gaze and nods to regulate the conversation. Most of us are very good at interpreting the facial behaviour of others and reacting to it appropriately.

Facial expressions also play a role in interaction with inanimate objects incapable of interpreting such signals. Who hasn't shouted, or at least grumbled, at a computer screen or a mobile phone? Computers, however, are currently blind to such signals. Automated detection and understanding of facial expressions would allow us to build machines which adapt to the emotional states of users. For example, an on-line course could give more hints or provide more examples if it detects that a student is confused. Such a system could even be used for market research through the analysis of behaviour elicited when consumers interact with a new product, replacing or augmenting the traditional questionnaires. There are many more applications in e-learning, security, assisted living, entertainment, and healthcare.

A crucial step in the development of systems which understand facial expressions is the automatic estimation of head pose and detection of facial features, such as eyebrows, eyes, nose, and lips. Tracking these features allows us to analyse their structure, motion, and texture. These resulting signals can then be used with machine learning algorithms to build automatic emotion recognition systems.

Unfortunately, the tracking of facial expressions in real-world environments is still an unsolved problem. The current state-of-the-art approaches still struggle to perform person-independent tracking of facial features and head pose. The biggest unresolved issues are tracking in the presence of large variations in head pose, expression, and lighting, not to mention occlusions such as eyeglasses, facial hair, and headwear. Real-world environments, however, are full of these confounding factors. Our work is interested in this very challenging problem, as we attempt to move from a fully-controlled laboratory setting to the real world.

My colleagues and I at the Computer Laboratory's Rainbow Research Group have built a robust, real-time, person-independent head pose and facial expression tracker that outperforms the current state-of-the-art approaches. In addition to just using a standard video camera, our approach takes the advantage of the newly available depth sensors such as laser range scanners, time of flight cameras, or the Microsoft Kinect sensor. These sensors are able to detect the distance of the object to the camera; the pixels represent distance instead of light intensity. Most of the commercially available depth sensors are still bulky, require a dedicated power source, have range limitations or work only in indoor environments. The technology will inevitably improve and we will see better quality devices that are integrated into computer screens, tablets and even mobile phones. Depth is proving to be a very useful signal for a multitude of computer vision problems, and it is a reason for excitement in the research community.

We chose to use the depth channel as it has the advantage of not being affected by amount and type of lighting in the scene, making the tracking easier. Combining both the colour and depth cameras allowed us to build a reliable facial expression tracker, which is capable of tracking facial expressions in difficult real-world environments.

Now that we have the ability to track facial expressions and head pose reliably we can use the tracked features for automatic understanding of facial expressions of emotion. In the future, this will lead to systems that can better understand our emotional states and adapt to our behaviour.

Tadas Baltrušaitis is a PhD candidate at the University of Cambridge Computer Laboratory. His research interests include affective computing and human computer interaction.

Hall of fame news

Bango

Bango will make it easy to buy things on Facebook when you log into Facebook on your phone.

The payment tool works on the mobile Web version of Facebook, not in its apps, and Bango will get a cut of each click. More than half of Facebook's users worldwide use the social network on their mobile phones.

blinkx

Suranga Chandratillake, founder and CEO, has assumed the role of President and Chief Strategy Officer of blinkx and will continue to serve as the Executive Member on its board. Suranga is responsible for advancing the company's technology and product vision, and exploring new opportunities for growth.

COO Brian Mukherjee has been appointed CEO, and will be responsible for the overall leadership of the company.

BlinkPipe

Development has been moving ahead quickly. In August BlinkPipe got its first ten prototypes back from manufacturing and they were "alive" within days. They have been receiving "great support" from Red Gate Systems, and have a meeting room hooked up for video conferencing. They have been taken in an interesting direction by user feedback, and are also demonstrating a HD video window running full time.

For those unfamiliar with a video window, BlinkPipe suggests thinking of a pair of big screens that are permanently on and show what's happening at the other end. You can simply walk up to one window and talk to someone standing by the other window. BlinkPipe says that it's great for teams split across sites and that it creates a more connected feel for offices.

BlinkPipe is now starting to think about funding to take it from prototype to products ready for market. If you're interested in what it's doing and would like to see a demo, go to www.blinkpipe.com

Bromium

Bromium has raised US\$26.5 million in Series B funding. The raise was led by Highland Capital Partners with participation from new investor Intel Capital and existing investors Andreessen and Ignition. Bromium has now raised US\$37 million in funding.

