Computing News – Spring 2016

Awards and Esteem

Marc Deisenroth is a recipient of a prestigious Google Faculty Research Award for 2016 in the category of Machine Learning. The one-year award supports the work of world-class, permanent faculty members at top universities around the world with the aim of advancing cutting-edge research in computer science, engineering and related fields. In this year, only 16% of 950 submitted proposals were successful.

Chris Hankin has been appointed, by the Minister of State for Universities and Science (Jo Johnson MP), to the expert working group on the new Institute for Coding. The Institute is a £20M initiative announced in the Chancellor of the Exchequer's autumn speech at GCHQ.

Stefan Leutenegger has won the ETH medal for an outstanding Doctoral theses 2015.

Daniel Liew, and his joint supervisors Cristian Cadar and Alastair Donaldson, have been named as recipients of one of this year's Best Paper Awards at the IEEE International Conference on Software Testing, Verification and Validation (ICST), one of the top venues for publishing research in software testing. The paper is entitled: 'Symbooglix, a Symbolic Execution Engine for Boogie Programs'.

Weiren Yu and Julie A. McCann's paper 'Effectively Positioning Water Loss Events in Smart Water Networks' won The Best Paper Award in 2nd International Electronic Conference on Sensors and Applications.

Lukas Rupprecht, William Culhane, and **Peter Pietzuch** found and reported a security vulnerability in the Google Cloud platform. In recognition of their work the LSDS group is being inducted into the Google Hall of Fame.

Björn Schuller was re-invited to the World Economic Forum Annual Meeting of New Champions in 2016 to take place in Tianjin/PR China as "Young Scientist" (one of 40 extraordinary scientists under the age of 40 – those from Europe are selected from the ERC Starting Grant awardees).

Claudia Schulz (PhD student in the CLArg group, supervised by F. Toni and M. Sergot) won an ACM UPE Scholarship Award, see
http://www.acm.org/chapters/chapter-newsletters/2016/chapter-member-newsletter-march-2016

Stefanos Zafeiriou has been selected by the Finland Distinguished Professor programme (FidiPro) to be a distinguished visiting Research Fellow at The University of Oulu.

CSG donated 60 4-year old PCs to Orleans Park School, Twickenham, arranged by **Duncan White**, with considerable assistance from **Lloyd Kamara and Geoff Bruce**. Orleans Park staff came to Imperial to collect the PCs and, before driving back in their heavily laden minibus, they were shown our lab facilities. They have thanked us profusely for the donation, which will refresh the school's teaching PC labs.

Top journals, conference papers and publications

Dalal Alrajeh, Axel van Lamsweerde, Jeff Kramer, Alessandra Russo and Sebastian Uchitel, Risk-Driven Revision of Requirements Models, ICSE 2016.

Dalal Alrajeh, Alessandra Russo, Jeff Kramer and Sebastian Uchitel, Logic-based Learning in Software Engineering, Technical Briefing, ICSE 2016.

I. Boureanu, P. Kouvaros, A. Lomuscio. Verifying Security Properties in Unbounded Mult-iagent Systems. Proceedings of the 15th International Conference on Autonomous Agents and Multi-Agent Systems (AAMAS16). Singapore. IFAAMAS Press. To Appear.

Cristian Cadar and Alastair Donaldson had a paper accepted at the Visions of 2025 and Beyond Track of the International Conference on Software Engineering 2016: Analysing the Program Analyser.

Cristian Cadar, Hristina Palikareva and Tomasz Kuchta's paper "Shadow of a Doubt: Testing for Divergences Between Software Versions" was accepted at ICSE 2016, 19% acceptance rate, the leading software engineering conference

Gul Calikli, Mark Law, Arosha K. Bandara, Alessandra Russo, et al, "Privacy Dynamics: Learning Privacy Norms for Social Software", SEAMS 2016.

R. Craven and F. Toni, Argument Graphs and Assumption-Based Argumentation, Artificial Intelligence.

Alistair Donaldson and his PhD student, Tyler Sorensen, have had a paper accepted at the 37th ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI).

