The Ring

Ring news

Annual dinner

This year's annual dinner took place in the magnificent surroundings of Queens' College Old Hall.

105 Ring members came together for what, everyone agreed, was a great occasion. Members young and old were delighted to welcome Sir Maurice Wilkes as guest speaker.

Clockwise from right:

Sir Maurice Wilkes at the drinks reception

Serial entrepreneur Jack Lang (sporting a dashing bow tie) catches up with journalist Bill Thompson

Camrivox co-founder, James Green (left) chats with Trinamo founder Stephen Allott

Professor Andy Hopper (right) shares a joke with Geoffrey Carr of the Economist

2007 graduate John Messer chats with Bukhari Shah

Hall of Fame Awards 2008

The awards celebrate the success of companies founded by Computer Laboratory graduates.
To date 151 companies have been founded by graduates of the Computer Laboratory.

Company of the Year

XenSource

Runner-up: Trampoline Systems

Ian Pratt, co-founder and Chief Technical Architect, XenSource

Product of the Year

Samsung SyncMaster 940UX from DisplayLink

Runner-up: SONAR from Trampoline

Paul Osborn (left), Michael Ledzion (centre) and Gavin Dolling, of DisplayLink

Publication of the Year

Tyler Moore and Richard Clayton, Computer Laboratory, University of Cambridge for ***Examining the Impact of Website Take-down on Phishing***

Runner-up: Ford Long Wong and Frank Stajano, Computer Laboratory, University of Cambridge for *Multichannel Security Protocols*

Tyler Moore (left) and Richard Clayton

Who's who

Marko Balabanovic (CC BA90) is head of research and development at Lastminute.com, Europe's largest travel and entertainment Web site.

David Bell (EM BA07) is an Associate on the KTP Project with the University of Ulster and Hunter Apparel Solutions Ltd. The project's remit is to review Hunter Apparel's existing IT systems and company requirements and to implement a fully integrated Business Information System incorporating a production planning and customer relationship management capability.

Jeremy Bennett (EM BA82, PhD88) is Vice President of ARC International.

Geoffrey Cross (CHU Meng96) is technical director at Yotta Ltd. Yotta is part of the Oxford Metrics Group, one of the UK's leading computer vision companies developing products including software used by the special-effects industry, motion capture cameras and high-tech automated GIS mapping layers.

Nick Bolton (T BA72) is Deputy Chairman of Cezanne Software. Cezanne Software develops and implements Web-based software for use by HR departments of major companies within the UK and overseas. It currently has 130 people based at offices in London, Bari, Bologna, Paris, Madrid, Lisbon and Caracas.

Jonathan Knight (T BA87) is now a director at Puresolo and Greenstone Carbon Management. Puresolo is a startup technology company focused on music and musicians. Greenstone Carbon Management is a carbon accounting and management company focused on helping large companies reduce their carbon emissions.

Daniel Craig (PEM BA05) is a business analyst at Hotels.com.

Jonathan Custance (JN BA95) is CTO at Camrivox. Camrivox has developed a simple way to unify telephony with on-demand CRM applications.

Rebecca Goddard (N BA) works in marketing for ProCheckUp, an IT security firm.

James Green (F MA96) is VP Engineering at Camrivox.

Anna Griffiths (DAR MPhil03) is working at Matrox as a junior sales executive.

David Gwilt (CHU BA97) is Product Marketing Manager at ARM Ltd.

David Hart (T BA71) is a computer consultant.

Simon Mendoza (CHR BA03) is a senior developer at MDSL. MDSL is a leading on-demand cost management company.

John Messer (JE BA07) is working for Trinamo in London.

Richard Moore (Q BA07) is a software developer at KBCFP in London.

Amir Nathoo (JN Meng 02) has founded WebMynd Corp and Cambridge Data Ltd. Cambridge Data Ltd provides hosted document sharing solutions for individual professionals and small legal and financial services firms.

Steve Pope (JE BA93 PhD97) is now in the US where he is CTO for controllers at Solarflare. Steve is a co-founder of Solarflare.

Russ Ross (W PhD07) is Assistant Professor of Computer Science at Dixie State College of Utah.

David Scott (R BA99, PhD05) is a principal software engineer at Citrix R&D Ltd in Cambridge.

Chris Town (T MA00, PhD05) has co-founded Imense Ltd, a Cambridge high-tech start-up focused on building the next generation of image search. Imense is developing innovative solutions that make content-based retrieval of images even easier and more powerful than search for text documents on the Internet.

Matthew Wiseman (T BA97, MPhil02) is product manager of YouTube in Europe and the Google Video ID system. He is now based in Zurich.

Samuel Zhang (T BA07) is a software developer at UBS.

