

The Ring

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Ring news

Hall of Fame Awards

The 2009 Hall of Fame Awards were presented at the Ring's Annual Dinner

The awards for company and product celebrate the successes of companies founded by Computer Laboratory graduates. To date 163 companies have been founded by graduates of the Computer Laboratory. They are awarded by the Ring Council from nominations by members.

The award for publication of the year goes to the best published paper by a Lab graduate and is awarded by an academic panel from the Lab.

Company of the Year

Linguamatics

Product of the Year

OpenPMF from ObjectSecurity

Publication of the Year

"Pedestrian Localisation and Indoor Environments" by Oliver Woodman and Robert Harle

The deadline for nominations for the Hall of Fame Awards is February 1st 2010. Please use the nomination form on the Web site or send nominations to jan.samols@cl.cam.ac.uk.

Annual Dinner

The 2009 Annual Dinner, once again a sell-out, was held at Queens' College on April 2nd.

The evening's programme kicked off at the Computer Lab with Hall of Fame Award winner Oliver Woodman giving a brisk lecture about his work on indoor pedestrian navigation (see page 9) followed by the Ring's AGM. Proceedings then moved to Queens' for a drinks reception followed by dinner in the spectacular hall.

ARM's Mike Muller gave an insightful and entertaining speech, sharing his three top lessons from his distinguished career. Stephen Allott did a typically polished job as master of ceremonies for the evening, and presented the Hall of Fame Awards.

Conversation continued well after dinner, and a good time was had by all.



Alison Spottiswoode chats with Martin Hollis (right) and Roger Hale, (centre), co-founder of Linguamatics, winner of the Hall of Fame Company of the Year award.



Stephen Allott (centre), master of ceremonies, at the drinks reception.



Sharing a joke over dinner

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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.

Governing council: Prof. Andy Hopper (TH78) (Chair); Stephen Allott (T80); David Colver (CHR80); Peter Cowley (F77); Robert Folkes (EM82); Lorenzo Wood (CHR93)

Careers committee: Peter Cowley (Chair); Andrew Herbert (JN75); Chris Morgan (JE01)

London Ringlet: Alastair Gourlay (SE02)

Comment

Open source for hardware? Jeremy Bennett is looking to establish the UK as a location where open source hardware businesses can proceed on a reliable legal footing.

Open source is well established as a business model in the software world. Red Hat is now approaching the market capitalisation of Sun Microsystems, while IBM, the world's largest patent holder, makes more money from open source than other software (source: BBC Radio 4 'In Business'). Major tools such as the Firefox web browser, the Apache web server and the Eclipse IDE are all open source.

But open source is more than just a business model. It is a change to the underlying approach to business. Open source software is "free" in the sense of "freedom" — as a customer you have the source code and you are "free" to do with that software as you wish, just so long as you pass on that freedom to others.

A consequence of that freedom is that open source software is usually also free in the sense of "not paying". A supplier can, if they choose, charge for their open source software — but their customers are free to pass on that software for no charge. When Red Hat started to charge for their Red Hat Enterprise Linux (RHEL), CentOS Linux started to redistribute RHEL free of charge, recompiled with any Red Hat proprietary material removed.

Open source works as a business model, because the marginal cost of distributing software is effectively zero. While users will typically pay nothing for the product, they stimulate a market, within which revenue can be generated. For a Web-based application the revenue may come from traffic-based advertising. With a software tool, revenue comes from the 1% of customers who need services based around the tool. For any area where there is high volume, the business model is a winner.

As a consequence, open source software development is a service rather than a product business. Business is more consultative, and revenue grows incrementally as the software becomes more popular. Fewer dot.com millionaires, but a relatively stable income for the professional programmer.

Now here's a novel idea. What about open source for hardware? At first sight this seems a non-starter. Open source relies on the nil marginal cost of software distribution, but hardware has to be manufactured.

But a modern silicon chip is typically built from silicon "intellectual property" (IP), written in a hardware description language such as Verilog or VHDL. Fabless design houses may never produce a chip themselves — one of the largest and best known is ARM in Cambridge, whose processor IP is built by other companies into one billion chips every month. That IP costs the same amount to produce, whether it goes into one chip or one billion.

The marginal revenue from this silicon IP is tiny. It is an urban myth that the company supplying the cellophane film covering a mobile phone's screen earns more than ARM from each phone, but the myth contains a grain of truth. ARM, as market leader, makes pennies from each phone. Smaller players make far less, or even receive just a one-off payment. For them the marginal revenue is nil.

The other factor is that the cost of any modern hardware is dominated not by the cost of the chip, but by the cost of the software that will run on that chip. In a modern product, there is far more value in the software than in the hardware, and that software will need regular updating to keep the product viable.

This gives the recipe for open-source hardware to work, at least for silicon IP. A marginal cost of nil and an associated product (the software services) whose value is pulled through by volume. Give away your silicon IP and software and make your money from servicing the software.

There is already a considerable amount of open-source silicon IP, and hardware design companies such as ORSoC AB in Sweden and Beyond Semi in Romania who work with such IP. However, a first glimmer of the complete approach can be seen with Google's Android open-source operating system for mobile phones. Google isn't giving away the hardware (yet), but put Android together with the OpenMoko open source phone and you have the complete story.

There is a fly in the ointment — the legal position. Open source software relies on licenses such as the GNU General Public License (GPL) to enforce the “freedom” rules. These in turn are based on copyright law, which has for a long time been held to apply to software and its contracts, even though it is explicitly not suitable for hardware use.

