

# The Ring

## **The Cambridge Technology Scene – past, present and future**

A talk to the Cambridge Computer Lab Ring.  
*Meeting report by Stephen Allott, Director of  
Development, Cambridge University Computer  
Laboratory*

Many people in the technology world, fed up with extensive foreign travel, have started to wonder whether to get involved in the local Cambridge technology scene. Is it home to Europe's leading technology business cluster or is it merely a bunch of computer hobbyists recycling Sinclair Spectrums? A thriving technology cluster doesn't really fit with one's memories of freezing winds, dinners in hall and garden parties in summer. To answer this question, we invited Laurence Garrett, head of 3i's Cambridge office to come and talk to the Ring on this topic. 3i is one of the largest VC firms in the world and is well placed to comment on the Cambridge scene. This was a popular question as over 60 people attended the Cambridge Computer Lab Ring's first event, here in the new William Gates Building on 10 October 2002.

Professor Ian Leslie opened the meeting, welcoming everyone to the new building and the first Ring event. It was great to see Professor Maurice Wilkes in the audience in Lecture Theatre Two. Others travelled from Manchester, Norwich, London as well as many from Cambridge itself. After a brief introduction by me, Laurence Garrett said he would cover 3 topics:

- The history of technology business in Cambridge and some case studies
- The situation today and the VC climate
- Future winners and what it would take to get funded.

In any discussion of the business world however, it's worth reminding oneself that success in business requires a long term sustainable competitive advantage which delivers value to customers and shareholders. It's about more than securing funding. Many markets have winner takes all characteristics and therefore success often requires achieving market leadership as well.

## **THE HISTORY OF CAMBRIDGE TECHNOLOGY BUSINESS**

In 1881 the Cambridge Scientific Instrument Company was formed by Horace Darwin, a member of the University and the son of Charles Darwin. It

supplied scientific equipment for the University and then diversified into other markets, taking on an apprentice, W G Pye. Recruited by the Cavendish Laboratory, W G Pye rose to chief mechanic. In 1896, W G Pye founded his own firm, Pye Group, to design and manufacture laboratory equipment. The Pye brand name will be familiar to many, eventually being absorbed into Philips. These 2 companies are the foundations of the significant scientific instrument business that exists in Cambridge to this day. It's noteworthy that both were directly linked to the study of science in the University and that an employee of one firm went on to found another.

In more recent times, world class R &D, commercial know-how and growing management expertise now all contribute to a track record of business success in Cambridge. Cambridge Consultants spun out of the Engineering Dept in the 1960s and itself was the source of many subsequent companies. In 1973, the first company, Laser-Scan, moved onto the Cambridge Science Park, founded by Trinity College. In 1977, Sinclair Computers provided their first computer kit. Chris Curry left Sinclair in 1978 and teamed up with Herman Hauser, then a PhD student in the Cavendish, to found the Cambridge Processor Unit which became Acorn Computers.

The Cambridge Phenomenon (1985, Segal, Quince and Wicksteed) and The Cambridge Phenomenon Revisited (2000, Segal Quince and Wicksteed, [www.sqw.com](http://www.sqw.com)) give a very detailed account of not only the history but also the current structure of Cambridge business. At around £90 for a copy, it's an expensive buy but a superb survey of the area. Consider obtaining a copy from your local library. By 1985, Acorn had become a substantial business. Former employees have founded 30 separate companies. In 1987, the St Johns Innovation Centre was established and in 1990, ARM had spun out of Acorn. The same year saw the founding of the Business School, the Judge Institute of Management Studies. The 1990s saw an acceleration of business start-ups; Virata in 1993, Unipalm (later UUNet/Pipex) was founded in 1994, Autonomy in 1996. ARM floated on the stock market in 1998. 1999 to 2001 were boom years with many Cambridge IPOs. By 2000, the European Commission had recognised Cambridge as "excellent" for supporting technology start-ups. So far in 2002, there have been no IPOs and no trade exits for Cambridge companies.

The late Nineties boom in Cambridge reflected global stock market conditions very closely. Most of the local IPOs occurred at the peak of the market. The amount of VC raised and invested also correlates

closely with the stock market index (although this is less rational - the best returns to VC are made when investing at the bottom of the cycle.)