The rise of RealVNC

Dr Andy Harter, graduate of Corpus Christi College, Fellow of St Edmund's College and visiting fellow at the Computer Laboratory, talks about the rise of Virtual Network Computing and the success of RealVNC.

TR: Andy, can you tell me about RealVNC and explain what Virtual Network Computing is?

AH: RealVNC is a company founded five years ago by the original inventors of Virtual Network Computing or VNC. We wanted to see if we could commercialise VNC, even though we made it freely available about ten years ago. Put simply, VNC is a remote control tool that lets one computer take over the screen, keyboard and mouse of another computer. Each end can be a different type of computer — such as Windows, Unix or Mac — and in the same room, or on opposite sides of the world. There are many different ways in which VNC is used, but a very popular use is for remote support, helpdesk and troubleshooting. Also, several people can connect to the same desktop simultaneously, so it's widely used for collaborative working and distance learning/demonstrating.

TR: Can you access the desktop of any computer that is running a VNC server with a wireless handheld device?

AH: Sure. We demonstrated an iPAQ remotely controlling a desktop over a WiFi connection a very long time ago. At RealVNC, we have a Windows Mobile Viewer which runs on Smart Phones and we have versions for Symbian phones and the Apple iPhone in development. We have a lot of customer pull for VNC Mobile, and it's definitely part of the strategy to roll out something comprehensive over the next year.

TR: How was the business model of the company developed?

AH: Organically.

One of the most important assets we have is the brand. There are well over 100 million copies of our free versions of VNC out there. It's a well-known and well-loved tool. We boot-strapped the business by offering support to existing large-scale users. We had some international household name signed up in the first week. We even cashed in by selling VNC mousemats and T-shirts in surprisingly large quantities for the first year or two! During this time, we concentrated on building a commercial-grade version of VNC with some of the features we knew were missing, such as strong integrated security. This went on sale three years ago and was an instant success. We've sold quite a few million licenses so far.

In parallel, we've also done bespoke development work and OEM licensing. This is a very exciting market, which grows steadily. VNC is embedded under license in about 20 products so far, both hardware and software. It's in medical scanners, video conferencing systems, helpdesk software and truck fleet systems. Because of the simplicity and small footprint, VNC is the number one choice for embedding in third-party products. It's become a *de facto* standard.

> *Trust your instincts. Had we followed standard advice, we probably wouldn't have started.*

The business is profitable and expanding, and we've been lucky enough to not require any angel or venture capital funding. This means we've not been distracted by endlessly writing business plans and tying ourselves up in knots coming up with an exit strategy. We may have taken longer to do some of the things than we might have done with more funding early on, but on balance I think we got it about right. I think our strategy has been wise, without being dull — and we have some grand plans!

TR: Can the individual user benefit from VNC? What advantages does RealVNC's Personal Edition have over the free option? How much does it cost?

AH: Yes of course. Most of us have multiple desktops these days, but we don't have a single shared file-space or set of applications. Each of our computers tends to be its own world, and we find ourselves wanting to use the file or program on "the other" computer. VNC lets you do this. Individual users choose the VNC Personal Edition if they are worried

about security, or wish for better performance. It also has integrated file-transfer for copying things between local and remote computers. It's under £15 a copy, and comes with full technical support. The quality and price are such that people are keen to buy.

TR: For individuals looking at a free option, how does your approach differ from that of your competitors like UltraVNC?

AH: Well, we're a proper company for a start, and our VNC Free Edition has been produced using the same level of care and testing that our commercial versions have. UltraVNC is an open-source project in the true "bazaar" sense, with all the pitfalls that one normally associates with such a venture. If you want fancy features but aren't worried about stability, then maybe UltraVNC is for you. If you want a reliable tool created by professionals that works across platforms, then I think VNC Free Edition is still the choice.

TR: How does your Enterprise Edition differ from other commercial tools such as pcAnywhere and Remotely Anywhere?

AH: We have the smallest footprint of any commercial remote control software, and support the widest range of platforms. Independent tests show that VNC Enterprise Edition outperforms most other systems. Over a LAN, viewing a Unix desktop from a Windows PC for example, can give you an "as if you were there" feel. As a result, major semiconductor manufacturers are using VNC Enterprise Edition as the sole means of accessing CAD tools, and so all their chips are being designed over a VNC channel. It's collaborative, so engineers in the USA and Europe can pore over the same design; and as it's persistent at the server and stateless at the viewer, you can disconnect and reconnect from home. You can't do this with X Windows.

TR: As a technologist, what are you thinking about in the area of remote control software? What technical challenges do you face and what are you most excited about?