J. Ezekiel, A. Lomuscio. Combining fault injection and model checking to verify fault tolerance, recoverability, and diagnosability in multi-agent systems. Information and Computation.

Xiuyi Fan and Francesca Toni, On the Interplay between Games, Argumentation and Dialogues, AAMAS 2016 (24.9% acceptance rate)

G. Fyffe, P. Graham, B. Tunwattanapong, A. Ghosh, P. Debevec, Near-Instant Capture of High-Resolution Facial Geometry and Reflectance, *Computer Graphics Forum (Proc. Eurographics'16)*, 35(2), 2016.

Yang Gao, Francesca Toni, Hao Wang, Fanjiang Xu, Argumentation-Based Multi-Agent Decision Making with Privacy Preserved, AAMAS 2016 (24.9% acceptance rate)

Ben Glocker has co-authored a book chapter "Random Forests for Localization of Spinal Anatomy" in the edited book "Medical Image Recognition, Segmentation, and Parsing" published by Elsevier.

Conference paper acceptances for **Anandha Gopalan and his Masters students** who graduated in 2015:

- "The TuringLab Programming Environment: An online Python programming environment for challenge based learning". Accepted in the 8th International Conference on Computer Supported Education (CSEDU).

- "Orka: A new technique to profile the energy usage of Android applications". Accepted in the 5th International Conference on Smart Cities and Green ICT Systems (SMARTGREENS).

Umberto Grandi and Paolo Turrini "A network-based rating system and its resistance to bribery" (IJCAI 2016)

D. Guarnera, G. C. Guarnera, A. Ghosh, C. Denk, M. Glencross, BRDF Representation and Acquisition, *Computer Graphics Forum (Eurographics'16 STAR Report)*, 35(2), 2016.

P. Kouvaros, A. Lomuscio. Parameterised Verification for Multi-Agent Systems. To appear in Artificial Intelligence. Elsevier.

P. Kouvaros, A. Lomuscio. Formal Verification of Opinion Formation in Swarms. Proceedings of the 15th International Conference on Autonomous Agents and Multi-Agent Systems (AAMAS16). Singapore. IFAAMAS Press. To Appear.

Stefan Leutenegger has had two papers accepted in CVPR'16 for oral presentation on "Simultaneous Optical Flow and Intensity Estimation from an Event Camera" and "Decomposing Image Sequences with Deep Pairwise Learning for Multi-View and Active Object Recognition"

Dan Liew, Cristian Cadar, Alastair Donaldson, "Symbooglix: A Symbolic Execution Engine for Boogie Programs", accepted at the IEEE International Conference on Software Testing, Verification and Validation (ICST) 2016, 27% acceptance rate, one of the top software testing conferences

A. Lomuscio, J. Michaliszyn. Verification of Multi-Agent Systems via Predicate Abstraction against ATLK specifications. Proceedings of the 15th International Conference on Autonomous Agents and Multi-Agent Systems (AAMAS16). Singapore. IFAAMAS Press. To Appear.

A. Lomuscio, J. Michaliszyn. Model Checking Multi-Agent Systems against Epistemic HS Specifications with Regular Expressions. Proceedings of the 15th International Conference on Principles of Knowledge Representation and Reasoning (KR16). Cape Town, South Africa. AAAI Press. To Appear.

Ruth Misener had the following paper accepted: Savvopoulos S. V., Misener R., Panoskaltsis N., Pistikopoulos E. N., Mantalaris A. A Personalized Framework for Dynamic Modeling of Disease Trajectories in Chronic Lymphocytic Leukemia. IEEE Transactions on Biomedical Engineering; 2016. DOI: 10.1109/TBME.2016.2533658

Esteban Pavese, Victor Braberman, Sebastian Uchitel 'Probabilistic Interface Automata', to appear in IEEE Transactions on Software Engineering

Peter Pietzuch, Paolo Costa and Alexander L. Wolf had their paper on a domain-specific language for writing application-specific network services accepted at the USENIX Annual Technical Conference (USENIX ATC) 2016.

