Computing News round-up – July-October 2015

<u>Awards and Esteem</u>

Congratulations go to **Daniel Rueckert** who has been elected a fellow of the Royal Academy of Engineering
http://www3.imperial.ac.uk/newsandeventspggrp/imperialcollege/engineering/computing/newssummary/news_22-9-2015-16-15-19.

Jeff Kramer has been invited to become a member of Academia Europaea. Membership is by invitation, made only after peer group nomination, scrutiny and confirmation as to the scholarship and eminence of the individual in their chosen field. Election is confirmed by the Council of the Academia. Members are drawn from across the whole European continent, and include European scholars who are resident in other regions of the world. Current membership stands at around 2,800. Amongst them are fifty-two Nobel Laureates, several of whom were elected to the Academia before they received the prize.

<u>Top journals, conference papers and publications</u>

Cristian Cadar had a paper accepted at ESEC/FSE New Ideas Track 2015 on Targeted Program Transformations for Symbolic Execution.

Giuliano Casale co-authored a paper that won the best paper award at the IEEE CLOUD 2015 conference. The paper studies Amazon micro VMs, a class of virtual machines with bursts in the available CPU capacity.

Alastair Donaldson had a paper on the new PENCIL programming language accepted to the International Conference on Parallel Architectures and Compilation Techniques, a collaboration with co-authors from the CARP EU project.

Alastair Donaldson has had another paper, "Overhauling SC Atomics in C11 and OpenCL", accepted at the ACM SIGPLAN-SIGACT International Symposium on Principles of Programming Languages (POPL). The paper is joint with John Wickerson and Mark Batty.

The paper "Autonomic Provisioning and Application Mapping on Spot Cloud Resources", co-authored by **Daniel Dubois** and **Giuliano Casale**, has received the best paper award at ICCAC 2015, the IEEE International Conference on Cloud and Autonomic Computing.

Jérémy Riviere, Pieter Peers, **Abhijeet Ghosh.** Mobile Surface Reflectometry, Computer Graphics Forum, 2015. doi:10.1111/cgf.12719

Thomas Heinis and David A. Ham. On-the-Fly Data Synopses: Efficient Data Exploration in the Simulation Sciences, published in SIGMOD Record (Special Issue on Visionary Data Management)

Henry Markram, Eilif Muller, Srikanth Ramaswamy, … **Thomas Heinis**, et. al. mult "Reconstruction and Simulation of Newcortical Microcircuitry" In: *Cell*, volume 163, 2015.

P. Gonzalez, A. Griesmayer, A. Lomuscio. Verification of GSM-based Artifact-centric Systems by Predicate Abstraction. Proceedings of the 13th International Conference on Service Oriented Computing (ICSOC15).
Goa, India. To Appear. Acceptance rate: 16%. Number of submissions: 112.

Peter Pietzuch had a paper on mitigating web application vulnerabilities accepted at the ACM Conference on Computer and Communications Security (CCS'15), which is ACM's flagship venue on security research.

Peter Pietzuch and Alexander L. Wolf had a paper on stream data processing with GPUs accepted at the ACM International Conference on Management of Data (SIGMOD'16), which is the highest ranked conference on database research.

Murray Shanahan has recently published a new book, "The Technological Singularity", with MIT Press: https://mitpress.mit.edu/books/technological-singularity

Herman Czemerinski, Victor Braberman and **Sebastian Uchitel**: Behaviour Abstraction Adequacy Criteria for API Call Protocol Testing, Software Testing, Verification and Reliability, 2015.

Nobuko Yoshida had three papers accepted by CONCUR 2015 in Madrid, Spain, 1-4 September 2015:
- Laura Bocchi, Julien Lange and Nobuko Yoshida. Meeting Deadlines Together.
- Dimitrios Kouzapas and Jorge A. Pérez and Nobuko Yoshida. Characteristic Bisimulation for Higher-Order Session Processes.
- Marco Carbone, Fabrizio Montesi, Carsten Schürmann and Nobuko Yoshida. Multiparty Session Types as Coherence Proofs.

Nobuko Yoshida and **Dominic Orchard** have had a paper "Effects as sessions, sessions as effects" accepted at POPL 2016.

Weiren Yu, and Julie McCann. Co-Simmate: Quick Retrieving All Pairwise Co-Simrank Scores. In Proceedings of the 53rd Annual Meeting of the Association for Computational Linguistics. (ACL 2015). Beijing, China, To Appear, 2015.
Weiren Yu, and Julie McCann. Gauging Correct Relative Ranking on Web Search. In Proceedings of the 24th ACM International Conference on Information and Knowledge Management (CIKM 2015). Melbourne, Australia, To Appear, 2015.

