The Ring

Who's Who

Gabrielle Anderson (BA08) has recently joined Google where she is a software reliability engineer.

Sébastien Bratières (CHU MPhil01, PhD17) has been appointed Director of Artificial Intelligence at Translated, a leading language service provider, based in Rome.

Abhishek Chander (CHU BA15) has joined Amazon where he is a software development engineer.

Peter Cowley (F MA77) has been appointed Chair of the Federation of Small Businesses Equity Finance Policy Group.

Neeral Dodhia (R BA10) has joined Rubrik in Palo Alto, California and is working as a software engineer.

Dave Gowans (Q BA06) has started Browser to Buyer, a consultancy helping online business to significantly increase their sales and revenue by using research to understand why users don't buy, then creating and split testing new versions of pages.

Dave Gwilt (CHU MEng97) is Head of Computer Science at The Perse School, Cambridge.

Amir Hajizamani (JN BA11) has joined Arbor Education Partners as a product manager.

Andy Harter (F BA83 CC PhD90) FREng CEng FIET, CEO of RealVNC, has been awarded CBE in The Queen's Birthday Honours 2017.

Andy Harter has been recognized for his 'Services to Engineering'. This award reflects his many years of leadership in the development and application of computer and communication systems, including his co–founding of RealVNC in 2002.

This recent accolade is another in a long list of recognition he has received for his contribution to engineering. In 2002 he was elected a Fellow of The Institute of Engineering and Technology, where he now serves as a trustee. In 2010 he was awarded the Silver Medal of the Royal Academy of Engineering in recognition of an outstanding and sustained contribution to software engineering and commercialization, and in 2013 he led the team that won the Academy's prestigious MacRobert Award. In 2011 he was elected a Fellow of the Royal Academy of Engineering, where he served as a trustee until 2016. In 2014 he was appointed Chair of the Cambridge Network and in 2015 he was awarded an Honorary Doctor of Science degree from Anglia Ruskin University. In 2016 he was awarded the Faraday Medal, the most prestigious award of the IET.

Roger Hill (JN BA85) has joined the De Beers Group of Companies as a CRM consultant.

Oli Lane (TH BA15) is working at Gearset where he is a software engineer.

Min Lin (CAI PhD09) has been appointed Deputy General Manager at China Unicom in Guangzhou, China.

Neil McClements (MBA10) has been appointed Chairman of Transformative.

Barney Pell (T PhD89) has been appointed Chairman of the Scientific Advisory Board at CrowdFlower Inc. CrowdFlower is the essential human–in–the–loop platform for data science teams. CrowdFlower helps customers generate high quality customized training data for their machine learning initiatives, or automate a business process with easy-to-deploy models and integrated human–in–the–loop workflows.

Kim Powell (F BA06) has been appointed Head of Deutsche Asset Management in Birmingham.

Tomaz Sesek (R MA96) is a partner at Emona Capital LLP, a London based investment and advisory firm.

Sunil Shah (F MA09) has recently joined Yelp as an Engineering Manager in their Distributed Systems group.

Max Spencer (BA13, RA15) has been appointed senior software developer at Guardian News & Media.

Frank Stajano (T PhD00) has been appointed Professor of Security and Privacy at the Computer Laboratory.

Bjarne Stroustrup (CHU PhD79) has been elected an Honorary Fellow of Churchill College, Cambridge.

Assel Zhiyenbayeva (F BA10) is Chief Digital Office as Astana International Financial Centre in Kazakhstan.

Hall of fame news

Global Inkjet Systems

Following a decade of industrial inkjet innovation, ongoing expansion and continued growth, GIS has moved to new headquarters within St John's Innovation Park in Cambridge, UK.

Staying in the heart of the Cambridge inkjet cluster, GIS has moved to larger premises at Edinburgh House within St John's Innovation Park, doubling capacity to 10,000 sq. ft.

Founded in 2006, GIS now employs over 50 people. The company started with one office at St John's Innovation Centre, occupying additional offices as it grew, and then relocated to The Jeffrey's Building following global expansion in 2012. This relocation investment to Edinburgh House is crucial to GIS' continued growth and will enable further innovation in software, electronics and machine control services for inkjet system builders and OEM integrators.