Although silicon IP is written in a description language, its results are typically disseminated through manufacture, not publication. This is governed legally by patent law and, unlike copyright, patents costs time and money to obtain. There have been some efforts to write an open source license that would work for hardware — most notably the Tucson Amateur Packet Radio (TAPR) Open Hardware License — but this is still a long way from the maturity of the GPL.

I have recently started discussions with the National Microelectronics Institute (NMI), the trade body for the UK electronics industry, exploring the possibility of a definitive open hardware license that is robust in English law. We have a candidate first project, developed in the Computer Lab by Marcelo Pias. The goal is to establish the UK as a location where open-source hardware businesses can proceed on a reliable legal footing. If you would like to help, please get in touch. In particular we’d like an academic lawyer versed in this area of the law to get involved.

I believe open source hardware will have an important role in the computer industry in the future, just as open source software has an important role today. I hope my efforts will contribute to that success.

Dr Jeremy Bennett (EM BA82 PhD88) is Chief Executive of Embecosm Limited. Embecosm (www.embecosm.com) provides open source services, tools and models to facilitate embedded software development with complex systems-on-chip. He is an active contributor to the OpenCores project (www.opencores.org). Contact him at Jeremy.bennett@embecosm.com

Who's who

Andrew Adamyk (PET BA86) is a business manager for Microsoft in the US.

Stephen Ades (T PhD86) is working for Simmtronic as a senior software engineer.

Noha Adly (CC PhD95) is deputy head ICT sector at Bibliotecha Alexandrina in Egypt.

John Anderson (PEM BA75) is working for Logica.

David Annis (CC MA86) is head of managed services at SAS, a software services company specialising in business analytics.

Simon Arrowsmith (CHU Dip93) is a senior software engineer at Grapeshot.

Mark Ashdown (CHU BA99 PhD04) is a research engineer at Thales Research and Technology, UK.

Richard Atkinson (CHU BA00) is a director at Atkinsoft Ltd, an intellectual property consultancy in software and electronics.

Paul Austin (F MA88) gained his PhD from the University of York in 1991. He is now a senior product engineer ETAS Ltd, a subsidiary of Robert Bosch.

Michael Bannister (EM BA05) works in software development for the John Lewis Partnership.

Christopher Barrington Brown (CAI MA79) founded Cuning Running Software Ltd, a small software house specialising in defence and counter-terrorism applications.

Neil Barton (K BA71 Dip72) has founded TransportTelematics to provide independent advice to major transport sector clients in the public and private sector.

Christopher Barwise (DOW BA84) is a consulting IT specialist for IBM.

Iain Betson (SE BA94) is a software engineer for Alcatel-Lucent.

Subir Biswas (DAR PhD96) is Associate Professor, Electrical and Computer Engineering at Michigan State University.

Branimir Boguraev (T PhD80) works for IBM Research in the US.

Anthony Bolton (CHU BA94) is a project manager at IPL in Bath.

Timothy Bond (CHU MA85) works as a software architect for Neosaej Corp in the US.

Youssef Bouguerra (PEM Dip98), now in Sao Paulo, has founded Newstart Consultoria.

Steve Bourne (T Dip66 PhD70) is CTO of El Dorado Ventures in California.

Sebastien Bratieres (CHU MPhil01) works in Brussels for Voice Insight where he is deputy CTO.

David Brooks (CC BA71) is a test lead at Microsoft in Redmond. David spends his spare time flying.

Sam Brooks (ED Dip02) is an investment associate for Insight Venture Partners in New York.

Simon Brown (T BA91) is a senior R&D engineer at Broadcast video. Simon is responsible for the design of all new products.

David Burnett-Hall (TH Dip55) has retired as a reader in Computer Science from the University of York.

Rachel Cardell-Oliver (Q PhD92) is a Professor at the School of Computer Science and Software Engineering at The University of Western Australia.

David Carter (KDip80 PhD86) is an R&D engineer at Autonomy Systems.

Tom Carver (CL MEng) is a software developer at Motion Software in Aberdeen.

Rob Charlton (CHU MA94) is CTO at Savage Minds Ltd, a mobile service provider.

Nick Chastney (CC BA83) is a senior software analyst at Convergys.

Jonathan Clay (DOW BA81) is VP Engineering at VerticalResponse Inc in California.

Steve Cook (CAI MA69) is a software architect at Microsoft in Cambridge.

Robert Cooper (CHU PhD88) is Director of system architecture at Mercury Computer Systems in Massachusetts.

Tim Coote (CAI MA80) is now working as EVP EMEA Operations at Adaptivity Inc.

Francisco Corella (CC PhD90) is CEO of Pomcor in San Diego. Pomcor conducts research on Web technology.

Paul Crouch (R BA87) works for hedge fund Cantab Capital Partners.

Patrick Dark (CC MPhil90) is a senior manager at Blackboard.

Jeremy Davey (R MA89) is a global technology strategist at Microsoft in Reading, UK.

Neil Davidson (T BA93), co-founder and joint CEO of Red Gate Software, has become the new chairman of Cambridge Network Ltd.

Alex Davies (JN BA08) works for Red Gate Software in Cambridge.

Chris Dawson (CC BA96) is a senior IT architect for IBM Global Services in Maryland.

Allan Dean (CC BA94) is a manager at Ernst & Young in London. He is currently technical architect for the National Identity (ID Card) scheme.

Langjie Deng (CHU Dip07) is a software developer for Blackberry.

Mark Denne (SE BA82) is a director and the chief architect at Intuit in California. Mark's book — *Software by Numbers* — was published by Pearson Press in 2003.

Julien Dersy (W MPhil96) is responsible for departure control system product management at Amadeus, the provider of IT solutions to the tourism and travel industry.

Conchur Dickinson (K MA00) has founded Acidy Ltd, specialising in the development of bespoke database systems.