AH: Making it easier to use. To enter the mass-market any product has to be user-friendly. For example, we can offer hosted services or services to help with the plumbing from one end to the other. This is needed when there are dynamic IP addresses involved, or routers and firewalls to traverse. We're working on some technology which will make this all much easier.

I'm also excited by the prospect of remoting more than just the user interface, such as other devices. We've already built in support for remote storage devices in the KVM-over-IP products that we have designed and marketed with Adder. This means you can remotely install software from the local CD drive — a huge boon for the system administrator. We can build this into the standard software version which will open up a range of possibilities.

I'm very excited about Adventiq, a company that we founded two years ago which has produced VNC on a chip for out-of-band remote control applications such as KVM-over-IP. The chip worked flawlessly first time, and there are already products on the market containing Adventiq chips. Some analysts say Adventiq will corner 75% of the market for this type of chip. That remains to be seen, but it looks good so far.

TR: How do you see the market maturing over the next couple of years and how will RealVNC respond?

AH: The remote control market is already quite mature. When we first invented VNC some 15 years ago, there were already a couple of remote control products on the market. Since then, remote control has become something of a commodity and prices are quite keen. However, with the right balance of innovation, quality and brand we've proved that it's far from too late to enter the market. There are enough platforms and applications that are still poorly catered for to make good growth very feasible.

Also, the market is still quite open for OEM applications, and VNC is a *de facto* standard. There are literally hundreds of products out there with VNC Free Edition embedded in them. Some companies are starting to read the GPL license more carefully. We're seeing an increase in the number of organisations becoming worried about compliance and coming to us for a commercial license. There is simply nowhere else to go.

TR: What is the most important thing that you have learned about business?

AH: Trust one's instincts. If we had followed standard advice, we probably wouldn't have started. 2002 was a gloomy time in the industry, and it was the received wisdom that without a fantastic business plan you could not survive. We didn't actually have a business plan at all; we just did the obvious pragmatic thing at each stage. I think we have shown that it is possible to navigate the business world with a minimum of fuss by having appropriate technology, a good brand and simple positioning.

For more information about RealVNC visit www.realvnc.com.

Martin Hollis

What does Martin Hollis have in common with Daniel Day-Lewis, Dame Helen Mirren and Wallace and Gromit? Well, they've all won BAFTA awards. The Ring caught up with the Lab's award-winning Martin Hollis.

TR: Martin, what put you on the path to working in the games industry?

MH: The first thing I ever did with a computer was to make a game or — technically — a puzzle. One weekend my father borrowed a ZX81 from the school where he taught and I drew a maze on it using the GRAPHIC feature and the mosaic characters. My vision was to draw a full-screen maze but, part way through entering this unusually long command line, the ZX81 reported "Out of memory". I was 12.

Even today game developers are always struggling against the technical limitations of the machine. A 4 GHz CPU is enough for most desktop applications, but if you search for "4 GHz" you will see that the push for more performance is led by gaming.

TR: From where do you draw your ideas and how do you decide what makes a good game?

MH: An idea can come from any place, depending on your personality and preferences. I get mine from books, films, TV, magazines, activities, people watching, memories of earlier life, and from nowhere.

If you don't keep filling up your mind, creativity will dry up — or at least you will be struggling hard for each idea.

TR: How did you feel the first time you saw one of your games on sale?

MH: It was 22 years ago — so long ago I can't remember the moment. I imagine I was mildly and quietly self-satisfied. I certainly did not realize how difficult it is to get published. If your first attempt at getting distributed is successful how could you know? Later I failed to get some of my BBC Micro games out and in that way I learned that rejection is the norm and being published is actually a significant achievement.

TR: How long did it take to develop your BAFTA-award-winning GoldenEye 007? Was this typical in the production of a title?

MH: Around three years including final stages like the European version. The production length certainly was not typical for the time! I would estimate GoldenEye required 20 person-years overall on the developer side. In 1997 a more typical number would have been 2 person-years. However, times change — today a game might use hundreds of developers.

TR: Did you foresee GoldenEye's success? Why didn't you do another Bond game?

MH: I didn't predict the scale of GoldenEye's success. You know a movie license of that magnitude will perform well. Eight million units sold at forty to sixty dollars each is better than well. The title remains one of the ten or twenty best-selling video games ever made, depending on your accounting.

Much as I love the Bond universe, another Bond game would have been one too many for me.

TR: What prompted you to go it alone and found Zoonami?

MH: I'm not sure exactly. A feeling. It was a good decision.

TR: You've been in the business since you graduated. What is it about games that keeps you excited?

MH: The synthesis of culture and technology, both of which I love. The multidisciplinary nature of the endeavour. It is impossible to find a subject which is not relevant to games. The people. The people are brilliant. In the industry there is an exciting mixture of artists and engineers, miraculous talent and very little in the way of ego.