## CAMBRIDGE TODAY IN 2002

With a long history in technology business, going back over 100 years, the East of England has a population of 5.4m people and a GDP of 14% above the national average. The Cambridge region itself has a population of 450,000 people, 44,000 of them employed in 1,500 technology firms. 120,000 live in Cambridge itself. Growth has been strongest in the last decade. There were only 600 technology firms in 1990. 23% of technology employment is in R & D (which includes ARM), 16% in software with instruments still being the third largest employer at 8% (even after 100 years). Radio/TV/Sound also employ 8%, Communications and Chemicals employ 7% each, IT Hardware, Electronics, Technical Consultants and Transport each employ 6% of the technology workforce. Many of the audience were surprised to find the business scene so substantial and well developed. It has strong roots in computing, with 35% of all Cambridge technology firms being software. With successful businesses like ARM, Geneva (which spun out of Ionica) and Virata, success has been breeding success, drawing in more VC and closer links with the University. It is still a city of small businesses - only 50 companies have over £5m turnover.

The University continues to be highly rated technically and well supported by industry. The Computer Lab has a 5\* rating, the highest available. Many large corporates have established research labs close to the University, Wellcome Trust and Microsoft being good examples. Laurence Garrett pointed out that the technical consultants such as Cambridge Consultants, PA Consulting, Generics, The Technology Partnership, Sentec, Plextek and Analysys have a large and to some extent unrecognised influence on Cambridge. They are the source of a large number of successful spin outs, solving client problems on a global basis. Cambridge now has 7 science parks, the Babraham Bioincubator, Cambridge Science Park, Granta Park, Melbourn Science Park, St Johns Innovation Centre, Peterhouse Technology Park and Cambridge Research Park.

10 VC firms have offices in Cambridge and a drop-in VC centre, Library House, has recently opened for out of town VCs. With offices in Station Road, Library House is handy for visitors. Over 50 memberships have been sold. Laurence explained that the funding market has recently changed dramatically. From the heady days of the late 90s when funding Euro 100m per company was common, it was now back to basics and back to an early 90s model where total funding of Euro 25m in 4 rounds would be more likely.

## FUTURE WINNERS

Cambridge world class R & D, commercial know-how, management expertise and success track record are generating plenty of future winners. Laurence mentioned Cambridge Silicon Radio, Cambridge Positioning Systems, 3G Labs, Arakis, Psytechnics, KuDOS, Adprotech, Ribotargets and Cambridge Display Technology. Biotech is now the biggest industry in town. There is a detailed survey of

Biotech in the Cambridge Phenomenon Revisited for those wishing to know more. I expect they will all need computing!

The ingredients for success are strong technology, a global outlook and aspirations and a management team that can deliver. Many people are finding Cambridge a pleasant place to live and bring up a family. You can even cycle to work. This is attracting more talented business managers into the town.

Laurence's key closing messages:

- Cambridge has a great track record
- It was flattered by the tech boom which has still not yet completely unravelled
- Cambridge has the ingredients for future success
- Future winners will come from old fashioned funding styles

It's a good time for seasoned managers to join a Cambridge company and help it grow bigger. It's a good time to start a new business from scratch. Old business models are breaking down. New opportunities are emerging. Talented staff are coming on to the labour market.

## Cambridge Computer Lab Ring Q1 events calendar (see also [www.camring.ucam.org](http://www.camring.ucam.org))

### 23<sup>rd</sup> January 2003

#### Telecommunications and Network

16:15 William Gates Building, Lecture Theatre 2

At what point does the telecommunications industry sit in the economic cycle? What sectors will drive its return to health? What's 'hot'?

To answer these questions we have invited David Cleevely, Founder and Chairman of Analysys, to talk to the association.

### 20<sup>th</sup> February 2003

#### Key Trends in Wireless Computing

16:15 William Gates Building, Lecture Theatre 2

Speaker: Andy Hopper, Professor of Communications Engineering, LCE, University of Cambridge, Department of Engineering. Professor Hopper is also the founding director of Virata Corporation and IPV Corporation as well as founding Chairman of Cambridge Broadband Ltd, RealVNC Ltd and Cambridge Internetworking Ltd.

### 17<sup>th</sup> March 2003

#### Lab Update followed by Reception and Annual Dinner

Booking form enclosed.