Nathan Dimmock (JE BA01 PhD05) has left Morgan Stanley. He now works for Facebook as a site reliability engineer.

Conrad Dirckx (CHU BA92) is a software project manager at Siemens Molecular Imaging.

Herve Duteil (W Dip90) is a managing director BNP Paribas Securities in New York.

Andrew Eames (TH BA86) works at Google in the US.

Philip Elder (SE BA85) has founded Xenon Technology, a supplier of data communications equipment and software.

David Elworthy (CTH Dip85 PhD93) is a software engineer at Google in California.

Innes Ferguson (CL PhD92) is a senior product manager at SpinVox Ltd.

Mike Field (CHU BA75) is a consultant at Mickleton Software Ltd and provides contract IT support for medium to large companies.

Benjamin Flynn (JE BA97) works for Logicalis as a senior pre-sales consultant.

Peter Ford (CHR BA02) is working at Atos Origin as an application developer.

Dr Charles Forrington (TH Dip59) runs a consultancy, Charles Forrington and Partners Ltd.

Jacques Fournier (TH PhD07) is a security architect at Gemalto in Marseilles.

Alex France (CHU BA76) is a principal consultant at FFEI Ltd.

Nicolas Furness (T BA95) is a GIS system architect and engineer. He has been involved in public and private projects worldwide, including post-9/11 work for the City of New York with the Department of Buildings.

Owen Garrett (JN BA93 Dip94) works for Zeus Technology as a product manager.

Jan Grothusen (R BA93) is technical director at Guidance Navigation Ltd.

Robert Hague (F BA99 PhD) is a senior engineer at Azuro, a provider of electronic design automation software for digital semiconductor chip design.

Bill Hammond (JN BA81) lives in Toronto where he is a senior project manager specialising in wealth management.

Gerhard Hancke (W PhD08) is a research assistant at Royal Holloway, University of London.

Michael Hardy (DOW BA83) is principal infrastructure engineer at ARM.

Ian Hargrave (DAR Dip92) works for Sartorius Mechatronics UK Ltd as the CFO.

Christopher Harris (DOW BA74) is an application developer for IBS-STL, the largest distributor of Christian books and median in Europe.

Glen Harris (HOM BA06) is a software developer at Global Inkjet Systems.

Peter Hartley (CL BA03) is a software engineer at Mentor Graphics, a leader in electronic design automation.

Alex Hassan (JE MA86) spent 14 years at Goldman Sachs where he was made

Technology Fellow. He subsequently worked as Chief Architect at Barclays Wealth. He is now pursuing personal interests.

Dave Hawkins (CHR BA98) is a principal software engineer at Oracle.

Trevor Heathorn (T MA 79 Dip80) is director of software development at Maxiscale Inc in California. Maxiscale is developing a scalable file system solution for Web 2.0 infrastructures.

Ian Henley (CTH MA81) is Chairman of ChangeBEAT.

Thomas Heron (CHU Dip92) works as a technical director for Sciforma in Paris.

Richard Hinchliffe (EM MA81) is head of IT, facilities and support at Ascribe Plc.

Peter Hutchinson (K BA76) is a CEO mentor at Merryck & Co. He mentors not only to CEOs but also senior executives.

Aidan Johnstone (HH Dip02) is a technical project manager at Telefonca O2 in Munich.

Adam Khan (Q MA95) is Deputy CTO at the Foreign and Commonwealth Office.

Brian Knight (CHU Dip77 Phd82) is principal software architect at Adventiq.

Justin Knight (PEM BA96) is a partner at Glassraven, a Web design company specialising in e-commerce.

Yioula Kyriacou (T BA83) is head of the administration and human resources division at the Cyprus Agricultural Payments Authority.

Neil Laister (CAI Dip85) is a director at Analytic Art, a Web site designer and publisher.

John Leake (EM MA72) is product strategy manager at Euronet Essentis, a provider of payment software and processing services.

Professor Miriam Leeser (Q PhD88) is head of the Reconfigurable Computing Lab in the Department for Electrical and Computer Engineering at Northeastern University, Massachusetts.

John Lindley (EM MA58 Dip59) has retired as director of IT Services at Durham University.

Anton Lokhmotov (R PhD08) is a research associate at the Department of Computing, Imperial College, London.

Scott Marshall (Q BA89) works for SpinVox as a software development manager.

John Mathieson (T BA81) is Director of System Architecture at California based NVIDIA.

Andrew McDonough (EM BA01) is senior software developer at sportcentric, the leading independent provider of Web-based software solutions to professional sports organisations.

Paul McLellan (SID MA75) is principal at GreenFolder in California. He provides consulting in business strategy, technology and marketing.

Professor Richard Millar (PEM MA86) is Dean of the Faculty of Computing and Engineering at the University of Ulster.

Philip Milne (W Dip86) is a director at BT where he oversees development for the Strategy and Innovation division.

Robert Milne (JE BA69) is a partner at Antelope Consulting, an independent consultancy that has worked on telecommunications policy and strategy since 1992.

Jim Minter (CHR MA03) is a sales engineer for Hewlett-Packard.

Gareth Morgan (CHU MA77) is Professor of Charity Studies at Sheffield

Hallam University. In addition to his work at the university, Professor Morgan is a senior partner in a spin-off firm of charity consultants, The Kubernes Partnership LLP.

Steve Muir (Q MEng96) is Chief Technology Officer of Vanu, Inc in Cambridge, Massachusetts.

John Nazareth (T Dip68) is a professor emeritus at Washington State University and an affiliate professor at the University of Washington.

Mark Nixon (R Dip90) works for Anglia Business Solutions, a software and IT consultancy, as product director.