The potential is really exciting. It delights me that interactive entertainment will change the world. I see changes in world culture, knowledge and fundamental shifts in the ways people interact.

Stories begat books, which begat radio, which begat film which begat television. Gaming is the next dominant cultural medium, and the passive media will fall into the background to a degree best illustrated by radio's current status.

Interactive play has a vital role to play in the future of education. Play has a purpose, a reason to exist, and that purpose is learning. Why should a student learn the equation for a parabolic trajectory under gravity from a book when they can discover it using a pleasurable interactive learning tool? Positive experiences make memory remember, and actively doing is better than passively listening.

New input devices mean that the tarnished promise of Virtual Reality is actually within reach. You can see it happening today with Nintendo's Wii Sports. Improved connectivity between machines means online games such as Second Life are delivering the aspirations of William Gibson's Cyberspace. In the future you won't need to travel to work or friends or family or school. You won't want to visit the library or the theatre or the bar. Instead you'll travel virtually. And in addition to these realistic destinations a multitude of artificial parallel universes will continue to be available.

Why would you hang out in so-called Reality? The only unknown is this: will it take 30 years or 100 years for virtual reality to displace reality? "Real" reality is doomed.

TR: A while ago I read a statement from Nintendo's president warning that the industry had to innovate or die. What are the biggest challenges games face now and in the near future?

MH: That statement was made in 2004 and expressed the mood of game developers. Since then, early indications are that the industry has chosen innovation. Last year was especially vibrant. Mr Iwata has done a fine job of reinvigorating Nintendo and this was proved beyond all doubt and beyond analyst expectation again and again in 2007. Microsoft and Sony are not idle and have solidified the Xbox360's lead in Internet capabilities and the PlayStation 3's lead in pure horsepower. A new genre — the music game — has come of age with Harmonix's and EA's Rock Band, creating a new exhilarating way to play together at home. An exceptional number of broadly conventional but simply superb games hit the shelves. Overall 2007 felt like a brisk year for innovation.

For the future, the video game industry needs to grow up. The demographics of video game developers, games journalists and games players are terrible — but are improving.

The medium must also earn the respect of the world, including our present government and the Daily Mirror! The UK games industry is in an advantageous but also a precarious position. The centre of gravity of game-making could shift towards Europe, or towards America or East Asia. Once upon a time this country had a strong film industry. Now there is Hollywood and Bollywood and Hong Kong. Once upon a time this country had a strong computer industry. Now there is Silicon Valley and China and Taiwan. The smallest change of incline in the competitive landscape and the games industry will roll out of town. We could willingly squander our national aptitude and our opportunity. That would be catastrophic for our nation's fortunes and significance in the 21st century.

TR: What advice would you give to aspiring games developers about breaking into the industry?

MH: Make a game at home. Game developers are suspicious of hiring employees who have not worked on a game professionally. Creating or assisting in the creation of something modest and interactive will help you hugely. Get a good degree or higher qualification. Make games as a part of your qualification. Play a lot of games. Think about them. Talk about them. Write about them. Lastly, if you don't want to be an employee, you don't have to be. You can sell the game you made yourself — either at retail as Introversion Software has, or purely on line like PopCap. You can enter an independent games competition and win kudos and access to games platforms as Jonathan Mak has.

TR: Finally, a rather obvious question. What games do you like to play when you're not developing them?!

MH: Lately I have played a little Everyday Shooter, Super Mario Galaxy, Super Monkey Ball, Rock Band and Dwarf Fortress.

Martin founded Zoonami Limited, a game developer based in Cambridge, which specialises in making "small games for big platforms". For more information about Zoonami, visit www.zoonami.com.

Martin also recently co-founded Games Eden, a games industry networking and partnership organisation centred on Cambridge.

Ubisense

When *The Ring's* editor, a keen equestrian, heard that Ubisense was being used to help horse riders in the US, she had to find out more. Tom Blackie, Chief Operating Officer, talked to *The Ring* about what's made Ubisense the world's leader in the real-time location system (RTLS) space.

TR: Tom, can you tell me a bit about RTLS and what makes Ubisense the world leader in RTLS technology? What makes Ubisense different from other companies operating in the same space?