Luís Pina and Michael Hicks. "Tedsuto: A General Framework for Testing Dynamic Software Updates", accepted at the IEEE International Conference on Software Testing, Verification and Validation (ICST) 2016, 27% acceptance rate, one of the top software testing conferences

Antonio Rago, Francesca Toni, Marco Aurisicchio and Pietro Baroni, Discontinuity-Free Decision Support with Quantitative Argumentation Debates, KR 2016 (26.9% acceptance rate)

Björn Schuller has had a journal article accepted in Autism Research with the leading individual in Autism Research, Prof. Simon Baron-Cohen, Cambridge University, together with others where tech is used to help children on the spectrum: Agnieszka Rynkiewicz, Björn Schuller, Erik Marchi, Stefano Piana, Antonio Camurri, Amandine Lassalle, and Simon Baron-Cohen "An investigation of the 'female

camouflage effect' in autism using a computerized ADOS-2, and a test of sex/gender differences".
Molecular Autism, 2016. 10 pages, to appear (IF: 5.413 (2014))

Shusen Yang, Yad Tahir, Po-yu Chen, Alan Marshall, and Julie McCann, Distributed Optimization in Energy Harvesting Sensor Networks with Dynamic In-network Data Processing, accepted by IEEE Infocom 2016.

The three papers have been accepted from **Nobuko Yoshida's group** at the European Joint Conferences on Theory and Practice of Software (ETAPS):
- FASE'16 - TITLE: Hybrid Session Verification through Endpoint API Generation
  AUTHORS: Raymond Hu and Nobuko Yoshida
- TACAS'16 - TITLE: Characteristic Formulae for Session Types
  AUTHORS: Julien Lange and Nobuko Yoshida
- ESOP'16 - TITLE: On the Relative Expressiveness of Higher-Order Session Processes
  AUTHORS: Dimitrios Kouzapas, Jorge A. Pérez and Nobuko Yoshida

In the context of the PAMELA EPSRC project, the collaboration between the Software Performance Optimisation and the Robotics Vision labs, the following paper has been published: **M. Zeeshan Zia, Luigi Nardi, Andrew Jack, Emanuele Vespa, Bruno Bodin, Paul H. J. Kelly and Andrew J. Davison**. Comparative Design Space Exploration of Dense and Semi-Dense SLAM. In IEEE Intl. Conf. on Robotics and Automation (ICRA 2016), Stockholm, Sweden, May 2016.

Funding success

Marc Deisenroth and **Ben Glocker** have each been awarded a Microsoft Research PhD Scholarship. The scholarships provide four-year funding for PhD students working in the field of machine learning and medical image analysis.

Alastair Donaldson has been awarded a five year EPSRC Early Career Fellowship, entitled "Reliable Many-Core Programming".

Ben Glocker has been awarded an EPSRC First Grant "Quantify-TBI". Ben has also been awarded as Co-I an EPSRC NetworksPlus grant led by Oxford which extends their EPSRC-NIHR HTC Partnership Award: Medical Image Analysis Network (http://goo.gl/j0c4gS).

Bernhard Kainz was granted an EPSRC First Grant 'Exploration of machine learning for preemptive scheduling in single-instruction multiple-data mega-kernel designs'.

Stefan Leutenegger as Co-PI, with Mirko Kovac (Aeronautics) as PI and together with further partners, have managed to secure a four-year project grant of £ 2.3M for "Aerial Additive Building Manufacturing".

Julie McCann has been awarded continuing funding with NEC Japan. This is ongoing work building on her current NEC funded project that examines networked control and communications for Smart Water Networks.

Nobuko Yoshida has been awarded two EPSRC grants: **'**Turtles: Protocol-Based Foundations for Distributed Multiagent Systems', Value £863,741; and 'Border Patrol: Improving Smart Device Security through Type-Aware Systems Design' value £1,765,760.