David Olive (EM BA80) is a member of Google's technical staff in Austin, Texas.

Colin Palombo (JE BA90) is a managing partner at Innovation Framework Technologies, a company he founded in 2006.

Dennis Payne (T MA72) works for Cambridgeshire County Council as a GIS manager.

Julian Payne (K PhD86) works for IBM in France.

Andrew Peace (F BA05) is a programme manager at Citrix.

Darrell Penning (T MA83) is an enterprise architect at eaga, the UK's leading provider of residential energy efficiency solutions.

Noel Poore (CL BA85) is a technical director at Sun Microsystems in New Hampshire.

Andrew Pullen (CHU PhD88) is a programme manager at Primagraphics, now part of Curtiss-Wright Controls Embedded Computing.

Brian Quail (DOW MA91) works at Credit Suisse in London as a software engineer.

David Rawlings (CL MA88) is a technical consultant at DeltaRail Group, a specialist software and technology provider.

Mark Reynolds (CL BA08) works for UBS in London, where he is a technical analyst.

David Rhoderick (CL74) is a software consultant for IBM in Massachusetts.

Julian Richards (TH MA74) is a self-employed solutions engineer in Texas.

Neil Rickards (F BA01) is a quant developer for hedge fund BlueCrest Capital Management.

Frederic Rivain (DAR Dip01) is Deputy CTO at Visiware, the world-leading creator of games for pay television.

Andrew Robinson (K BA76) runs Seventh String Ltd, a provider of music software.

Dr John Robinson (CC MA56) is an emeritus professor of logic at Syracuse University.

Andrew Robson (R BA91) is Chief Executive of Perfect Image, a company he founded in 1991.

Val Robson (NEW MA82) is communications officer for the Diocese of Ely.

Mark Ryan (K BA86 Dip87) is a Reader in computer science at the University of Birmingham.

Krishnan Sadasivam (TH BA91) is a partner at hedge fund Brevan Howard.

Justin Salaman (CL BA07) has completed a Masters with the Music Technology Group at the Universitat Pompeu Fabra in Barcelona. He is now doing a PhD in Sound and Music Computing.

Christopher Salt (F BA02) is a team leader at Markit Group Ltd, a financial information services company.

Sanjay Samani (JE BA95) is a director at DayTime Software, an independent Mac software vendor.

Chris Scoggins (K Dip87) is Chief Executive at National Rail Enquiries.

Janet Scott (NEW BA87) is Deputy Headteacher at Sandbach High School & Sixth Form College. Janet is also a member of the UK Council for Child Internet Safety.

Peter Scott (JN MA83) is a partner at PSDT based in the Pacific North West.

Chris Sharman (EM MA85) is an IT consultant.

Daniel Sheridan (K BA99) completed an MSc in Computation from Oxford University in 200 and a PhD from Edinburgh University in 2005. He is currently working as a consultant for Adelard in the area of computer-based safety-critical systems.

Daniel Simonovich (HH 92) is a professor at the European School of Business (Reutlingen University) where he has been Dean and Vice President.

Dr Tim Simpson (T BA68) heads Simpson Consulting Partners.

David Singer (CC BA78 PhD81) works for Apple Inc in California.

Matthew Slyman (SE MA99) runs Slyman Data Services.

Damian Smith (T BA00) is a senior systems engineer at Global Inkjet Systems.

Donald Spicer (CC Dip83) is Associate Vice Chancellor and CIO at the University System of Maryland. The USM comprises 11 universities, two research institutions, two regional higher education centres, and a system office.

Alison Spottiswoode (CL BA81) has left Cable & Wireless. She is now a director at ChangeBEAT, the technology business expert and specialist in change management.

Christopher St John (G BA92) is a director at Primus Inter Pares, a software design and engineering consultancy.

Robert Stanforth (EM BA97 Dip99) is a senior developer at ID Business Solutions.

Jonathan Stankler (W MPhil92) is a partner and head of corporate finance technology at KPMG.

Mark Staples (CA PhD98) is a research at NICTA, Australia's Information and Communications Technology Centre of Excellence.

Daryl Stewart (CTH BA95 PhD01) works in electronics design automation.

William Stoye (M BA81 PhD86) works at Staccato Communications as a standards architect.

Bjarne Stroustrup (CHU PhD79) has added the 2008 Dr Dobb's Excellence in Programming Award to his many accolades.

Julian Styles (TH BA87) is an executive Vice President at Pi Shurlok, an automotive electronics supplier in Michigan.

Mark Taylor (Q BA98) is chief engineer at Pi Research, the market leader in high performance vehicle electronics and wind tunnel control systems.

Augustine Tibazarwa (F BA88) works as a consulting software engineer for Invensys Process Systems in Massachusetts.

Jason Trenouth (DAR Dip86) is head of development at Linguamatics.

Martin Turner (JN BA90 PhD94) is the visualisation team leader within the Research Computing Services at the University of Manchester. He is also an Honorary Lecturer within the School of Computer Sciences.

Hugo Tyson (K BA82) is a software engineer for radio chip maker at CSR.

Kobus Van Der Merwe (JN PhD98) is at the Networking Research Department of AT&T Labs Research in New Jersey.

Chris Vaughan (CHR MA90 Dip91) is a partner at Harrison Goddard Foote, a UK-based firm of Patent and Trade Mark Attorneys.

Robin Wall (PET BA81) works for BeyondIT in NSW, Australia.

Chze Ling Wee (HH MPhil04) is a junior research fellow at Oxford University.

Martyn Wheeler (CTH MA80) is a senior computer systems analyst at Lockheed Martin Information Systems & Global Services in North Carolina.