TB: Well, RTLS does seem to cover a wide range of topics and mean many different things to different people. At the low end we find passive radio-frequency identification (RFID) vendors basically selling products like shop security tags — the kind of tags that are detected near exit doors that make an alarm system sound. This tells you that a particular tag is near that specific door at that time. They tend only to work if the tags are close to the coils around the doors, so are not really able to give any large-scale real-time element or any precision location. Then there is the class of active RFID tags. They have a battery so can transmit a radio signal over a much greater distance. These tend to have the characteristic of long range and when several receivers detect the signal, the location of the tag can be found by measuring various times or signal strengths at each receiver — very crudely described as triangulation. Typical accuracy is 5 to 10 metres. This is fine for many applications — for example, knowing some goods are in a warehouse enables an automatic inventory to be generated — it does not really help to tell someone exactly where the goods are. Hence, the ability to gain savings by quickly finding items cannot really be realised.

Ubisense is quite special. To start with we define RTLS as *precise* real-time location solutions. This is a subtle but highly important change. We believe the level of precision that our system achieves, coupled with the reliability and scale of the physical area covered, really differentiates our product. Our company is also highly focused on delivering working solutions to end customers.

To put that into perspective and give you some examples, our system is able to provide a precision of 15cm in 3D and to do this almost instantaneously for thousands of tags. This information is then shared using our real-time distributed software platform that allows applications to make use of relationships between tags and then automate many manual processes. For example, in the automotive manufacturing industry we tag cars moving down a production line along with mobile tools like electric torque drivers. Knowing in real time which tool is next to which car allows us automatically to control the function of that tool, set the correct torque for that specific vehicle and thus reduce errors and increase throughput — basically improving quality, reducing re-work and allowing more cars to be made on the production line.

This is just one example of what a true RTLS really is capable and I'm pleased to say I don't think there is another in existence that can do this, especially with the extremely high reliability demanded by mission-critical, 24×7 operation in real production environments.

TR: What is the profile of current RTLS customers? Do horse riders conform to the typical profile? How is the Ubisense product helping them?

TB: Horse rider tracking is just one of many applications, so I probably wouldn't describe it as typical, but it is certainly not unusual. We have around 300 customers and it is amazing to see just how many different application areas people are working in. They range from animal tracking, healthcare, retail trolley tracking, worker safety applications in the nuclear and petrochemical industries, tracking sports players, logistics and industrial manufacturing, to name a few.

Over the past year the exciting thing for us is seeing several of these lead customers now moving from early stage pilots to real large-scale deployments. For example, in logistics we now have over ten live installations in large distribution centres and multiple installations in automotive manufacturing plants. The benefits to these customers are immense. Put simply, we are improving quality and increasing throughput. This drops straight to the bottom line where more cars can be made from the same capital equipment investment.

TR: Can RTLS assist business in reducing costs?

TB: Absolutely. By knowing where all of an organisation's assets are it is quite easy to improve efficiency. For example, in healthcare

knowing how many IV pumps are waiting to be sterilised and for how long can lead to optimisations in the sterilising process and consequent cost savings — a hospital may be able to reduce its IV pump requirements by 10% just by knowing where all the pumps are. In aerospace manufacturing, locating and recovering an expensive piece of mobile test equipment could get a 747 plane back in the air a few days earlier and could also avoid the need for purchasing additional sets of test equipment.

TR: I see that Ubisense announced a partnership with Building Sustainability last year. Can you explain how the Ubisense product can help reduce the corporate and individual carbon footprint?

TB: That paticular project is with a major UK bank. They have a new building in Rotherham and one of the aims is to reduce the carbon footprint. Our system is used to monitor the usage of the building and automatically control the heating, air-conditioning, lighting, etc. When rooms are unoccupied the lights are turned off. We're able to control all of the environmental facilities right down to an individual's desk. So, when the desk is empty it is even possible to turn the phone off, yet have it turned back on again just before the person returns. Ultimately, this kind of precise fine-grained control, based on people's location and preferences will be commonplace through out all office space and, eventually, in homes as well. On this scale it will make a massive impact towards carbon footprint reduction.

TR: The UK Information Commissioner has said that the public needs to be made more aware of the "creeping encroachment" on civil liberties created by e-mail monitoring, CCTV and computer tracking of our buying habits. Shouldn't we be concerned about RFID? What are the implications for privacy and civil liberties?

TB: At Ubisense we take privacy extremely seriously. Like many technologies one could conceive of examples where, in the wrong hands, RFID or RTLS could be used to monitor how often someone took a break, went to the bathroom or out for a cigarette. That said, it would require that infrastructure was put in place to monitor the tags, and as yet I have not come across such a request from any of our customers. If there are no sensors covering outside in the smoking area, then the system can't say that someone is there. It is also the case that if someone simply left the tag a desk the system would no longer know where that person was.