The talks are unticketed but capacity is limited so to reserve a place please email [jan.samols@cl.cam.ac.uk](mailto:jan.samols@cl.cam.ac.uk) or phone 01223 763585.

## Smart Card Defence Technologies

by Dr Simon Moore

The EU-funded 'G3Card' project has developed a significantly better way to design smart cards. Ross Anderson and Simon Moore have lead a team in the Computer Laboratory to develop a prototype chip which has been tested extensively by Gemplus (France) and NDS (Israel).

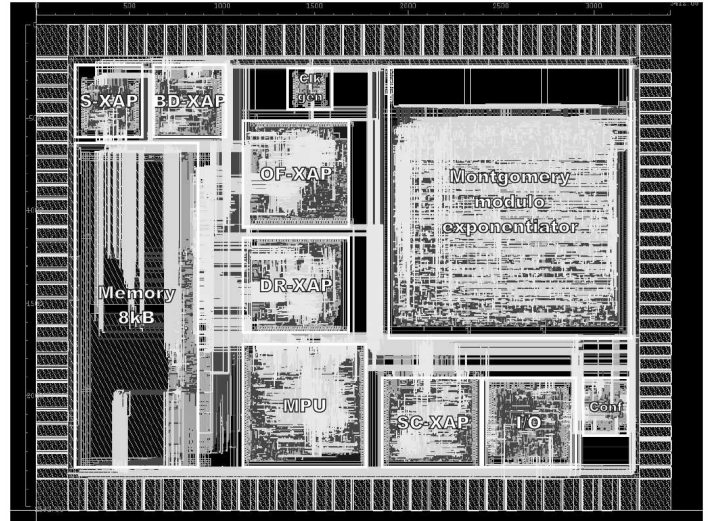
The new technology incorporates into hardware two critical defences against attack that until now have been implemented --- expensively --- in a combination of hardware and software. The result is a platform that offers improved security, is easier to program, offers easier maintenance of both hardware and software, and also has a number of side benefits such as reduced RFI/EMI.

The goal of the project was to make the CPU immune to two troublesome types of attack: power analysis and fault induction. The industry's growth has been held up by the attacks based on observing the current drawn by the CPU, or by causing components in the chip to fail. Ideally, to prevent such attacks, the current consumed should not depend on the data being processed, and the failure of a single transistor should not allow sensitive data to leak. The problem is that adding hardware countermeasures to an existing CPU using conventional design techniques is complex and time-consuming. Countermeasures are therefore implemented partly in hardware and partly in software, both of which become progressively more complicated and expensive to maintain. The skill required of programmers grows continually, and evaluation becomes more expensive.

New thinking was required. Ross Anderson and Simon Moore came up with the idea of redesigning the CPU using balanced asynchronous logic. In this system, a logic bit is communicated using two wires rather than one: for example, '0' may be transmitted as 'HL' and '1' as 'LH'. There is also an alarm state, which might be 'HH'. Circuit components such as gates, adders, and registers are now redesigned to meet two security objectives: that current consumption be data-independent and that single-transistor failures result either in a reset or in safe deadlock. Given a library of such components, an existing CPU design can be reimplemented in a way that stops both power analysis attacks and fault induction attacks.

This work was funded by the EU under the Fifth Framework to the tune of Eu 2.3m in a project that also included ARM, Gemplus, NDS, Cryptomathic and the Universities of Manchester and Louvain-la-Neuve. This project, known as 'G3Card' (for 'third generation smartcard') will be concluded this fall and has been successful. The test chip fabricated so far contains versions of a 16-bit processor designed using conventional clocked logic, standard self-timed logic (of various kinds), and the new balanced asynchronous logic. The new technology gives a high degree of resistance against known attacks.

The project is now at the stage of commercialisation and ready for initial licensing. Where state-of-the-art security, maintainability or memory size is the main customer concern, the new technology offers sustainable competitive advantage.



The test chip

### THE RIGHT DECISION

Careers for Computer Scientists

A talk to the Cambridge Computer Lab Ring.

Meeting Report by Stephen Allott

Director of Development, Cambridge University  
Computer Lab

Careers are an important topic judging by the large audience of over 70 people who gathered in Lecture Theatre 1 in the William Gates Building. Many current students and recent graduates attended as well as more senior members of the Association.

Mike Muller, Chief Technology Officer from ARM in Cambridge was the first of our 2 speakers. His first piece of advice is that making predictions can be dangerous. Don't make decisions which rely too much on a prediction coming true.