The Data Science Institute has won £50k of funding to create "AN INTERACTIVE MAP OF THE UNIVERSE FOR THE KPMG DATA OBSERVATORY". The Investigators are: Prof Yike Guo, Director, Data Science Institute; Dr Elizabeth Hauke, Senior Teaching Fellow, Centre for Languages, Culture and Communication; Dr James Rosindell, Department of Life Sciences; Dr Roberto Trotta (lead PI), Astrophysics Group, Physics Department and Director, Centre for Languages,Culture and Communication.

Media mentions

Marc Deisenroth has been interviewed by the Xinhua News Agency on the upcoming AI Milestone of Google DeepMind's computer program playing the game of Go against the human World Champion. http://news.xinhuanet.com/sports/2016-03/07/c_128780880.htm (in Chinese)

Images arising from **Alistair Donaldson**'s research into compiler reliability (joint with Andrei Lascu and Tyler Sorensen) were shown in Imperial's recent Art of Research exhibition: http://multicore.doc.ic.ac.uk/projects/artofresearch/

Ben Glocker and PhD student K**onstantinos Kamnitsas** received an honourable mention for NVIDIA's 2016 Global Impact Award announced at GTC 2016 in April for their work on deep learning for detecting brain damage (https://goo.gl/HeCuvx).

Stefan Leutenegger was interviewed by I, Science and gave a demo of his team's autonomous flying robot: see https://www.youtube.com/watch?v=M5kuSfVaReU.

Julie McCann's lab appeared in BBC's Click programme on 30 April: http://www.bbc.co.uk/iplayer/episode/b079c96x/click-30042016. It's mostly filmed in the lab but the link sections are all filmed in the Data Science lab (and one in the machine room).

Murray Shanahan was interviewed for Radio 4's Today Programme and BBC One's Weekend News about the AlphaGo vs Lee Sedol go match - 12 March 2016: http://www.bbc.co.uk/programmes/b006qj9z & http://www.bbc.co.uk/programmes/b009m51q. He was also a guest of Radio 4's Agree to Differ on 20 April: http://www.bbc.co.uk/programmes/b077gtvz.

The **Data Science Institute** has launched a research collaboration with marketing and data science specialist, Jaywing. http://www3.imperial.ac.uk/newsandeventspggrp/imperialcollege/engineering/datascienceinstitute/newssummary/news_1-3-2016-16-25-2

Researchers from **The Dyson Robotics Lab**, led by Andy Davison, are closer to developing vision for household robots and have developed technology called ElasticFusion. This prototype technology could enable a robot to create a clearer representation of the environment that they are in and simultaneously determine where it is in that environment – an important initial step towards enabling robots to work closely with humans at home. See the full story at: http://www3.imperial.ac.uk/newsandeventspggrp/imperialcollege/newssummary/news_26-11-2015-10-31-15

Events, seminars and key note talks

Dalal Alrajeh is co-chairing a workshop "iRENIC:Requirements Engineering for Investigating and Countering Crime", co-located with the 24th IEEE International Requirements Engineering Conference (RE'16) in Beijing, China. The workshop will be on September 12, 2016.

Cristian Cadar and **Peter Pietzuch** were the general chairs of the European Conference on Computer Systems, EuroSys 2016, hosted by Imperial College London between 18 and 21 April. EuroSys is one of the premier systems research conferences, which brings together professionals from both academia and industry.