As well as the physical constraints, we also work closely with customers to ensure the data gathered from the tags is appropriate for the end application requirements. It is often the case that knowing who is where is not really needed. For example, in the car manufacturing plant it is about knowing which tool is next to which car, not who is there. In some applications it is important to know the 'who', such

as a worker safety applications where knowing a worker's location is paramount in order to find her or him during an evacuation and muster point application, or to send in a fireman to the rescue. Even in these cases it is recommended that the protection of personal data security should be in line with policies adopted within the organisation, such as those related to personnel data covered by the data protection act.

In summary, the technology is here and can't be un-invented, there are many technologies capable of misuse and RTLS, like all of the others, should be treated carefully with sensibly designed procedures to minimise misuse and protect privacy.

TR: The RTLS revolution is well under way. What is your growth prediction for the market? What's going to spur this growth? Where do you see Ubisense in five years?.

TB: That's a big question. One thing's for sure, it never happens as quickly as we'd like. If I were pushed to give a financial prediction, I'd point you at the many market pundits who predict the current market size is around £200 million per annum, but likely to grow towards £3 billion over the next five years.

We believe there are quite a lot of similarities between RTLS and the early days of GPS. 20 years ago GPS was really just emerging from military use with a few large companies starting to fit GPS to vehicles. Now it's almost standard in cars and will soon be fitted to every mobile phone. With this level of market penetration costs are driven down and applications proliferate. We contend that RTLS is right at the cusp of a very similar growth curve. Perhaps not in five years time, but maybe in ten years time we will see RTLS in very wide use, maybe even in consumer-level devices.

Between now and then we expect to see major advances within the industrial manufacturing sectors, especially where fundamental business performance can be improved by removing manual process interactions, where there is considerable scope to reduce errors and increase throughput.

We believe that Ubisense is well positioned to capitalise on this rapid adoption, being the only company to have a high-reliability proven product that complies with both European and US regulations. This means we really do have a fantastic opportunity to mould the industry, drive global standards and be the world-leading precise real-time location solution.

www.ubisense.net

James Moore

After graduating in Computer Science at Downing College in 2005, recent graduate James Moore talks about the first few years of his career with Cambridge software company Red Gate Software.

I first met Red Gate at the Computer Laboratory's Career Fair in late 2004. I went to a number of interviews with a variety of companies but Red Gate stood out. Not only did it have a lot of smart people but it was somewhere I could make a difference — I wouldn't just be a small cog in a big machine.

When I started at Red Gate, ten days after graduating, it was a 20-person company. I was thrown in at the deep end and started working on major revamps of our flagship products, SQL Compare and SQL Data Compare. I worked closely with our user experience specialists on new designs for the software, took these designs and implemented them. It was my first experience of working on a software project with people of various disciplines. This was quite an eye opener. I had come from working on large open-source projects exclusively with software engineers, and at university the focus was on the discipline of computer science rather than writing commercial software.

Nine months after starting at Red Gate I had been through my first release cycle and had some idea of the trials and tribulations of developing a piece of commercial software. I took on the role of Technical Lead for my second project, a major revamp of the user interface for our database backup product. I had responsibility for the overall architecture of the rewrite and any new features to be implemented. We spent ten arduous months creating a new interface, which we hoped would simplify managing backups for the tens of thousands currently using the product.

In May 2007 I was approached by Red Gate's two directors, Neil Davidson and Simon Galbraith, and asked to plan and set up a semi-autonomous business unit to develop another part of the business which had, in the past, been neglected in favour of our SQL Tools business. After two months of detailed research I presented my business plan and was given the green light to go ahead and form the business unit.

So in July 2007, after quite a bit of desk shuffling, the .NET Developer Tools division were in place and the first development project under way.

The last eight months have involved a lot of learning. I have moved from software development to managing a team with a wide-ranging set of disciplines. Moreover, I now have profit and loss responsibility for the division and that's taken some getting used to. However, I needn't have worried as Neil and Simon have provided me with a great framework in which I can succeed. The appropriate mentors have always been on hand to help me meet the challenges of running a successful business.

Since July, the team has nearly doubled revenue and is on course to hit the three-year revenue and profit targets. We have just embarked on our second project — a revamp of our code profiler — which will help Red Gate to achieve its vision of creating ingeniously simple tools.

Since I joined the company, Red Gate has grown from a small 20-person company into a company of over 100 people, each with her or his own strengths. It's a great company to work for and everyone is encouraged and helped to reach their full potential. For the past two years Red Gate has been listed in *The Sunday Times 100 Best Small Companies to Work For* and we're all really proud to be part of the team.

I feel incredibly lucky to have joined such a great company straight out of university. It has a fantastic culture and both Neil and Simon place great value on all their employees. I have been allowed to make the difference I wanted to and been lucky enough to work with some really smart people. They have helped me to continuously push myself to the limits of my abilities and thus learn something new every day. It is incredibly exciting to watch a company you have helped grow continue to expand and do well.