Bromium has won Business Weekly's inaugural *Startup of the Year* award.

Embecosm

Embecosm has participated in a three-month open source research programme at the Department of Computer Science at Bristol University, investigating the impact of compilers on energy consumption in embedded systems.

The presentation on the project, given to the 2012 GCC Cauldron meeting in Prague, is available at bit.ly/PbZ75a

Global Inkjet Systems Ltd

Global Inkjet Systems has moved to a new 5,000 sq. ft. head office in Cambridge and has opened a new technical support office in Shanghai.

The extra space in the new head office will allow the company to expand its engineering team and also provide a larger R&D area, equipped with print rigs for every print head type that the company supports.

The new technical support office for the Asia Pacific region, based in Shanghai, marks GIS's growing customer base in the region and the need for locally based technical support.

Jagex

Jagex, makers of RuneScape — recognised by the Guinness Book of World Records as the most popular free-to-play multi-player on-line game — announced the opening of its highly anticipated combat beta *Evolution of Combat*. 50,000 testers have been selected from the hundreds of thousands of players who applied for access to the beta, and have been granted the opportunity to shape the development of the update.

Masabi

New York's MTA Metro-North Railroad, working with transit mobile ticketing specialists Masabi US Ltd., will begin testing a smartphone app that will let people buy their train tickets anywhere at anytime.

The technology will allow customers to use phones to quickly and securely buy and display electronic tickets.

Masabi US Ltd is also working with Massachusetts Bay Transportation Authority (MBTA) to introduce smartphone rail ticketing system this autumn. Masabi's technology also supports the future move to contactless near-field communications technology when compatible handsets become more widely available, allowing tickets to be checked or gates opened simply by tapping a phone against a reader.

Masabi's technology is used by 13 of the UK's transport agencies, including Virgin Trains, Cross Country Trains, Chiltern Railways and thetrainline.com.

Masabi has been named as a finalist for the 2012 Bully Awards honouring Europe's leading technology, media and telecommunications companies. A total of sixty European firms were selected from a pool of hundreds of nominated European TMT companies.

RealVNC

Telecom Cook Islands, the largest provider of fixed phone, mobile and broadband services to the Cook Islands, has deployed VNC® with an Enterprise license to provide remote IT support and home working. With offices on 11 of the 15 remote South Pacific islands, spread over 2.2 million square kilometres of ocean, RealVNC's software has resulted in a significant reduction in IT downtime, greater staff productivity and increased levels of service to Telecom Cook Island customers.

TouchType

Swiftkey, TouchType's text entry app for smartphones, has picked up a Webby Award for Innovation, beating off strong competition from Google Wallet and others.

SwiftKey, which creates smart typing solutions for mobile devices powered by artificial intelligence, was chosen for the award after a remarkable six months that saw the company break over six million downloads of SwiftKey X, reach the number one spot in Android's global paid apps chart and pick up the coveted Most Innovative App at the mobile industry's Oscars, the Global Mobile Awards.

The 2012 Webby Awards received nearly 10,000 entries from over 60 countries. SwiftKey was just one of five companies shortlisted for an Experimental and Innovation award.

Xsilon

Xsilon was selected by UK Trade & Industry to showcase its Hanadu solutions for in-home M2M at the British Business Embassy during the London 2012 Olympics.

This was Xsilon's first public outing for its HAN9000n Connectivity Evaluation Kit. Hanadu is a connectivity technology that has been specifically designed to connect up the Internet of Things within the home. It is the first M2M solution that has been aimed at mass-market deployments in the domestic environment, uniquely designed to reach into the even the most difficult-to-connect parts of every home.

Ubisense

Ubisense Group Plc, a market leader in location-based smart technology, has announced a new range of products for telecom operators called netSolutions. The new products build upon the success of Ubisense's existing telecom products combining these into an integrated solution which exposes data to mobile and Internet users via smart devices such as tablets and smart phones.



Hall of Fame board in the Computer Laboratory

Companies started by Computer Laboratory graduates will be listed in the appendix of Cambridge Computing: The First 75 Years.

If you have started a company but can't find it on the list (www.cl.cam.ac.uk/ring/halloffame.html), please email cam-ring@cl.cam.ac.uk

Computer Laboratory news

Awards and Honours

Professor Andy Hopper will take over as President of The Institution of Engineering and Technology. On October 4th 2012 Professor Hopper will deliver his inaugural address entitled *A Perspective on Innovation*. In it he will talk about what it takes to start and grow a successful company, with concrete examples based on his own experience, and then make some policy recommendations about how the interface between universities and industry can be improved leading to much more wealth creation in the UK.