Mike read Computer Science at Fitzwilliam College, graduating in 1980 in the era of music on vinyl and Pong, one of the first computer games. His first career decision occurred at the cash machine at Barclays Bank in Cambridge where he heard from a friend that Herman Hauser's company, Cambridge Processor Unit, was holding interviews. After a successful interview with Herman, Mike took the job. The company was soon renamed Acorn which soon landed the contract to develop the BBC "B" computer. Acorn had huge success with the BBC "B" and a generation of British children learnt programming and computer skills with this machine. The lesson to draw from this experience is listen to your friends and acquaintances for career tips and opportunities. Another lesson from Acorn is make sure you ask for share options.

Mike took 3 years off to do a Ph D in the Computer Lab and on returning to Acorn, worked on designing Acorn's RISC chip which Apple wanted to use in their early PDA, the Newton. After Acorn was restructured, having gone bust twice in 10 years, Mike left to co-found ARM, Advanced RISC Machines, to continue to develop the ARM processor. Having checked job opportunities abroad, ARM was the best bet. He recounted an early meeting in the pub with the businessman who had been recruited to be the chief executive. As all the founders were technical, he went around the room assigning senior management

jobs. Mike was told that he was becoming Marketing Director. The lesson from this experience is be prepared to take your opportunities when they come along. Mike found that sales and marketing people are really important in a business although technical people don't always realise this.

Things went well at ARM. However, Mike went for the second of his only 2 job interviews at HP Research. Wanting to find out what other opportunities existed, he decided, wisely, to stay at ARM. The lesson here is be aware of other opportunities but do not change career for change's sake. Also know your own character and aspirations. Make sure you have a good team around you. The quality of people you work with is very important. On work / life balance, know when to go home. Make sure you can balance your life appropriately. Listen to customers intently. Understand and solve their problems rather than merely pushing your technology. Every problem is an opportunity. When an internal problem arises, think out some solutions before going to your boss.

We thanked Mike for his advice which was beautifully illustrated. Acorn and ARM are 2 of the greatest success stories in Cambridge computing. Acorn employees have launched more than 30 companies. ARM has established a strong market position all over the world.

Steve Harrison from Logica was our second and final speaker. Logica is the largest UK headquartered IT services firm and the second largest in Europe. Steve graduated in Natural Sciences from Queens in 1978 and initially started work as a geophysicist. He then bought a BBC "B", learnt BASIC and got a job with Ferranti. Steve says IT is a great industry, a good choice of business to be in. Like steel in the 19<sup>th</sup> century, it's at the heart of our modern economy. Everyone needs it.

Steve explained that there are 3 main types of IT employer outside academia; product vendors (like ARM), end users and services companies (like Logica). Each type of career has different characteristics.

Services companies do a very wide variety of work across a broad range of technology products. There are many services companies to choose from. The larger ones will offer good structured training programmes for graduates and provide valuable experience. They are very customer driven and require personal flexibility and mobility. You may have to work on the client site from time to time during a project. They have only a small amount of R & D work.

End user companies offer greater "breakout" career opportunities, where one can change from a technical role into non-technical role such as sales, marketing, general management or operations. Jobs in wealthy industries can be very well rewarded. IT people in the City of London have been well paid. Pay levels reflect the economics of the specific industry so don't expect much money if you go into local government IT. There is more limited exposure to new technology and applications and end user IT operations can be outsourced. Customers are internal and the IT operation will take on the characteristics of the host industry.

Product vendors are where the R & D happens. There is a very wide choice of companies to work for but one is limited to one vendor's products. The

companies' fortunes can hang on one product. You deal with both internal and external customers. Many of the traditional computer industry players have been US dominated but there are plenty of European companies as well.

Be clear on where you want to go in the long term when making career decisions. Technical expertise is a good start but there is a technical ceiling which one can reach at the age of 35 or so. There is a spectrum of technical challenge from product vendor (highest), to services company (middle) and end user (lowest in most cases).

We had a lively question and answer session. Computer Lab Ring members can obtain informal careers advice from volunteer senior members. See the web site for more details [www.camring.ucam.org](http://www.camring.ucam.org) or contact [jan.samols@cl.cam.ac.uk](mailto:jan.samols@cl.cam.ac.uk).