Red Gate is hiring. For information about the current opportunities please visit www.red-gate.com/careers.

Hall of fame news

Azuro

Azuro, a leading provider of advanced clock implementation tools for nanometre chip design, announced that it has completed its third consecutive year of record growth. Increases in revenue resulted from worldwide customer expansion in Europe, Japan and India, and several multi-year renewals in North America.

Bango

Bango has been helping AnimationFC to give the UK's top football clubs a winning presence on the mobile Web. Currently helping to develop mobile Web sites and deliver content for over 90 Premiership, Championship and League clubs, AnimationFC has revealed the top five best performing sites. In alphabetical order they are: Aston Villa, Glasgow Rangers, Leeds, Tottenham Hotspur and West Ham United.

blinkx

blinkx, the world's largest video search engine, has announced content partnerships with the BBC, CBS and The Weather Channel. It has also expanded its partnership with Ministry of Sound TV, the first digital content provider of dance music entertainment.

Camrivox

Camrivox, a unified communications innovator and developer of computer telephony integration software for the SME market, has raised £1.2 million from a consortium of investors. The over-subscribed funding round was led by NESTA Investments and involved existing shareholders and Create Partners. New investors included Bank of Scotland Growth Equity who invested alongside business angel members of Oxford Investment Opportunity Network.

Codian

The TANDBERG Codian MSE 8321 gateway has been launched, enabling organisations to hold up to 1,000 concurrent videoconferencing calls between IP and ISDN. Both service providers and large enterprises will now have the flexibility to deliver a variety of services at an unprecedented level, worldwide.

DisplayLink

DisplayLink has been shortlisted as a finalist in the One to Watch category for the Fast Growth Business Awards 2008.

Jagex

Jagex, the on-line games developer, has launched FunOrb, its latest games offering. FunOrb offers an array of on-line games, including classic shooters, puzzlers, 3D platformers and strategy games. It offers a mix of single- and multi-player games, complete with virtual 'lobbies' enabling users to choose who to play against from other FunOrb players. Additional features such as friends league tables, player achievements, forums and instant messaging will also be available in-game or on the Web site.

Linguamatics

Linguamatics, a leader in natural language processing for the life science market, has announced the commercial release of the new version of its flagship I2E software. I2E 3.0 provides accessible text mining, enabling research and business decision-makers to rapidly uncover relevant insights by extracting key facts and relationships from document collections.

nCipher

nCipher has announced its unaudited preliminary financial results for the year ended 31st December 2007.

Revenues were up 15% to £24.2 million with operating profit increased more than three-fold to £2.2 million. Profit before tax was significantly improved to £3.4 million (2006: loss of £4.7 million) while earnings per share rose to 11.4p (2006: loss of 15.3p).

Saviso Consulting

Saviso is acting as lead platform architect building Internet infrastructure for the Sport Relief and Red Nose Day campaigns.

Tideway

Tideway has been named in the list of Top 10 Enterprise Management Tools by Network Computing. Said Network Consulting, "Tideway Foundation automatically generates detailed business application dependency maps and populates them into your service impact monitoring tool. This speeds initial rollout and improves maintainability of the service impact monitor. Better yet, Foundation continually monitors the IT environment, detecting changes and automatically updating service maps."

Trampoline Systems

Trampoline has received two award nominations recognising its leadership in enterprise social computing.

It has been nominated for the Partnering for Innovation Award at the UK Technology Innovation and Growth Awards 2008. The nomination recognises the strong partnership between Oracle and Trampoline which has brought together the world's largest enterprise software company with Trampoline's enterprise social computing techniques.

Trampoline has also been nominated for Emerging Business Partner of the Year at the Oracle UK Partner Awards.

Trinamo

Trinamo has launched a new Greentech Practice to help a variety of greentech and cleantech firms facing problems of growth and scale in their organisations.

Zeus

Zeus Technology's ZXTM GLB (ZXTM Global Load Balancer) has been short-listed for Network Computing's 'Product of the year' award.

Don's diary

Matthew Parkinson wonders whether we will ever write correct software.

With the latest conference deadline over, and teaching finished for the term, I can return to my usual pursuit of staring out of the window wondering "will we ever write correct software?" Whenever I mention that I research computer programming I am always confronted with negative reflections on software: "can you fix my computer?"; "why does [some program] always crash?". It is a sad state of affairs. Off-the-shelf software products are usually shipped with disclaimers that they can do untold damage, not guarantees that they will function correctly.

In some ways the situation is improving. The increased adoption of languages with managed runtimes, like Java and C#, is helping to introduce run-time checks and better type systems, which can prevent some errors. But there is a serious problem looming: multi-core.