Recent funding successes

Cristian Cadar has been awarded an EPSRC grant of £286,470 on Improving Symbolic Execution via Targeted Program Transformations.

Abhijeet Ghosh has recently been awarded an EPSRC Early Career Fellowship. Abhijeet has also received a grant from the Royal Society for organizing an International Scientific Seminar (Round 9) on "Imaging in Graphics, Vision & Beyond" at the Kavli Royal Society International Centre.

Prof Guo and David Birch have won £42k funding from the 2015 Arup Global Research Call on the topic of "Evidence based visual decision making in Urban Master Planning".

Julie McCann has been awarded an EPSRC programme grant: "RASS" (Research Vision and Ambition) the aim of which is to deliver new principles and techniques for the development and deployment of verifiable, reliable, autonomous sensor systems that operate in uncertain, multiple, multi-scale environments.

Stephen Muggleton has been awarded a £3.7M NERC Large Grant involving using Inductive Logic Programming to model the impacts of global warming on food webs in fresh water environments. The four year grant start date was 1 October 2015, and the award is jointly held with Prof Guy Woodward in the Department of Life Science at Silwood Park.

Maja Pantic has an EPSRC programme grant, with Co-I's Stefanos Zafeiriou and Tae-Kyun Kim in EEE, and in collaboration with teams at Surrey and Stirling universities. The grant's title is "FACER2VM" and the goal of the programme is to advance the science of machine face perception and to deliver a step change in face matching technology to enable automatic retrieval, recognition, verification and management of faces in images and video.

Peter Pietzuch has received a Google Research Faculty Award for his proposal "Meta-Dataflows: Automatic Exploration Steering for Big Data Analysis".

The following EC Horizon 2020 research grants have been awarded:

- **Maja Pantic:** "DE-ENIGMA" - Multi-Modal HRI for expanding social imagination in autistic children (ENIGMA).
- **Peter Pietzuch**: "SecureCloud" on secure hardware-assisted big data processing in cloud environments.
- **Stefanos Zafeiriou:** "TESLA" An Adaptive Trust-based e-assessment System for Learning.

Events, seminars and key note talks

Ioana Boureanu (Marie Curie Fellow in the Verification of Autonomous Systems group) gave an invited talk entitled "Multiagent System-based Verification of Security and Privacy" at the Agent Verification Workshop, held in conjunction with the 16th International Conference on Toward Autonomous Robotic Systems (TAROS 2015), on the 11 September 2015, in Liverpool, UK.

Cristian Cadar gave talks at UMD College Park and ETH Zurich on Symbolic Execution for Evolving Software. Cristian also gave a keynote talk at the 13th International Workshop on Satisfiability Modulo Theories (SMT 2015) in July on Constraint Solving in Symbolic Execution.

Paul Kelly delivered the opening keynote talk at LCPC 2015, the 28th International Workshop on Languages and Compilers for Parallel Computing (Raleigh, North Carolina, Sept 9-11 2015) (http://www.csc2.ncsu.edu/workshops/lcpc2015/program.html). The title was "Synthesis versus Analysis: What Do We Actually Gain from Domain-Specificity?" and the slides are available at http://www.doc.ic.ac.uk/~phjk/phjk-Publications.html#LCPC15. Paul also delivered the invited talk for "Compilation Day" at Maison Minatec, Grenoble, France (https://persyval-lab.org/sites/default/files/project_team/HPES/2015-09-18-Fernando-Endo.pdf). The title was "Compiler technology for solving PDEs with performance portability" (Sept 18 2015).

Bob Kowalski presented a keynote address entitled "Computational Logic for Human (and Computer) Thinking" at Technology and Society, Chicago in May 2015. Bob also gave an invited lecture: "Computational Logic for Artificial and Human Intelligence" at the George Boole Bicentenary Celebration in Cork on 30 August 2015

Jeff Kramer taught at the LASER summer school on Concurrency in Elba, 6-13th September.

Ruth Misener gave a seminar in the University of Edinburgh, Department of Mathematics on 7 October. Ruth is also attended a workshop on MINLP in Oberwolfach on 18-23 October.

In November 2015 **Stephen Muggleton** will be a keynote speaker at the China Machine Learning Applications conference in Nanjing and in December 2015 he will be an invited speaker at the NIPS 2015 workshop on Cognitive Computation Systems in Montreal.

Luís Pina gave a talk at Improbable about the Dynamic Software Update System, Rubah.