John Whight (JN MA80) runs 54321 Ltd.

Nicholas White (CHU BA07) is a developer at Markit.

Jeremy Wilde (CC BA76 Dip77) works for BT as an information security consultant.

Gordon Williams (R BA94) is a programme manager at Cisco in California.

Quin Wills (M MPhil06) is the chief scientific officer at SimuGen, a Cambridge-based biotech company founded in 2005.

David Wolfram (T PhD90) is a senior manager at Accenture in Victoria, Australia.

Sarah Woodall (G MA80 Dip81) was principal software engineer at ARM and now runs her own publishing services company, Little Pink Cloud Ltd.

Duncan Woods (CL BA00) is a software manager at Garrad Hassan & Partners Ltd, an international renewable energy consultancy.

Carl Zetie (PET BA85) is a strategist at IBM in Virginia.

Indoor pedestrian location

Location information is an important source of context for ubiquitous computing systems. Hall of Fame Award winner Oliver Woodman describes a novel approach to locating people inside buildings.

Today, GPS allows a device to locate itself to within 25m in an outdoor environment, but indoor localisation remains an open research problem. Researchers have yet to develop a system which can be easily and cheaply deployed in a large building, whilst still providing accurate localisation.

We have developed a wearable indoor localisation system based on a foot-mounted inertial measurement unit (IMU). By using constraints such as the walls of a building, the system is able to locate and track a user without relying on any fixed infrastructure.

Our system consists of two filters. The first (low level) filter processes the IMU data, generating a sequence of 'step' events describing relative changes in position. The second (high level) filter combines step events and environmental constraints to infer the user's absolute position.

An IMU contains three orthogonal rate gyroscopes and accelerometers, which report angular velocity and acceleration respectively. It is possible to integrate these signals to track position. However, in practice rapidly-growing 'drift' errors are incurred due to the propagation of error terms through the integration steps. Even a state-of-the-art MEMS IMU will incur drift errors in excess of 100m within the first 60 seconds of operation.

In our system we use a foot-mounted IMU. By detecting when the foot is stationary, the low-level filter is able to apply periodic 'Zero Velocity Updates' (ZVUs), which correct velocity and tilt errors that have accumulated during the previous step. Using this technique, the growth of drift is reduced from cubic-in-time to linear-in-distance-travelled. Each time a ZVU is applied, a step event is generated which describes the relative change in position since the last update.

In our system a particle filter is used to infer the user's absolute position from a sequence of step events and a map of the environment. Initially the user's position and heading is unknown, so particles (each representing a candidate location) are generated across the entire building facing in arbitrary directions.

When a step event is received each particle is updated by propagating its state according to the step description, perturbed by random noise which models the potential drift incurred during the step. When a particle passes through a wall it is destroyed. As the user moves through the environment the number of candidate locations (particles) decreases, until they form a single cluster around the user's true position.

Rotational and translational symmetry in the environment can delay or prevent convergence to a single cluster of particles. Instead a number of distinct clusters may arise, each of which represents a possible location. One way of preventing such distributions is to constrain the initial location of the user. Our system is able to do this by measuring the signal strengths of WiFi access points. The observed strengths are compared to those in a pre-constructed radio-map to construct an initial region. Particles are then only generated in this region.

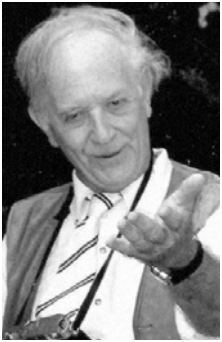
We evaluated the accuracy of our system by comparing it to the Bat system, an ultrasound location system which locates a transmitter to within 3cm 95% of the time. We found that our system was able to track a user to within 0.5m 75% of the time, and 0.73m 95% of the time.

In conclusion:

- We have developed a location system capable of tracking users to a high accuracy without significant infrastructure requirements.
- The system can exploit the availability of WiFi access points to speed up localisation.
- Such a system is ideal for tracking pedestrians in large, sparsely-populated buildings.

Read more about this research at
<http://www.cl.cam.ac.uk/~ojw28/localisation.html>

Stan Kelly-Bootle



Stan Kelly-Bootle, prolific author and one-time manager of Kevin Keegan, has enjoyed a parallel showbusiness career. After graduating in Mathematics from Downing College, Stan earned a Diploma in Numerical Analysis & Automatic Computing in 1954.

What's your favourite gadget at the moment?

My iPod Touch. The new App Store offers "Shakespeare": free searchable access to the Bard's complete works. No other gadget, to my mind, so compactly signals the advances in technology that were undreamed of in our EDSAC days.

What's your favourite Web site?

Two really: www.maa.org and <http://mags.acm.org/queue/>

What was the last book you read?

"Is Mathematics Inevitable? A Miscellany", Underwood Dudley, Ed., Mathematical Association of America, 2008. This is really a book for reading and random re-visiting. For fiction, I mostly listen. My last audio-book was "Revolutionary Road", with many nostalgic echoes of working for Univac in the USA.

What was your first job?

IBM UK, 1955. There were just five or six of us forming IBM's new computing division in Berkeley Square, London W1. Under MD Tom Hudson, we embarked on replacing dark-brown Hollerith with big, bright Blue.

What has been the most exciting moment in your career?

So many. Close call between MIT Press publishing my "Computer Contradictory" (1995) and Cilla Black recording my "Liverpool Lullaby" (1968).

What do you miss most about Cambridge?

The heady combination of academic challenge and folksong revival.

What do you miss least?

The joys of adversity! Supporting a wife and four children on a £300 p.a. student grant, supplemented by (very) odd vacation jobs.

Who have been your musical inspirations?