Processors are no longer getting faster and faster but will have more and more cores. Although a multi-core processor is theoretically faster than a single-core processor, writing concurrent software that takes advantage of the additional cores is extremely difficult.

Concurrent programming has always been considered the hardest kind of programming, and the Java Threads and Swing tutorial has some particularly helpful advice on it: "If you can get away with it, avoid using threads. Threads can be difficult to use, and they make programs harder to debug." Testing concurrent software is also a real challenge. Test harnesses are more complex than for sequential programs, and errors are unpredictable and hard to duplicate.

One hope for improving the reliability of concurrent programs is verification. In the 60s Tony Hoare began advocating the use of assertions and mathematical specifications to verify code formally and hence address the problems of software reliability. But software verification has not been widely adopted. On the other hand hardware verification *is* used by industry. Since the Pentium fdiv bug, companies such as Intel have put a lot of effort into verification of their processors.

Perhaps the difficulty that programmers will have in releasing the potential of multi-core will be the catalyst for adopting software verification, as the fdiv bug was for hardware verification.

Matthew Parkinson came to Cambridge as an undergraduate. He was a PhD student in the Theory and Semantics group before working at Middlesex University with Professor Richard Bornat on separation logic and concurrency. He has returned to the Computer Laboratory where he is a Royal Academy of Engineering and EPSRC Research Fellow.

You can contact him at Matthew.Parkinson@cl.cam.ac.uk.

Computer Laboratory news

Paying by credit card? That'll do nicely…. at least for the fraudsters

Do you insist upon inserting your credit card into the Chip & PIN machine yourself? Do you look around to check that no-one's looking over your shoulder? Do you place your hand over the keypad as you type? Even these precautions are not good enough to prevent attack from fraudsters.

The Computer Laboratory's Professor of Security Engineering, Ross Anderson, and researchers Saar Drimer and Steven Murdoch, have shown that Chip & PIN machines are not as secure as the banking industry claims. Indeed, on BBC2's Newsnight on February 26th 2008 Drimer and Murdoch demonstrated how easy it is for fraudsters to attach a "tap" to the PIN Entry Devices (PEDs) which record PIN and account details as they are transmitted between the card and the PIN pad. Armed with this information fraudsters can create a counterfeit card and withdraw cash from ATMs abroad.

Criminals are already using techniques similar to these to defraud British customers, with losses in one case alone claimed to be in eight figures. The technical sophistication required to carry out this attack is low, and fraudsters have already shown they have the necessary skills. The tap would not normally be visible to customers, and in the case of the Ingenico i3300 PED it could be totally enclosed by the device.

"The vulnerabilities we found were caused by a series of design errors by the manufacturers" noted Saar Drimer. "They can be exploited because Britain's banks set up Chip & PIN in an insecure way. These PEDs failed to protect the communication path that carries the card data from the card to the PIN pad, and that carries the PIN from the PIN pad back to the card. A villain who taps this gets all the information he needs to make a fake card, and to use it."

The Cambridge attacks call into question the system under which bank terminals are certified. Visa and APACS certified these devices as secure, and the vendors are pushing retailers to buy certified devices. But the evaluators did not find the flaws identified by the Cambridge team. The Protection Profile — the target used by the evaluators — was approved by GCHQ, and yet the Cambridge work has shown it was unrealistic. APACS and Visa claimed the devices were evaluated under the Common Criteria, an international evaluation scheme administered in the UK by GCHQ; yet GCHQ had not heard of the work and now says that the devices were never certified under the Common Criteria.

Visa and APACS have refused to disclose the evaluation report and to withdraw the vulnerable terminals from use. The vendors are passing the buck to APACS and Visa, and GCHQ is claiming they knew nothing of what was going on.

"The lessons we learned are not limited to banking" says Professor Ross Anderson. "Other fields, from voting machines to electronic medical record systems, suffer from the same combination of stupid mistakes, sham evaluations and obstructive authorities. Where the public are forced to rely on the security of a system, we need honest security evaluations that are published and subjected to peer review."

In future, *The Ring* will be paying with cash.

The Cambridge team's results are also to be presented at the academic conference "IEEE Symposium on Security and Privacy", Berkeley/Oakland, California, US, May 18–21 2008.

Valediction for the Diploma Course in Computer Science

You may have seen in the January 2008 newsletter that the Diploma Course is to be withdrawn at the end of the current academic year, after 55 years of invaluable service.

To mark its passing, the Computer Laboratory will be holding a valedictory party at 12.30 on Wednesday 16 July 2008, in the Atrium of the William Gates Building.

All Diploma Course alumni are invited so please spread the word.

Please RSVP to reception@cl.cam.ac.uk