Improbable

Improbable made headlines after it announced that it had raised $502m in a round of Series B funding led by SoftBank.

Although its exact valuation remains undisclosed, Improbable is now valued at over $1bn, making it a member of the exclusive UK tech 'unicorn' club.

Improbable also announced an alliance to develop big online game worlds with Hall of Fame company Jagex, the maker of online game RuneScape. Jagex will use Improbable's SpatialOS, an operating system built for the era of cloud computing and big data, for future development projects.

Masabi

Masabi, the global leader in transport mobile ticketing and innovative fare collection, has announced that Fire Island Ferries, the ferry and water taxi operator serving Fire Island, New York, has adopted the JustRide Platform to deliver mobile ticketing to its riders. The ticketing app is available for download from Google Play and the Apple App store. The system will initially support water taxi services with ferries being added later in the year.

French cities Orleans and Montargis have also gone live with mobile ticketing using Masabi's JustRide SDK (Software Development Kit). The SDK allows Masabi's strategic partner Keolis to incorporate mobile ticketing into existing travel information, booking and planning apps, greatly improving the travel experience in these cities.

Moon Express

Moon Express has said it is still on course to launch its lander by the end of the year.

The company is currently building the lander, termed the MX-1E, and hopes to be finished by the end of the summer so it can ship it to the launch site in New Zealand.

Artist's impression of the Moon Express MX-1E lander. Photograph: Moon Express

Moon Express is working against the clock because if it meets the schedule and lands successfully by the end of the year, it could win the $20m Google Lunar X-prize. The challenge was announced in 2007 and the deadline for the prize is the end of 2017.

Even if it misses the deadline, Moon Express will press ahead with its plans. It is planning at least three missions. After the MX-1E, a lander near the lunar south pole would prospect for ice and other resources. A third mission would bring samples back to Earth for analysis.

Pico Authentication Ltd

Pico Authentication was founded in 2016, by the Computer Laboratory's Frank Stajano with his Research Associate David Llewellyn–Jones, to develop both a more secure and more usable alternative to passwords. A working prototype of Pico is now ready and the open–source startup and the team is currently seeking early adopters to run pilot deployments.

Raspberry Pi

Raspberry Pi has won the UK's top engineering innovation prize — the Royal Academy of Engineering MacRobert Award.

Known for spotting the 'next big thing', the annual MacRobert Award is presented to the engineers behind the UK engineering profession's most exciting innovation.

Originally conceived as a way to boost computer science applications to the University of Cambridge, Raspberry Pi has created a whole new class of computer that has transformed the way engineers design control systems in industry.

The Pi has also proved phenomenally successful in its original educational ambi-

tion. Over 12 million devices have been sold in total, re-engaging people with the power of coding, and helping to ensure that future generations are equipped for the increasingly digital jobs of the future.

Dr Dame Sue Ion DBE FREng FRS, Chair of the MacRobert Award judging panel, said:

'All three of this year's finalists demonstrate exceptional engineering, but what sets Raspberry Pi apart is the sheer quality of the innovation, which has allowed the computer to be used far beyond its original purpose. By blending old and new technology with innovative systems engineering and circuit board design, the team has created a computer that is cheap, robust, small and flexible. It is manufactured in the UK cheaper and at higher quality than elsewhere. Raspberry Pi's original educational goal has actually resulted in a computer control system that can influence many different industries.'

'Raspberry Pi has also inspired multiple generations to get into coding: children are learning about coding for the first time, often alongside their parents and grandparents. Communities in the developing world are being empowered by the Raspberry Pi and its modern day computing-on-a-budget.'

Sophos

Sophos has been named as a Visionary by Gartner, Inc.'s July 10, 2017, 'Magic Quadrant for Enterprise Network Firewalls.' This is the first year that Sophos has been placed in the 'Visionaries' quadrant of this report.

Twigkit

Twigkit, a software company specializing in user experiences for enterprise–grade search and big data applications, has been acquired by Lucidworks, a provider of enterprise search solutions.