## Profile – Blue Technologies and Masabi

*In a series of articles over forthcoming editions, 'The Ring' will be profiling companies founded by Computer Lab graduates. In its first interview, 'The Ring' talked to Tom Godber and Sean Mullaney who founded Blue Technologies and Masabi shortly after graduating from Corpus Christi in 2000.*

*TR:* Can you tell me about your companies?

*SM:* We originally started Blue Technologies as an IT consultancy geared at "taking the hills", a strategy espoused by our previous employer – sadly introduced too late to actually save them from mass lay-offs! The basic idea is to identify a key problem in an industry (the "hill") and work with a partner in that industry to solve it, leaving us with an industry-leading solution to be sold on to other interested parties. As part of this process we've used Blue as a vehicle for taking on less ambitious jobs to pay the rent!

*TG:* So far we have identified two "hills" – our first spin-off, Masabi, is working in the mobile gaming sector where there is great potential for growth whilst most of the current major players in the games industry sit on the sidelines waiting to see how things will go. The second spin-off is Blue Control Systems, working with a partner in the refrigeration industry to enable a new business model that could redefine the market, whilst providing environmental benefits.

*TR:* What made you set up on your own and how did you go about it?

*TG:* We left Cambridge and went to work for an Austin, Texas based IT firm called Trilogy – at the time they were regarded, alongside Microsoft, as the leading recruiter of Computer Scientists from US universities and they were keen to expand into Europe. We went through three months of intense training (I remember working 36 hours straight on more than one occasion) that put us in some positions of amazing responsibility, talking to the CEOs of Pizza Hut, Taco Bell and KFC and spending a month pitching for new business at one of the largest pharmaceutical companies in the world. The culmination of training would have been the clinching of that deal, but the company hit financial difficulties and laid off half the employees including all the new recruits. Understandably this was upsetting, but fired

up by the training period and a large severance package, we decided to team up with an old friend who had been active in the CUE to try to implement the best practices we had been taught at Trilogy. We'd all had experiences in startups, so this was less of a jarring change than it might have been!

*SM:* In the early days all our business came through personal contacts, and whilst recently we've extended beyond this it's still an incredibly valuable means of finding work. The great thing about running an IT consultancy like blue is that your costs are minimal – a few laptops, an ADSL line – and we had the good fortune to have a friend whose office space we could borrow for meetings. You can go a long way with a professional web site, a few hundred nice looking business cards and the business and technical knowledge to back it up.

*TR:* Is it going well?

*TG:* Our main problem at the moment is that we have far too much work and not enough time to do it all! Masabi has had an immensely successful launch, with games out now and more in the pipeline, whilst Blue Control Systems has won a Smart award from the government to do a feasibility test on the technology we plan to develop. So yes, I think it would be fair to say everything is going as well as we could have hoped!

*TR:* What have been the biggest problems/difficulties you have encountered?

*TG:* One of our biggest problems is the state of the post-bubble technology industry – we really have picked a hard time to start any kind of IT company! This has made it hard for Blue to find clients at times and we have had a few crisis months when we were nearly forced to give up.

*SM:* We've also found our age to be a barrier at times – in some sales situations grey hair can be a huge advantage. We've had to work extra hard to be taken seriously with clients, though refreshingly in Masabi things often work the other way!

*TR:* What have you enjoyed the most or found most rewarding?

*SM:* For me, the main attraction of working at Blue has been the exposure I've had to all aspects of the company, from initiating a sales cycle to analyzing and modelling a client's business.

*TG:* I'd definitely agree with that – I think in the last 6 months I've done everything from creating a brand of Masabi in print and on the web, server-side Java development, putting out press releases, journalist interviews, business networking, game graphics design, through to generating business models and strategies. The beauty is that whilst we work long hours, we pick which those hours are – much like being a student again really.

*SM:* Actually good point – getting up at midday is the best part!

*TR:* What are your plans for the future?

*SM:* After we've finished the current round of games releases for Masabi, we aim to make the company more self-supporting so we can concentrate on overturning the refrigeration industry! We should start bringing in more people as soon as the cash

flow allows for it, so we'll be switching from running the companies as shoestring startups into more mature businesses.

*TG:* I'm quite partial to a small mansion on a beach in Brazil, but I guess that might have to wait until next year!