Lab PhD **Claudio Angione** received the best paper award at the Turing Centenary Conference in Manchester. The paper, *Computing with Metabolic Machines*, is joint work with Giovanni Carapezza, Jole Costanza, Pietro Lio' and Giuseppe Nicosia.

Claudio Angione is a member of the Artificial Intelligence Group under the supervision of Pietro Lio'.

Jisun An has been awarded a Google Europe Fellowship in Social Computing.

Jisun An is a member of the Systems Research Group under the supervision of Professor Jon Crowcroft.

Cambridge topped the Guardian University Guide 2013 league table for computer science.

Universities are ranked according to spending per student; their staff/student ratios; graduate career prospects; what grades applicants need; a value-added score that compares students' entry qualifications with their final degree results; and how happy final-year students are with their courses, based on the annual National Student Survey.

Raspberry Pi

Raspberry Pi has inspired The Great British Raspberry Pi Bake Off at the University of Manchester School of Computer Science.

The competition seeks to inspire students to have a go at a project with a Raspberry Pi. There will be worksheets and activities to get those who have never used a computer before started. The competition will also give seasoned coders a chance to showcase their skills.

Raspberry Pi has also been centre stage at IBM's Extreme Blue residential camp for university students.

Split into teams, groups worked hard building answers to problems identified by IBM's technology experts — including a new children's games platform for the Raspberry Pi. The platform, Raspberry FishPi, is a sequence of games which users play. At each level they are shown how to adapt the experience by editing the code behind the game.

At the University of Southampton, a team of engineers has built a "supercomputer" made from 64 Raspberry Pi boards.



Professor Simon Cox, of Southampton University, with his Raspberry-Pi-based "supercomputer". Also pictured is his six-year-old son James, who was the project's Lego consultant.

The Iridis-Pi (housed in a rack made of Lego) contains 64 ARM11 700MHz processors, 16 GB of RAM and a Terabyte of flash memory (16 GB per board). Because every Raspberry Pi is so energy efficient, the whole system can run off a single 13 Amp mains socket.

The Raspberry Pi has also recently been updated with a few hardware tweaks and changes. The new revision 2.0 boards are in distribution channels and will filter out to end users as stocks of the earlier boards run out.

The 2.0 board will be manufactured primarily in the UK. Previously, the decision was made to outsource the Pi to China where the correct price-point could be reached in unit volumes of tens of thousands. However, following talks with Sony, and realising that the Pi is now looking at unit volumes in the hundreds of thousands, it was possible for the Foundation to bring manufacture to the UK.

The UK-made Raspberry Pis have been assembled at Sony UK Technology's factory in Pencoed, South Wales.

If you are a parent of a Raspberry Pi-wielding enthusiast, we'd love to hear what they're up to.



UNIVERSITY OF CAMBRIDGE

Professor Andy Hopper requests the honour of your company at celebrations to mark the Computer Laboratory at the University of Cambridge, and the centenary of the Cambridge computer pioneer Professor Sir Maurice Wilkes.

Events take place on Wednesday April 24th, 2013.

2.30pm	Wheeler Lecture Professor Sir Tony Hoare	<i>Lecture Theatre 1, Computer Laboratory</i>
3.30pm	Book Launch Cambridge Computing: The First 75 Years Refreshments	<i>The Street, Computer Laboratory</i>
4.30pm	Innovation Lecture Dr Mike Lynch OBE, FEng	<i>Lecture Theatre 1, Computer Laboratory</i>
5.30pm	Innovation Discussion Panel	<i>Lecture Theatre 1, Computer Laboratory</i>
	Cambridge Ring Annual Dinner	
7.30pm	Drinks	<i>The Old Kitchens, Queens' College</i>
8.00pm	Dinner	<i>The Old Hall, Queens' College</i>

Tickets for the afternoon events are free; limited numbers are available.

Tickets for the dinner cost £57. Please make cheques payable to "University of Cambridge" and send them (with your e-mail address and details of any special dietary requirements) to Cambridge Ring, William Gates Building, JJ Thomson Avenue, Cambridge, CB3 0FD.

To confirm your place, please e-mail cam-ring@cl.cam.ac.uk with details of the sessions you wish to attend.