



## REVIEW OF THE YEAR 2008-09

### Personnel

Dr Stephen Clark was appointed to a University Senior Lectureship in Natural Language and Information Processing from 1 January 2009, coming to Cambridge from the Oxford University Computing Laboratory. Dr Clark’s research goal is to produce effective Language Technology by exploiting theories and techniques from Computer Science, Linguistics and Machine Learning.

Four members of staff enjoyed personal promotions from October 2009: Anuj Dawar and John Daugman to Professorships, Cecilia Mascolo and Steven Hand to Readerships.

Dr Steven Murdoch was awarded the Sackler and Cambridge Foundation Research Fellowship at Christ’s College, to continue his work on analyzing and improving the Tor anonymous communication network, especially developing its usefulness as a censorship resistance tool.

Mohan Ganesalingam, a PhD student in Department, was awarded a Junior Research Fellowship at Trinity College, for his work on “The Language of Mathematics”.

Dr Frank King, University Senior Lecturer, retired in September 2009, at the end of 37 years service in the Computer Laboratory.

Ian Grant, a Computer Officer in the Computer Laboratory, resigned his post in May to start a new and very different life in Bolivia, where there is more scope for serious mountain climbing than in East Anglia.

Fiona Billingsley resigned her post in Student Administration when she and Will returned to Australia with their new son in December 2008. Jennifer Underhill was appointed as Fiona’s replacement.

Megan Samons moved from Reception to Student Administration to help with the increased workload resulting from the introduction of the new MPhil course. Michelle Jeffery was appointed as Megan’s replacement in Reception.

On 1 October 2009 the Computer Laboratory consisted of 93 members of staff:

Established posts	Academic staff	37
	Academic-related	9
	Assistant staff	14
Un-established posts	Academic-related	2
	Research Fellows	5
	Researchers	26

## Honours and Awards

Professor Ross Anderson was elected as a Fellow of the Royal Academy of Engineering in July 2009.

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

Professor Jon Crowcroft has been awarded the 2009 SIGCOMM Award for his pioneering contributions to multimedia and group communications.

Two members of the Computer Laboratory have been successful in the recent round of EPSRC Fellowships:

Dr Peter Sewell was awarded a 5-year Leadership Fellowship

Dr Eiko Yoneki was awarded a Career Acceleration Fellowship.

Steven Murdoch was awarded the Sackler and Cambridge Foundation Research Fellowship from Christ's College.

Viktor Vafeiadis, a former PhD student at the Computer Laboratory, was awarded the 2008 ACM SIGPLAN outstanding doctoral dissertation award. Viktor returns to the Computer Laboratory as a Research Associate in January 2010.

PhD students in the Computer Laboratory continue to win prizes:

Oliver Woodman, a PhD student at the Computer Laboratory, scooped first prize at the East of England Hub regional poster competition for postgraduate researchers.

Silvia Breu was awarded a \$5000 Anita Borg Scholarship for 2008-09. Emma Burrows reached the finals and received a \$1000 award.

Yan Wu won the 2008 Chinese Government Award for the Outstanding Self-finances Student Abroad.

Robert Harle and Oliver Woodman received the best paper award for "Pedestrian Localisation for Indoor Environments" at the 10<sup>th</sup> International conference on Ubiquitous Computing (UbiComp).

## Activities

While economic circumstances resulted in the loss of some members of the Industrial Supporters' Club, a number of lucrative additions were made. Indeed, the average donation of the new additions was higher than the average of those lost. Membership remained at a healthy 64, a marked improvement in outcome compared with the last economic downturn. Interest in the annual recruitment fair remained robust with the November 13<sup>th</sup> 2008 event again sold out. Members continue to come to Cambridge throughout the year, and have provided students with valuable opportunities to participate in workshops, interview clinics and other events.

Membership of the Cambridge Ring grew to almost 700 and the number of companies founded by Computer Lab graduates grew to 171. All networking activities were well attended and a number of more recent graduates have signed up to the mentoring scheme.

This summer, the Computer Laboratory helped celebrate the University's 800th anniversary with a series of talks and events throw light on different aspects of computing in Cambridge, together with demonstrations organised as a treasure trail of computing related sites around Cambridge. The trail started with an analogue, hydraulic computer at the Economics Department and ended with a practical quantum computing demonstration at the Cavendish Laboratory. Various historical computers built at the Computer Laboratory were highlighted.

Memorable talks included:-

- Inventing the User: EDSAC in context - Professor David Barron, Dr Doron Swade MBE and Professor Sir Maurice Wilkes
- The 10 Cultures Problem - Bill Thompson
- Concurrency Through the Ages - Andrew Birrell
- Toward Energy-efficient Computing - David J. Brown
- Evolving a language in and for the real world - Bjarne Stroustrup

The Open House Festival of Interactive Technology, one of the key events during this year's HCI 2009 Conference, was held at the Computer Laboratory on September 2nd. The Festival, organised by the University and Microsoft Research Cambridge, was a one-off event to mark the University's 800th anniversary.

John Daugman was one of three Finalists for the European Inventor of the Year 2009 Awards, Europe's top annual innovation prize, in a gala awards ceremony at Prague Castle hosted by the European Patent Office and the Czech President Vaclav Klaus.