*TR:* What advice would you give other graduates thinking of starting their own business?

*TG:* I think the more experience you can get whilst still at Cambridge the better. Work for a range of companies in the holidays – both the big names and startups, of which there are plenty in the area – so you can decide what type of work suits you best. Starting on your own is certainly not for everyone, and you don't want to find that it's not for you when your rent, electricity, water, gas, phone, council tax and credit card bills all come in and there's no monthly pay cheque to cover them! Secondly, and perhaps more importantly, it's very important to leave Cambridge with as wide a network of people as possible. The people you see in the College Bar are going to be the future leaders of this country, and working the Old Boy's network – which exists and will continue to exist whatever the moral arguments against it – can be immensely valuable. Within five years even a Cambridge degree loses much of its impact on a CV, but those contact you make now have the potential to be golden for the rest of your life.

*SM:* Join the CU Entrepreneurs competition whilst still an undergrad – I was a finalist in 1999 and it's the best business training you can get whilst at Cambridge – by the end you could end up running your own company. More importantly, this is where you'll meet the future stars of the Cambridge business world (not in the College Boat Club). I cannot recommend the CUE experience enough as the starting block to a career as an entrepreneur. Finally, it's worth getting an update on the business startup community. Gone are the days of being handed money for a good idea – funding is scarce and the best way of creating a business is to start small and grow organically. Young people have started some of the greatest businesses in the world from a garage with nothing more than pocket change (Apple, HP, Microsoft etc) so get over the dot.com boom and get innovating!

*TR:* Tom and Sean, thank you very much. I wish you every success with Blue Technologies and Masabi and look forward to following their progress.

## **Science, Engineering & Technology Student of the Year Awards**

The Science, Engineering & Technology Student of the Year Awards (SET) are the Oscars of British science and technology education. For the second year in a row the Misy Award for the Best Computer or Computer Software Student has been awarded to a student of the Computer Laboratory. Congratulations to Timothy Hospedales (Jesus College, CST Part II in 2001-2002) who has won the 2002 award for 'Advances in Eye-Tracking'.

## Distinctions

**Dr Michael Salmony** (CST 1977) was appointed:  
Member of Multimedia Enquete commission of Baden-Wurtemberg and the national German government  
Member of the expert council of the German national Ministry of Education, Science, Research and Technology  
Member of the jury and supervisory board of Media@Komm  
Member of Multimedia Futurecommission of Booz Allen & Hamilton  
Member of the 'Bank-IT' advisory board for Handlesblatt  
Member of Advisory board of CMG plc, Germany

**Dr C-K Toh** (PhD 1993-1996) has been appointed:  
IEEE Distinguished Lecturer (2002-2003)  
Chairman, IEEE Technical Committee on Computer Communications  
Editor, IEEE Transactions on Wireless Communications  
Director of Research, Communication Systems Organization, TRW Tactical Systems Division

## Publications

**Dr C-K Toh** (PhD 1993-1996) has had published:  
"Ad Hoc Mobile Wireless Networks", the Prentice Hall Engineering Title Best Seller. He has also received the Best Technical Journal Paper Award by the Korea Science/Research Council, 2002

**Prof Heinz Lemke** has edited:  
"Computer Assisted Radiology and Surgery", Proceedings of the 16<sup>th</sup> International Congress and Exhibition.  
Thank you to Professor Lemke for sending a copy of the book to the Ring. For those who may be interested, the book can be found in the library at the Computer Laboratory.

## Business Hall of Fame

Thank you to all those who contacted us to add a company to the list. They are as follows. The full list can be found on [www.camring.ucam.org](http://www.camring.ucam.org).

**Alex Hsu Siu Chi**  
Creature House (f.1994)  
*Software developer and research lab in computer graphics*

**Conchur Dickinson**  
**Simon Freytag**  
Anondesign (f.1999)  
*(Comprehensive e-business software)*

**Tom Godber**  
**Sean Mullaney**  
Blue technologies (f.2001)  
*Creates software solutions, combining the best of mobile and enterprise technologies*

**Masabi** (f.2002)  
*Develops games and entertainment applications for the next generation mobile phones and connected PDAs*

**Roger Hale**  
**David Milward**  
**James Thomas**  
**Sylvia Knight**  
Linguamatics (f.2001)  
*Creates products and conducts cutting-edge research in the areas of Information Extraction and Dialogue Systems*