Job listing

August 2017

AKKA Auto Ltd
- *Cyber security expert*

MediaTek
- *Graduate wireless communications engineer*

July 2017

Lyft
- *Software engineer*
- *Senior iOS engineer*
- *Senior android engineer*
- *Data scientist*

Code Kingdoms
- *Full stack developer*

Privitar
- *Software engineer*
- *Data scientist*
- *Product manager*
- *Solutions architect*

PitPat
- *.NET developer*

Boldport
- *Creative engineer*

If you have a job advert that you would like included in the weekly listiing, please send the details (as a word doc) to cam–ring@cl.cam.ac.uk

Sonic Pi

One hundred days, 10 countries. Sonic Pi tours Africa.

Sonic Pi, an open source programming environment designed to explore and teach programming concepts through the process of creating new sounds, and created by Dr Sam Aaron, a Research Associate at the Computer Laboratory, has come a long way since its initial development in 2012. Indeed Sonic Pi is well on its way to achieving its two ambitious goals — to be both excellent for education and for professional musical performances.

The first of these goals (to be excellent for education) can perhaps be no better demonstrated than by the CodeBus Africa project that aims to inspire young people to discover and make use of technology, and to empower especially girls to explore technology's possibilities for their future.

The Code Bus has toured ten African countries over 100 days and is the main activity in Africa celebrating Finland's 100 years of independence.

The CodeBus project has taught music programming in the Sonic Pi environment, and while the Finnish team has been able to develop its own curriculum and deliver it unsupported (which is an excellent demonstration of how self–sufficient Sonic Pi has become), Sam Aaron has acted in an advisory capacity.

The CodeBus Africa workshop concept was adapted and implemented to fit various local needs by a global team of 62 instructors. No matter the students' starting level, instructors made sure that each and every attendee finished with a creative outcome — their very own song. Altogether 50 African instructors received training in running Sonic Pi coding workshops which reached over 2000 students.

Oh, and if you're wondering how Sonic Pi can claim to be excellent for professional musical performances then look no further than Rolling Stone magazine's coverage of Moogfest 2016. Rolling Stone described Sam's set as 'Electric Café–era Kraftwerk, a little bit of Aphex Twin skitter and some Eighties electro' that 'truly seemed …. like an invitation to code your own adventure.'

It is testament to Sam's work and success with Sonic Pi that he recently received a Google Open Source Peer award.

More information about Sonic Pi can be found at: http://sonic–pi. net/

Teaching Sonic Pi at the Beats&Bytes tech conference in Dar es Salaam, Tanzania. ©Roope Kiviranta

Research Skills course

Partha Maji: Are your online photos revealing more than you want?

Now that smartphones are ubiquitous, photographs are taken and shared online more frequently. In 2014, according to Mary Meeker's annual Internet Trends report, an average of 1.8 billion digital images are uploaded every single day [1]. Many of the photos shared online leak sensitive information about users who upload them. Human faces, clues from natural surroundings, license plates, house numbers are some of the most common examples of such sensitive data. Since full encryption of photos and videos are not efficient for compression, a number of obfuscating technologies are used to encrypt sensitive parts of the images while leaving the rest untouched.

In the current state–of–the–art, privacy is measured informally based on human–level ability to recognise an obfuscated image. Very recently, a group of researchers from Cornell University demonstrated that the modern neural network can easily recover hidden information from images protected by commonly used obfuscation technologies [2]. To illustrate this phenomenon, they experimented with four neural network models that are very popular as benchmarks in the deep learning community; a digit recognition model for the MNIST dataset, an object recognition model for CIFAR–10, and a face recognition model for AT&T and FaceScrub celebrity facial dataset. To test the effectiveness of the current methods, the authors put the three most common obfuscation techniques for image encryption under the microscope. As a threat model, the authors assumed that the adversary has a set of unobfuscated images that can be used to train the neural network. Surprisingly, both the MNIST and CIFAR–10 model can recognise obfuscated images with 90% accuracy. Using the network trained on AT&T dataset, the model can achieve over 95% accuracy in recognising mosaiced images. The neural networks used in these experiments are very simple compared to more complex ones recently proposed by Google or Microsoft [3]. The authors warn that a more sophisticated model could present a serious threat to online privacy.