Philippa Gardner and colleagues Peter O'Hearn (UCL, Facebook), Mike Gordon FRS (University of Cambridge), Greg Morrisett (Cornell University) and Fred B. Schneider (Cornell University) hosted two high-profile scientific meetings on the topic of Verified Trustworthy Software Systems in April. The first meeting was held at the Royal Society and was attended by over two hundred and fifty delegates. These comprised verification experts, systems and security experts interested in verification, industrialists using verification, and government scientists. The second event, held at Imperial College, was a specialist meeting aimed at a more technical audience. Over a hundred people, with renowned experts as well as promising young researchers from the fields of verification, systems, and security got together to discuss current work in verification and trustworthy systems. Podcasts of the Scientific meeting are available on the Royal Society website: https://royalsociety.org/events/2016/04/software-systems/. Recordings of the Specialist meeting are at the College YouTube channel: Day 1 Specialist meeting; Day 2 Specialist meeting

Ben Glocker was invited to speak at the Deep Learning for Healthcare Summit on April 7 in London (https://goo.gl/QnNVHv). Ben also gave an invited talk at the workshop "Big Data, Multimodality & Dynamic Models in Biomedical Imaging" on March 9 organised by the Turing Gateway to Mathematics at the Isaac Newton Institute in Cambridge (http://goo.gl/gOkBVY).

Anandha Gopalan was invited to give a talk, titled 'The impact the change in curriculum is having on university recruitment' at the BCS Education Lecture Series on January 29th - mainly aimed at the Koeran delegation visiting from KOFAC (Korean Foundation for the Advancement of Science & Creativity). He also gave a talk, titled 'Exploring FinTech for Financial Inclusion' at the Research showcase on FinTech held in Imperial College London on March 9th (http://www3.imperial.ac.uk/newsandeventspggrp/imperialcollege/engineering/eventssummary/event_2-2-2016-15-25-3).

Michael Huth participated in The Industrial Internet of Things evening at Chatham House on the 5th of May 2016. The speakers explored the potential of the IIoT and how it could affect industry and the world of work in the future, drawing on a number of case studies.

Stefan Leutenegger and **Andy Davison** ran a workshop at ICCV 2015 in Santiago de Chile on "The Future of SLAM". See http://wp.doc.ic.ac.uk/thefutureofslam/ . It was one of the most highly attended workshops at ICCV with almost 100 participants.

Stefan Leutenegger released "OKVIS: Open Keyframe-based Visual-Intertial SLAM" under BSD (finalising work from his PhD at ETH Zurich), see https://www.youtube.com/watch?v=TbKEPA2_-m4, code at http://ethz-asl.github.io/okvis_ros/

Last year **Stephen Muggleton** gave conference and workshop keynote talks at IJCAI, NIPS and ILP.

Julie McCann did an invited presentation to the British Computer Society in Edinburgh on 'Smart Dust and Things' in December 2015.

Ruth Misener gave an invited seminar at the London School of Economics on 20 January and lectured at MINO/COST Spring School on Mixed Integer Nonlinear Programming and Applications, Paris,in April.

Ruth has also been invited to give a presentation at the annual Mixed Integer Programming workshop at the University of Miami this year. This is an invitation-only single track workshop for the discrete optimisation community.

Ruth Misener participated in Voice of the Future 2016, an event where researchers aged 18 - 35 pose questions to Ministers and key scientific advisors in London Parliament.

Luigi Nardi (http://wp.doc.ic.ac.uk/lnardi/) organised the Architectures and Systems for Real-time Mobile Vision applications (ASR-MOV) workshop in March, in conjunction with CGO 2016 in Barcelona, one of the top conferences in code generation and software performance optimisation.

Luigi Nardi (http://wp.doc.ic.ac.uk/lnardi/) was invited to speak at the HARSH workshop (March 12) co-located with HPCA 2016 one of the top conferences in computer architectures. He was also invited to give a seminar at the prestigious Oxford eResearch Centre Many-core seminar series in the area of many-core computing (February 24).

Luis Pina gave a talk on "Deploying Dynamic Analyses and Preventing Compiler Backdoors with Multi-Version Execution" at the ICT COST Action IC1402, Barcelona, March 2016.

Murray Shanahan was a plenary speaker at AISB 2016, Sheffield on 5 April. He was also a speaker at the Innovation Forum Imperial College: The Future of Artificial Intelligence on 14 April 2016.

Francesca Toni gave a tutorial on Argumentation Frameworks for Explanation-Based Reasoning at KR in April 2016.