**Andy Hopper**  
Orbis Ltd (f.1978)  
*Networking equipment. Sold to Acorn in 1979*

**Acorn Computer Ltd** (f.1979)  
*BBC Computer system. IPO on USM (London) in 1982, spun out ARM in 1990. De-listed in 1999 and ARM shares distributed to shareholders in lieu*

**Qudos Technology Ltd** (f.1985)  
*E-beam chip prototyping and CAD software. Based at Chilton*

**Olivetti Research Ltd** (f.1986)  
*Industrial research. Sold to AT&T in 1999. Closed in 2002.*

**Virata Ltd** (f.1993)  
*DSL semiconductor. IPO on NASDAQ in 1999. Merged with Globespan to form GlobespanVirata in 2001. Based in Red Bank, New Jersey*

**IPV Ltd** (f.1996)  
*Video management software. Based in Cambridge*

**Adaptive Broadband Ltd** (f.1996)  
*Fixed wireless equipment. Sold to California Microwave in 1998*

**Cambridge Broadband Ltd** (f.2000)  
*Fixed wireless equipment. Based in Cambridge*

**Real VNC Ltd** (f.2002)  
*Remote control software. Based in Cambridge*

**Cambridge Internetworking Ltd** (f.2002)  
*High speed networking equipment. Based in Cambridge*

**Hans Hsu**  
**Fecilite.com** (f.1999)  
*A universal gift registry where people can register gifts from any store, for any occasion*

**Peter Jones**  
**Metrica Systems** (f.1993)  
*Leading provider of network performance systems to Wireless operators.  
Awarded Queen's Award for Export 1997  
Acquired by ADC Telecommunications*

**Adam Martin**  
**GreX Games Ltd** (f.2001)  
*Develops Massive-Multiplayer Online Gaming (MMOG) technology, enables games developers to write MMOG's for internet and/or mobile gaming with hundreds of thousands of simultaneous connected players*

**John Moore**  
**JMEC Ltd** (f.1989)  
*Specialises in Cathode Ray Tube circuitry, video signal processing, and graphics applications*

**Andy Rawson**  
**First DBS Ltd** (f.1985)  
*Independent consultancy delivering high quality tailored services, focused on delivering business benefits*

**Chris Royle**  
**Objectronix** (f.1997)  
*Network security and design consultancy specializing in implementation and management of security systems including firewalls, content inspection and IDS*

**Mark Yudkin**  
**Yudkin Consulting AG** (f.1989)  
*Software and Systems Engineering (Finance and Statistics)*

## Computer Laboratory News

### New Staff

Sean Holden has joined the permanent staff of the Computer Laboratory as a Lecturer in Artificial Intelligence. Sean started life as an Electronic Systems Engineer, completing a BSc at the University of East Anglia. However, realizing that he found mathematics and AI much more interesting, he then moved to the Signal Processing Group at

Cambridge University Engineering Department (CUED) to do his PhD, applying computational learning theory to a particular class of neural networks. He was briefly a postdoctoral researcher at King's College London working on very high order digital filters before returning to CUED as a postdoc in the Speech, Vision and Robotics Laboratory.

From 1995 until his move to the Computer Laboratory, Sean was Lecturer in Computer Science at University College London, where among other things he set up and directed the advanced MSc in Intelligent Systems while continuing research in computational learning theory and the application of support vector machines to drug design.

Apart from that, Sean continues his ongoing attempts at musical immortality by playing drums and more recently the mandolin family, in particular mandocello and Irish bouzouki. He also tells us that he makes occasional use of an angle grinder to strike fear into the heart of a recalcitrant classic car, which will one day emerge from his garage as a thing of exquisite beauty.

### Graduates in the News

We would welcome news of any appointments, distinctions gained or honours and awards made to graduates of the Laboratory. Please contact the Cambridge Computer Lab Ring office.