Andy Hopper, the Head of Department, successfully completed a Round the World flight in his Cessna. During the trip, which covered approximately 35,000 miles and took 190 hours with 24 stops, Professor Hopper tested many of the technologies that the Computer Laboratory has helped develop of the years, including communications networks and location technologies.

The Computer Laboratory now funds the University's online subscription to Springer's Lecture Notes in Computer Science, a major research publication series with several hundred new volumes each year.

## Teaching

2008-09 was the first year that Computer Science was available as a bench subject within the Natural Sciences Tripos Part IA. Feedback to us indicates that most NST students who took the subject last year enjoyed it, and we were pleased to see that this cohort outperformed those taking other bench subjects.

Nevertheless, there were concerns about a small minority of candidates who were unable to complete their practical assignments and accumulated substantial penalties, in some cases scoring negative marks overall (which were interpreted as zero). To address these concerns, for 2009-10, we have reduced the number of mandatory programming exercises in Paper 1 from 17 to 10, and adopted a marking scheme similar to that used in more traditional NST subjects: 20% for practical work and 80% for the written paper, with no penalties for missed work. The point of these changes is to ensure that the marks we give to the Chairman of the Part IA NST examiners have a similar distribution to those of other bench subjects. A similar marking scheme will be used for Paper 2 of CST Part IA.

## Research

The Computer Laboratory obtained the following profile for its Computer Science and Informatics submission the Research Assessment Exercise 2008 (RAE2008):

4*	3*	2*	1*	Unclassified
45	45	10	0	0

Although profiles are not rank ordered as part of the RAE2008, a commonly applied third-party ranking is via the Grade Point Average (GPA) of the profile. The Computer Laboratory's GPA is  $4*0.45 + 3*0.45 + 2*0.10 + 1*0.00 = 3.35$ , which is the *highest of all the submissions* to Computer Science and Informatics. The Computer Laboratory also shares with the *Department of Engineering* and the *Department of Material Science & Metallurgy* the highest GPA among departments in Cambridge.

In the financial year ending 31 July 2009 research income amounted to £4.6M.

The Computer Laboratory holds a portfolio of 84 research grants, covering a broad spectrum of topics. Recent activities included the following:

- A team from the Graphics and Interaction research group ran a two-day discussion meeting at the Royal Society on Computation of Emotions in Man and Machines. Sixteen leading international research workers presented their work at the colloquium, which also attracted the largest audience of any such meeting.
- The Opera group started an EPSRC-funded project in October 2008, Smart Flow: Extendable Event-based Middleware, in collaboration with Imperial College and ECRIC (Eastern Region Cancer Registry and Information Centre). The PIs at Imperial and ECRIC are former Opera PhDs. In July 2009 a new project started, funded by the Technology Strategy Board under the basic research strand of the ALIP call (Assisted Living Information Platform). EPSRC fund the Universities (Cambridge and Essex) and TSB the companies (BT and Ericsson). The project is PAL: Personal and Social Communication for Health and Lifestyle Monitoring. The transport monitoring research continued under the TIME project.
- The Computer Architecture group migrated activity from circuit-level research on hardware security and networks-on-chip to parallel computer architecture. Two EPSRC research grants each around £700k funded research in Communication Centric Computer Design (C3D) and Biologically Inspired Massively Parallel Architectures (BIMPA). C3D work addressed the disparity in wire vs. transistor scaling which inexorably pushes us into an era where more power is burnt moving bits around than performing computation. The BIMPA project researched massively parallel (1 million) processor systems in collaboration with Prof Steve Furber (Manchester), Prof Brown (Southampton) and Prof Allerton (Sheffield).
- The EPSRC WILDSENSING project deployed a wireless sensor network and RFID system for the monitoring of badgers in Whytham Woods in collaboration with Oxford zoologists. A poster about the work was presented at ACM Sensys 2009.
- Two members of the Natural Language and Information Processing Group, Ann Copestake and Stephen Clark, led a team of 11 researchers as part of the Johns Hopkins University Language Engineering Workshop. The Workshops are annual events lasting six weeks, are highly prestigious, and attract some of the leading international researchers in the field. The title of the Workshop was "Large-Scale Syntactic Processing: Parsing the Web".
- Professor Ross Anderson led a project to write a report for the Joseph Rowntree Reform Trust on what's wrong with public-sector IT in Britain, and how to fix it. Entitled "Database State", it got wide media coverage, and a number of its recommendations have been adopted as policy by the main opposition parties.
- Professor Andrew Pitts was Chairman of the Programme Committee for the 24th Annual IEEE Symposium on Logic in Computer Science, which took place in Los Angeles in August 2009.
- Professor Anuj Dawar spent eight months at the Laboratoire Spécification et Vérification at Ecole Normale Supérieure de Cachan, supported by a Leverhulme Trust Fellowship.

## **Visitors**

Professor Marco Botta, University of Turin

Dr George Constantinides, Imperial College London

Dr Johan Glimming, Royal Institute of Technology, Stockholm

Professor Warren Hunt, University of Texas at Austin

Professor Suresh Jagannathan, Purdue University, USA

Dr Matt Kaufmann, University of Texas at Austin

Professor Vito Latora, University of Catania

Dr Paul Levy, University of Birmingham

Professor Tobias Nipkow, Technical University of Munich

Dr Tom Schrijvers, Katholieke Universiteit Leuven

Dr Anna Slobadova, Intel Corporation

Dr Philip Watts, University College London

AH/MAL

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