Ewan MacColl, Peggy & Pete Seeger, Fritz Spiegl and Richard Wagner.

Of all the people you have performed with, who was the most memorable?

Dominic Behan.

Do you still support Liverpool FC?

I bleed Anfield Red forever, although under pressure from genetically distorted family members. I belong to both Liverpool and Everton Supporters' Clubs. Scousers of the World Unite! We have nothing to lose but our whingeing accent.

Who would you invite (past or present) to your ideal dinner party?

In search of alcohol-aided ecumenical rapport: Newton and Leibniz; Edmund Wilson and Vladimir Nabokov; Edgser Dijkstra, JG Kemeny and TE Kurtz; Bill Joy and Steve Bourne; Niklaus Wirth and Dennis Ritchie; Bertrand Meyer and Bjarne Stroustrup; and my ex-wives.

What do you do to relax?

Following doctor's orders, I take N Co-dydramol tablets *per diem*, where $2 \leq N \leq 8$. If these fail, I listen to Mahler's 4th symphony, Ella Fitzgerald Sings Cole Porter, or Georges Brassens singing "Le Roi des Cons."

What's going to be the next big thing?

Liverpool FC's 14th League Championship? Think Red, not Black Swan! A boom in property values? Economical energy from Fusion? But on the medium/near-term technological front, you've posed the essentially unanswerable question, in so far as the answer might well vitiate the prediction.

Hubdub

Do you have a passion for news? Enjoy betting but don't want to risk losing your hard-earned cash? Tom Griffiths tells the Ring how Hubdub can help you satisfy both cravings.

TR: Tom, can you tell me about Hubdub? Where did the idea for a news prediction site come from?

TG: In a nutshell, Hubdub aims to bring the excitement of fantasy sports to other topics such as politics, business and technology news. It allows users to stake play money on the outcome of any news story, win more if they are right, and climb topic-specific leaderboards in competition with other news junkies. Users create the questions on which the other users make their predictions, and the forecasts produced by all the users' predictions turn out to be quite accurate. The idea came from the combination of two industries: on-line news, that has high reach but low engagement, and betting, which has high engagement but low reach. With Hubdub we are trying to see if we can get the best of both worlds.

TR: Can you describe your typical Hubdub user? How many users do you have? What's your target over the next 12 months?

TG: We currently have around 200,000 monthly unique users. These are typically well-educated news junkies with a competitive streak, and are usually male aged 20–40. Over the next 12 months we want to continue to grow at a similar rate. Also, in addition to traffic we focus on other metrics such as engagement and retention.

TR: How many questions are added and how many predictions are made per week?


TG: We are currently tracking about 75,000 live predictions on over 2,500 open user-created news questions. About 36,000 predictions and 800 of the questions were created in the last week. As you can tell, short-term markets (for example financial indices predictions and the weekend's sports matches) generate most interest.

TR: Congratulations. I see that, despite the dire state of the economy, you have recently raised £810,000 in Series A funding. What has attracted some of the big hitters in the European web scene to Hubdub?

TG: Yes, we were very pleased to close our Series A with Pentech Ventures right at the end of last year. I think they were excited by a number of the possible strategic directions for Hubdub, including its potential to offer media companies new ways to monetise their user bases or provide a new tool for market researchers. There was also a good fit with our team and theirs.



FEATURED QUESTION



PORKY PIG FLU: Will any country order the mass killing of Pigs by May 31st?

Yes 68% predict >

No 32% predict >

[Read more...](#)

Question suspends in 4 weeks Activity: H\$19,788

TR: How are you going to make money? Are you planning to white label your application and sell it to news providers?

TG: There are a few different ways we are looking at. One option is to collect a subscription for entry to premium competitions around specialist events, for example Wimbledon or the Oscars, with prizes for the top performers. Another is the white-label approach and we are talking to a number of news organisations about this, the upside for them being additional engagement, page impressions and therefore revenue. Right now we're lucky enough to be in a position where we are able to experiment with these different models to find the one that will scale.

TR: How has Hubdub been greeted by media pundits?

TG: Interesting question — most who learn of it find it an interesting take on what they do and are keen to join and make some predictions, and even suggest some questions to run on the site. We actually ran a subsite a few months ago called PunditWatch (<http://punditwatch.hubdub.com>) where we tracked the accuracy of professional pundits. A small number of them took issue with how we interpreted their predictions and our assessment methods. However, they were usually the ones who scored badly!

TR: How do you set boundaries as to what is acceptable to bet on? For example, I notice that some market predictions on deaths and assassinations have prompted outrage.

TG: We recently took the commercial decision to ban new markets on deaths and assassinations. We used to carry them because we felt they were news but, due to the number of complaints they generated, we were faced with an administrative cost without any real gain. Moreover, partners wouldn't want to carry them anyway. We will continue to evolve our policies in consultation with our userbase.

TR: Where do you see Hubdub in the next three years?

Our goal over the next year is to find a path to revenue that we are confident we can scale. As part of that and beyond I see a rich mobile version of the site, more high-profile partnerships and new types of prediction game. Our dream would be to breakthrough to the mainstream, like Twitter is doing now, and have our predictions quoted regularly on TV and in the papers.

For more information about Hubdub visit <http://www.hubdub.com>

Rebecca Goddard



Rebecca Goddard, a graduate of Newnham, married a Computer Lab graduate and moved from music to computer science.

I came to computer science later than most, having studied music at Cambridge. During my time at university I had a number of Compsci friends (I married one of them!), and had found their discussions interesting, even if I didn't always follow the finer technical aspects.