How to design privacy protection technologies that can hide the sensitive information while preserving the main content of the shared media is an important topic of research. The research done by the author in this paper demonstrates a fundamental flaw in the current state of the art ad hoc image obfuscation techniques. They argue that humans may no longer be the gold standard for benchmarking such techniques. Using deep learning technology and stolen reference data, obfuscated images can easily be recognised and sensitive information can be revealed. Instead of informal arguments based on human inability to recognise sensitive information in the obfuscated image, the researchers of privacy protection technologies should measure how much information can be reconstructed or inferred from the obfuscated images using state–of–the–art image recognition technology. Perhaps this experiment on breaking obfuscated images will lead to design of better privacy protection technology in the future.

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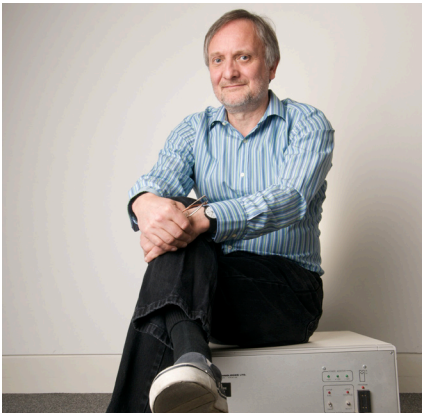
The best essays from the Research Skills module of the MPhil in Advanced Computer Science course 2016/2017 are being published in 'The Ring'. This is the third of these essays.

Computer Laboratory news

Professor Mike Gordon FRS

It is with great sadness that we announce the death of Professor Mike Gordon FRS.

Mike Gordon joined the Computer Laboratory in 1981 and he made magnificent contributions to the Department in many different ways. He will be sadly missed.

Computer Laboratory renamed

The General Board, on the recommendation of the Faculty of Computer Science and Technology and with the support of the Council of the School of Technology, has approved the renaming of the Computer Laboratory as the Department of Computer Science and Technology.

The Department was founded as the Mathematical Laboratory in 1937, and became involved in digital computing after 1945. During this early period, the study of computing as an academic subject and the provision of computing facilities to the University as a whole were closely bound together. Pioneering work on building complete computer systems has since given way to research and teaching in a broad range of subjects within the disciplines of Computer Science, Engineering, Technology, and Mathematics.

The new name better describes the Department's purpose and distinguishes it from University Information Services, which now has responsibility for the provision of IT within the University.

The name change will be effective from October 1st 2017.

Honours and appointments

Professor Andy Hopper CBE FREng FRS has been elected Treasurer of the Royal Society. The appointment, which is for five years, starts on November 30 2017.

"I am delighted that Andy will be the Society's next treasurer. He has a great track record in both academia and industry that will prove invaluable to the Society in the coming years." said Venki Ramakrishnan, President of the Royal Society.

Professor Ian Leslie has been appointed parttime Interim Director of University Information Services. He is also Senior Adviser to the Vice-Chancellor with special responsibility for Information System Strategy and Environmental Sustainability, and chairs the Information Services Committee and the Environmental Sustainability Strategy Committee.

Lawrence Paulson, Professor of Computational Logic, has been elected a Fellow of the Royal society.

Lawrence joins the very small group of people who have been honoured both by the Royal Society for their research and by the University with a Pilkington Prize for their teaching.

Computer Laboratory appointments

On September 1st 2017 the department will welcome two new members of staff. **Dr Nada Amin** is joining as a University Lecturer in Programming Languages. Nada joins from École Polytechnique Fédérale de Lausanne (EPFL).

Dr Amanda Prorok joins as University Lecturer in Cyber-physical Systems. Amanda is currently a Postdoctoral Researcher in the General Robotics, Automation, Sensing and Perception (GRASP) Laboratory at the University of Pennsylvania.