Paolo Turrini will be an invited speaker at Stanford University for the 5th CSLI workshop on Logic, Rationality and Intelligent Interaction 26th May 2016.

Nobuko Yoshida gave an invited lecture at JFLA, Inria, France which was held from 27-30 Jan 2016.

Outreach

Caterina Fernandes has successfully guaranteed external funding from a company for the outreach programme - coding club for girls running for 10 Saturdays (1.5 hours) each term. Funding is £5000/per term for the foreseeable future, which funds 30 girls ages 8-14 or more per term.

Major committee/editorial board memberships

Cristian Cadar has joined the editorial board of the ACM Transactions on Software Engineering and Methodology (TOSEM), as an associate editor. ACM TOSEM is one of the two leading software engineering journals.

Marc Deisenroth will be Area Chair for NIPS 2016.

Dr Catarina Fernandes, Teaching Fellow and Athena SWAN coordinator, has been invited to become the Academic Leader for the Anita Borg Institute Local - London (ABI.London) - focusing on supporting, inspiring and advancing female technologists in London.

Antonio Filieri is on the programme committees of the 13th Working IEEE/IFIP Conference on Software Architecture and Component-Based Software Engineering and Software Architecture (WICSA/CompArch

2016), the 31st IEEE/ACM International Conference on Automated Software Engineering (ASE 2016) and the 39th International Conference on Software Engineering (ICSE 2017).

Ben Glocker is co-organiser and program chair of the 7th International Workshop on Biomedical Image Registration (WBIR 2016): http://wbir2016.doc.ic.ac.uk/. Ben is also area chair and member of the program committee of the International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI 2016): http://miccai2016.org.

Alessio Lomuscio is serving on the following programme committees:
- PC member for the 15th International Conference on Autonomous Agents & Multi-Agent Systems (AAMAS2016), to be held in Singapore in May 2016.
- Senior PC member for the 25th International Joint Conference on Artificial Intelligence (IJCAI2016) to be held in New York City, USA, in July 2016.
- Senior PC member for the 22nd European Conference on Artificial Intelligence (ECAI2016). The Hague, Netherlands in August 2016.

Björn Schuller was re-elected as member of the IEEE Speech and Language Processing Technical Committee (SLTC) for 2016-18.

Morris Sloman has been appointed a member of the IEEE Fellows Committee who decide on the IEEE Fellow nominations.

Nobuko Yoshida has joined the Journal Editorial Board of Mathematical Structures in Computer Science (CUP) from 1 January 2016.

Student news

Mr Mark Law (PhD student of Alessandra Russo and Krysia Broda) has been awarded a 2016 IBM PhD Fellowship. The fellowship is for at least one year.

Bryan Liu, a 4th year Joint Maths and Computing Undergraduate student, won the Outstanding Student Prize from the Worshipful Company of Information Technologists (WCITs). The award was presented on 10th February at WCIT's 91st Business Luncheon. Bryan attended the luncheon with the Head of Department, Susan Eisenbach.

Cross-College student team 'Imperialists SK' including **Daniel Zvara** from Computing, Martin Ferianc and Miroslav Gasparek were the winners of the Cisco Switch-Up Challenge finals. They impressed the jury with their project 'Wells' which consists of two components: a 'smart cap', which can fit any standard plastic bottle, and a smartphone app. When using the Wells app, the user is provided with a recommended water intake for the day, based on their personal metrics. The prize for the winning team is a week-long trip to Cisco's global headquarters in San Jose, California.

Student Academic Choice Awards

Dr Ruth Misener, Robert Chatley, Dr Fidelis Perkonigg, Dr Anandha Gopalan and Himadri Das have all been nominated for the Student Academic Choice Awards (SACAs) run by the Student Union. Since 2013, the Awards have helped to recognise and reward excellence in staff members across the College, based on nominations from students. These nominations are reviewed by panels of student representatives from each department and 6 nominees are chosen across the College for each category.