When it came to choosing a career I realised music wasn't for me and instead looked at other industries. I found a number of interesting jobs, but the one which stood out was working for a small IT security firm doing a number of roles (marketing, finance etc). I really enjoyed the environment of a small company and found the world of IT security fascinating. It was good knowing that through our ethical hacking we were able to help our customers lock down their applications/infrastructure and prevent unauthorised people gaining access. Roughly a year ago I switched company and joined Context Information Security, a bigger player in the IT security industry, which has a broader range of IT security services. It was created out of the founder's desire to find a world-class one-stop shop for IT security services. There wasn't one, so he set up his own! We work with our customers over a range of projects, and take great pride in the high number of referrals from our existing customers.

My own role at Context is rather diverse. I have day-to-day responsibilities in finance and operations, but also am called on to take charge of other projects. Currently I am helping set up a new quarterly pub evening for those in IT security (partly based on the success our sponsoring the London Ringlet bar!) and overseeing the production of a new corporate brochure while dividing my time between London, Cheltenham and Germany, the latter two being the locations of our new satellite offices which I am helping to set up.

I am really pleased to be working for Context. We have a fantastic team of techies who are not only great at what they do, but also good fun to be around (who can argue with the occasional firm game of Soldier of Fortune?). They have a very diverse skill set between them, which means that we are able to specialise in a number of different areas. A large part of what we do is testing companies' applications and infrastructure, but we also offer forensic services, as well as training courses for those who want to learn how to code more securely.

Due to our wide customer base we have a lot of interesting work come in, but unfortunately I can't write about any of it as we sign NDAs with everyone! However, one question I'm asked frequently is whether we employ (ex-)criminals to work for us in our hacking department. We don't — and given how good my colleagues are I'm very pleased they're on the right side of the law!

The other great thing about working in IT is the Computer Lab Ring, especially the London pub nights. These have always been enjoyable, and I have been able to chat to a great many people about their businesses. I am always impressed by the diversity of paths taken in the compsci world, from face mapping to gambling sites, shipping services to ink-jet printing — I've learnt a lot and made many new friends.

Hall of Fame news

Azuro

Azuro, a provider of software tools for semiconductor chip design, has launched Rubix™, a new clock concurrent optimisation tool. Rubix combines the separate design flow steps of physical optimisation and clock tree synthesis to deliver up to a 20% increase in chip speed.

blinkx

blinkx, the largest video search engine, has been selected by editors at CNET Webware as a finalist for the 2009 Webware 100 Awards in the Photo & Video category. The winners will be announced on May 19th 2009.

CamrivoX

CamrivoX, a Unified Communications innovator and developer of Computer Telephony Integration software has announced the public beta availability of Skype integration for its Flexor™ CTI family of products. Flexor CTI now unifies Asterisk based telephony and Skype with Microsoft Outlook and leading CRM applications providing users with the choice to make and receive calls in the way that suits them best.

Camvine

Camvine's CODA system has been deployed by The King's School, Peterborough. Camvine has provided The King's School with a system that allows them to schedule and deliver content to 11 screens around the campus — soon to be expanded to 17 screens. The entire network can be managed from anywhere including the admin office or from the Assistant Head Teacher's home, just using a standard Web browser. Moreover, the CODA system allows for the easy incorporation of up-to-date live data.

Cronto

Cronto, UK banking security specialist, has been named as one of the leaders in the Authentication and Security category of the Innovation Showcase by Finextra, the leading independent newswire and information source for the worldwide financial technology community.

Cronto and Commerzbank AG, Germany's second largest bank, have launched the visual transaction signing solution allowing selected customers to authorise their domestic transfer in "two clicks" using their camera phones.

Jagex

Jagex has appointed Mark Gerhard as Chief Executive Officer. Mr Gerhard was previously Jagex's Chief Technical Officer.

Masabi

Masabi, the secure mobile applications company, has been named a finalist of Red Herring 100 Europe, an award given to the top 100 private technology companies based in the EMEA region each year.

ObjectSecurity

ObjectSecurity has been awarded a UK Ministry of Defence (MoD) contract to carry out research related to agile Service Oriented Architecture (SOA) accreditation. The project was awarded by the MoD's Centre for Defence Enterprise and is managed by the MoD's Defence Technology and Innovation Centre.

RealVNC

RealVNC has announced its new BNC Mobile Solution that delivers remote control capabilities for mobile devices. VNC Mobile Solution now makes it possible for developers to build applications that can remotely control and manage any number of mobile devices or applications, anywhere in the world. VNC Mobile Solution is supplied as a Software Development Kit.

Trampoline

Trampoline has been selected as one of two Web Mission alumni to act as ambassadors for UK-based technology start-ups with global reach. Web Mission is organised by the UK Government to promote leading start-ups in America. By fostering connections and communications between companies on either side of the Atlantic, Web Mission aims to promote Britain as a home of innovation and vibrant startup environment.

Zeus

Zeus Technology, the software-based application traffic management company, has announced the launch of the Zeus Development Licence. Zeus Extensible Traffic Manager Development Licence will be available to web application developers at no cost to enable the creation, management and delivery of faster, more reliable web applications and services.

Don's diary



A day in the life of Jon Crowcroft, the Marconi Professor of Communications Systems in the Computer Laboratory

A few weeks ago, the Centre for Applied Research in Educational Technologies in the University contacted me about participating in a survey of how academics communicate. To this end, I kept a diary for three days, logging every encounter, real, virtual or alcoholic. In the interest of variety, I started on a Friday (6th), skipped the weekend (it was quiet and I didn't have any Saturday classes, supervisions or other things on), and continued on Monday and Tuesday.