October 1st 2017 sees the arrival of **Dr Eva Kalyvianaki** who is joining the department as a Senior Lecturer. Eva, who is currently at City University London, was a post–doctoral researcher in the Department of Computing, Imperial College London and obtained her Ph.D. from the University of Cambridge Computer Laboratory.

Funding Successes

ERC Advanced Fellowship

Professor Larry Paulson: 'Large-scale formal proof for the working mathematician'
Five years, €2.4M

Professor Paulson project aims to create a proof development environment for working mathematicians, based on legible structured proofs. The project will focus on creating an ecosystem of libraries, decision procedures, query mechanisms and other tools to support the formalisation of mathematics in the large, based on Isabelle/HOL.

EPSRC Fellowship

Dr Jat Singh: 'Towards a legally-compliant Internet of Things'
Three years

Dr Singh will take an interdisciplinary approach to develop conceptual frameworks and technical means to enable systems (and those responsible) to comply with legal and regulatory obligations, by improving control and visibility of data as it moves throughout IoT.

EPSRC standard grant

Dr Andrew Moore: 'EARL: sdn
EnAbled MeasuRement for alL'
Four years, £2.4M (in collaboration
with QMUL, and also involving
Corsa, LINX, Cambridge Cybercrime
Centre, ESnet and Geant)

To explore how to overcome the limitations
of current BGP-Traffic Engineering prac-
tices adopted in network management at the
IXP, by exploiting the SDN paradigm and
advanced network monitoring techniques.

Horizon 2020 ITN

Rafal Mantiuk: 'RealVision'
Four years, €4M (in collaboration
with DTU Fotonik (Denmark),
Universite de Nantes, Bang and Olufsen
AS, MPI Informatik, CNRS, Dxo
Labs, University of Oxford, Bangor
University and Fraunhofer IIS)

The goal of the project is to build a new
video capture, processing and display pipe-
line delivering highly realistic content,
through development of new capture and
display technologies such as light fields,
high dynamic range and a variety of 3D
approaches.

**EPSRC Academic Centre of Excellence
in Cyber Security Research award
(renewal)**

Professor Frank Stajano

£81,719 to support activities of the ACE
over the next 5 years.

University Open Days

The Computer Laboratory recently opened
its doors to students considering making
an application in October 2017 for entry in
October 2018 (or deferred entry to October
2019).
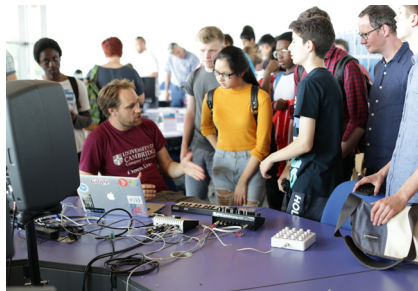
The days were a great success: 450 students
attended a series of subject talks as well
as demonstrations of student projects and
faculty research.

Student prizes 2017

G-Research Prize for The Best Part IA
Student awarded to **Jakub Perlin** (CHU)

G-Research Prize for The Best Part IB
Student awarded to **Song Pan** (CHU)

ECM Prize for The Best Part II Student
awarded to **Gellert Weisz** (CHU)

G-Research Prize for the Best Individual
Project in the Computer Science Tripos
awarded to **Cristina Matache** (F)

The following students were highly
commended for their project dissertations:

Alex Coplan (CTH), **Bradley Hardey**
(Q), **Devan Kuleindiren** (R), **Stella Lau**
(T), **Dimitrios Los** (JN), **Cheng Sun**
(CHU), **Dmitrij Szamozvancev** (DOW),
Tudor Tiplea (CHR)

Entrepreneur First Prize for the Best Part III
Student awarded to **Laurynas Karazija**
(F)

Google Prize for the Best Part III Research
Project awarded to **Charlie Barton** (EM)

Dr John Maheswaran Prize for a Highly
Commended Project Report awarded to
Laurynas Karazija (F)

Winton Capital Prize for the Best MPhil
Student awarded to **Jan Menz** (G)

Google Prize for the Best MPhil Project
Report awarded to **Lars Hulstaert** (CHU)