Media mentions

Abhijeet Ghosh's collaborative research with USC-ICT on skin microgeometry deformation, published August's *ACM Transaction on Graphics* journal's special issue on the proceedings of the ACM SIGGRAPH 2015 conference, has also been covered by various media outlets including Gizmodo, FXGuide, and has been featured by Imperial communications as well as on Imperial's main page (http://www3.imperial.ac.uk/newsandeventspggrp/imperialcollege/newssummary/news_20-8-2015-16-0-55).

Chris Hankin chaired a cyber skills round table for the Daily Telegraph that was in their Business Supplement on 10 September 15.

Murray Shanahan was on BBC Breakfast on Tuesday 15 September as part of the BBC "intelligent machines" week.

On the same day Murray was also on Radio 4's Today programme, also talking about AI.

Major committee/advisory board memberships

Cristian Cadar will be part of the Program Committee for ICSE 2016, one of the top software engineering conferences, and PLDI 2016, one of the top programming language conferences.

Jeff Kramer attended the first Scientific Advisory Board meeting of the joint SUTD-MIT International Design Centre in Singapore from 16-18 August.

Alessio Lomuscio is serving as PC member for the following conferences:
- 30th AAAI Conference on Artificial Intelligence (AAAI2016). Phoenix, AZ, USA. February 2016.
- 13th European Conference on Multi-Agent Systems (EUMAS15). Athens, Greece. December 2015.
- 18th Conference on Principles and Practice of Multi-Agent Systems (PRIMA 2015) held in Bertinoro, Italy in October 2015.

Ruth Misener is going to be a Director of AIChE Computing and Systems Technology Division (an elected post which several people hold simultaneously) for the years 2016 – 2018.

Peter Pietzuch is serving on the Program Committee of the USENIX Annual Technical Conference (USENIX ATC'16), which is among the top-ranked conferences for software systems research.

Berc Rustem is the Chair of the 2016 EURO Gold Medal Committee: http://www.euro-online.org/web/pages/212/gold-medal-egm (deadline for nominations 31 January 2016).

Weiren Yu is serving on the PC of the 26th Australasian Database Conference (ADC 2015) which is co-located with ACM SIGMOD 2015 in Melbourne, Australia.

Student achievements

BioMedIA students were successful in two medical image computing challenges at MICCAI 2015:
- **Kostas Kamnitsas**, 1st year PhD student, has won the Ischemic Stroke Lesion Segmentation Challenge with his method entitled "Multi-Scale 3D Convolutional Neural Networks for Lesion Segmentation in Brain MR". Kostas is supervised by Ben Glocker and Daniel Rueckert.
- **Isabel Lopez Andrade**, MSc student, is among the winners of the Automatic Intervertebral Disc Segmentation Challenge with her approach entitled "Complementary Classification Forests with Graph-cut Refinement for Accurate Intervertebral Disc Localization and Segmentation". Isabel was supervised by Ben Glocker.

When MSc student, **Matthew Lai** (supervised by Duncan Gillies) posted his project report on ArXiv, it immediately generated a flurry of media interest. For the project Matthew built a computer that managed to teach itself chess, and in just three days attained a level of skill comparable with some of the world's most skilful players. Here are some reviews:
http://www.technologyreview.com/view/541276/deep-learning-machine-teaches-itself-chess-in-72-hours-plays-at-international-master/
http://www.independent.co.uk/life-style/gadgets-and-tech/news/machine-teaches-itself-chess-in-24-hours-attains-international-master-level-without-being-told-the-rules-10502311.html

PhD Student **Robert Wright** has been awarded the best student paper award at the Computing and Control for the Water Industry (CCWI) Conference 2015. Robert is supervised by Dr Ivan Stoianov and Dr Panos Parpas (Department of Computing). The paper, which is entitled " Optimized Control of Pressure Reducing Valves in Water Distribution Networks with Dynamic Topology", was co-authored by Edo Abraham, Panos Parpas, and Ivan Stoianov.

Industrial Liaison

The Department's Corporate Partnership Programme has several new members including ARM, Remora and Pivotal. This means we currently have 38 CPP members, either as 'Benefactor' or 'Member', and the contributions from industry have more than doubled over the last two years.

Upcoming seminars

Centre for Process Systems Engineering 2016 Seminar Series: The Next Generation
- Dr. Thomas Vetter (The University of Manchester) 10 February 2016, 4pm
- Dr. Claudia D'Ambrosio (LIX École Polytechnique) 24 February 2016, 4pm, Huxley 311, DoC
- Dr. Pietro Belotti (FICO) 09 March 2016, 4pm
- Dr. Carl Laird (Purdue University) 27 April, 4pm
- Dr. André Bardow (RWTH Aachen) 4 May 2016, 4pm
- Dr. Mariano Martín (Universidad de Salamanca) 11 May 2016, 4pm