## Correspondence

"At least the Diploma is useful for something"

*Annette Haworth (nee Dyer) came from reading Mathematics at Oxford to the Computer Lab in 1968. She met Guy (also from Oxford) by the Green Door on Corn Exchange Street, going in to register for John Larmouth's FORTRAN course on the Diploma. When Annette and Guy were married a few years later, Maurice Wilkes said "At least the Diploma is useful for something".*

*Since finishing the Diploma, Annette has stayed on the University circuit and here she updates us with her news.*

After the Diploma, I worked at the CUP Printing House for three years with Neil Wiseman, on their pioneering computer typesetting system. I moved for a brief spell in Ferranti, real time programming. I then joined Reading University where Leonard Dresel (who had been in the lab in 1949) was Director, as a systems and communications programmer in the halcyon days when one had to write one's own operating system before getting started on any application. I was also a great believer in taking BCPL with me onto any machine. I became Project Manager for future development in the Computer Centre, and worked part-time for several years while the children were young. In this period I worked briefly for Alan Robiette, who I had first met in the Lab's teletype queue in the late 1960's. In 1986, I became Deputy Director of Computer Services under Peter Kemp (Diploma 1967 I think), and Director when Peter moved to Glasgow in 1987. In the mid 1990's I was elected Pro-Vice-chancellor for a four year term and am now Director of Information Services, a post grandly titled a 'Chief Officer' of the University (which means I get to go to posh dinners), running the Division which includes IT services, the

University Library and, rather surprisingly, an oversight of the University's special collections, particularly the Rural History Centre and Museum. Like everyone, I have sat on far too many committees to remember, and am currently non-Executive Director of our NHS acute hospital, governor of a Quaker School, a director of EDSERV which provides CHEST and ATHENS authentication service for UKHE/FE and sit on Oxford's ICT committee. I seem to meet ex Computer Lab people everywhere, most recently David Hartley at the BCS AGM who said he reckoned 'he'd taught us all'.

*Professor John Bennett (Sir Maurice Wilkes's first research student), responding to the receipt of "The Ring", sent some details of his career*

After four years in the RAAF ground radar, I entered the computer field in 1947 as a PhD student with the Cambridge University EDSAC team. I spent 1950 to 1955 with Ferranti Ltd in Manchester and London and then returned to Australia in 1956 as Senior Numerical Analyst at the University of Sydney with responsibility for the management of the University's first computer, SILLIAC, and the organization of associated courses. In 1961, I was appointed to the Chair of Physics (Electronic Computing) and in 1981 the title of the Chair was changed to Computer Science. I have been President of the Sydney Association of University Teachers (1964-65), Chairman of the University of Sydney Appointments board (1970-74), Fellow of the University of Sydney Senate (1976-77, 1980-84) and President of the Sydney University Association of Professors (1977-78). I retired from the University of Sydney at the end of 1986 with the titles Professor Emeritus and Honorary Associate.

From 1959-1963, I was foundation Chairman of the Australian National Committee for Computation and Automatic Control (ANCCAC). In 1965 I was President of the NSW Computer Society and in 1966 became foundation President of the Australian Computer Society (ACS). I am an Honorary Life Member of ACS and in 1980 received an ACS Chips Award. He was co-editor of "Computing in Australia" – the history of ACS's first 25 years. I was Vice-President of the Intl Federation for Information Processing (1975-78), and Trustee (1974-75, 1978-80). In 1981, I was elected a Governor of the International Council for Computer Communications of which, from 1988 to 1993, I was the Secretary General. In 1981 I was elected a Fellow of the Australian Academy of Technological Sciences and Engineering and, in 1983, became a member of the Council of that Academy. In 1982, I received the Officer of the Order of Australia award and in 1985, was awarded the 1984 ACS ANCCAC Prize.

In addition, I have served on the boards of two computer companies and have acted as a consultant on various computer matters to a number of companies, universities and government and UN agencies. I was a member of the Australian Government Committee on the Computerisation of Legal Data (1973) and the Committee on Privacy (1973). I visited the UK in 1966 as a British Council Distinguished University Scholar and, in 1975, as a Commonwealth Visiting Professor. In 1981, I visited Stanford University as an Australian-American Educational Foundation Senior Scholar and in 1988-89, spent a term with the National University of Singapore as a Visiting Professor. At various times I have been invited to lecture in Hong Kong, India,

New Zealand, the People's Republic of China, UK,  
USA and Russia.

I have published over 150 papers and technical reports mainly on various computational aspects of using computers and associated social effects. Recently, my interests have been in the use of Groebner bases (for solving sets of polynomial equations arising in the solution of certain engineering problems), in information retrieval, and in workforce and privacy implications of computer usage.