Friday 6th February

8:30: Slalom-biked through the slushy snow to the Computer Laboratory. Met Eiko Yoneki (post doc RA) to talk about a paper on geographic cascades in on-line social network behaviour. Ironically, one of our examples was a hash tag system on the past few days' UK snowfall, where people mapped out where the impact of weather had been worst across the country. Bill Thompson (technical journalist and Diploma alumnus of the Lab) had suggested this as a nice source of data, and he was right (as usual).

10:00: Received the final draft of a PhD thesis from my last student extant from UCL (which I left 8 years ago). Scanned and OK'd it modulo putting in some better LaTeX magic so that the bibliography points back to the pages where citations were called out! (If you are wondering how he lasted so long, UCL has part-time PhDs, and the drop-dead deadline is 10 years!)

11:00: Met with Dr Andrew Moore, and agreed to better wording for some Part II exam questions that I'd set in too much of a hurry!

11:30: Briefly met with my PhD student Nishanth and Dr Mateja Jamnik about possible 800th anniversary Wednesday seminars. Some exciting possibilities lie ahead in the spring/summer.

12:00: A contingent of Mexicans came to my office to talk about what they should fund in Internet research. I'd had a conversation with my colleague Dr Tim Griffin, where we agreed that University work should be long term (10–20 year time frame, not just fixing this year's BGP or VoIP bugs). I advised the Mexicans so.

14:00: Listened to talks from 8 Part II project students on their progress to so far. Some of the projects are very good indeed.

18:00: Off to the pub to talk with colleagues about the future of systems research, with the usual important catalytic ingredients.

Monday 9th February

A very cold start to the day — arrived a bit later to avoid random lateral bus/car movements on the road.

10:00: Talked to a colleague about whether to agree to IBM's Haifa lab joining an EU project consortium. Did a SWOT analysis. Strength: great lab, very good Web 2.0 and speech processing skills, and excellent management. Weakness: terrible place for meetings. Opportunity: possible military exploitation. Threat: possible military exploitation.

12:00: Lunch with Dr Hand in the cafe West. We discussed the Next Big Thing to do in the systems work in the lab, post Xen (post Internet from my perspective).

All afternoon subsequently spent working on Cascades paper and on another paper on declarative delay tolerant networking idea with Dr Yoneki.

18:00: To the Castle pub where I met a bunch of Citrix folks excited about their next phase of development VM.

Late that night: update all (three of) my blogs.

Tuesday 10th February

10:00: Met with our accounts officer regarding a project that we've just been awarded — an ESRC grant to study epidemics, using Bluetooth radios on cell phones to track the contacts between large numbers (thousands) of people to gain a more accurate (empirical) understanding of how diseases spread.

Computer Lab News

12:00: Went to the Mexican to get burritos for lunch, and had a discussion about the politics philosophy, and economics (yes, I know that that is an Oxford degree awarded to future politicians) behind my research agenda. Actually, I have two agendas. One is getting content from the “long tail” better distributed; the other is designing a providerless replacement for the 3G radio systems. Typically, both of these are met with incredulity or obstructiveness by the incumbents.

Immediately after burritos, we had the NetOS (Networks and Operating Systems) research group weekly meeting, and one of the PhDs gave a nice talk about his current work on virtualisation for replicated systems for fault tolerance.

17:00: Off to Wolfson College to go to one of the Arcadia project talks, run by John Naughton, on the future of publishing. Alas, had to leave early for childcare reasons, so no College dinner! Late that evening, had an e-mail exchange with Professor Robin Dunbar, a Social Anthropologist in Oxford, with whom I am working on online social nets. I’ve read his excellent book (*Gossip, Grooming and the Evolution of Language*) and wanted his opinion on another book I’ve been reading — Julian Jayne’s bizarre book on the Bicameral Mind. He points out that the core idea in the book — that consciousness suddenly emerged somewhere in between Homer writing the *Iliad*, and writing the *Odyssey* — seems a tad implausible. I blog this and point out that it could just be a misinterpretation of a literary convention — the fact that there is no “I” in the *Iliad* is no more significant to how society and individuals actually think about themselves than the fact that there is no “You” in *Ulysses* (that is, James Joyce’s *Ulysses*, which is a first-person stream of consciousness).

Last thoughts that night are that I have a talk at the British Library conference on Digital Lives the next day, and I had better make sure they have my slides so I don’t have to bring a laptop (Mac) — and fight another battle in the tedious VGA projector war. One day, someone will put VNC and WiFi in every projector, and we can stop this nonsense.

For more about Jon Crowcroft’s research visit <http://www.cl.cam.ac.uk/~jac22/>

Computer Laboratory tops the table for Computer Science and Informatics in the Research Assessment Exercise 2008

The Research Assessment Exercise (RAE) evaluates the quality of research in UK higher education institutions.

It is based on the expert review; the panel for RAE 2008 consisted of 20 members, each with a major international reputation in his/her area of research expertise, drawn from a wide range of institutions and research areas, and including two industrial researchers.

The four UK higher education funding bodies use the results to determine their grants for research to the institutions which they fund, with effect from 2009–10.

The Computer Laboratory’s Grade Point Average was the highest of all submissions to Computer Science and Informatics. Moreover, along with the Department of Engineering and the Department of Material Science & Metallurgy, it posted the highest GPA among departments in Cambridge.

Awards

Professor Larry Paulson has been made a Fellow of the ACM for his contributions to theorem provers and verification techniques.

The ACM Fellows Program was established in 1993 to recognise and honour outstanding ACM members for their achievements in computer science and information technology and for their significant contributions to the mission of the ACM. The ACM Fellows serve as distinguished colleagues to whom the ACM and its members look for guidance and leadership as the world of information technology evolves.

Professor Paulson is one of 44 distinguished computer scientists who will be inducted as Fellows of the ACM this year.