Computing News – April 2015

Top journals, conference papers and publications

Alastair Donaldson and the Multicore Programming Group have had two papers accepted at the Programming Language Design and Implementation (PLDI) conference, and one at the Architectural Support for Programming Languages and Operating Systems (ASPLOS) conference:

- "Many Core Compiler Fuzzing" (PLDI) is about finding defects in compilers for the OpenCL programming language. This is a UROP success story: the project started as an MEng thesis (Christopher Lidbury), the MEng student and another Imperial student (Andrei Lascu) then worked on it over the summer as UROP students, and we worked with Nathan Chong (former PhD student) to get it ready for PLDI.
- "Asynchronous Programming, Analysis and Testing with State Machines" (PLDI) is about a new language, P#, designed by PhD student Pantazis Deligiannis during an internship with Akash Lal at Microsoft Research Bangalore, and is also joint work with Jeroen Ketema and Paul Thomson at Imperial.
- "GPU Concurrency: Weak Behaviours and Programming Assumptions" (ASPLOS) is joint work with Jeroen Ketema and John Wickerson at Imperial, as well as researchers at UCL, Cambridge and Utah. The paper demonstrates the extent to which GPUs exhibit memory relaxed consistency models

J J Belić & A A Faisal (2015) "Decoding of human hand actions to handle missing limbs in neuroprosthetics", Frontiers in Comp Neuro, 9:27

Behbahani, F. M. P., Taunton R., Thomik, A. A. C. and Faisal, A. A. "Haptic SLAM for context-aware robotic hand prosthetics - simultaneous inference of hand pose and object shape using particle filters" Neural Engineering (NER), 2015 7th Intl. IEEE/EMBS Conf. on. IEEE, 2015.

Ferrante, A., Gavriel, C. and Faisal, A. A. "Towards a brain-derived neurofeedback framework for unsupervised personalisation of Brain-Computer Interfaces " Neural Engineering (NER), 2015 7th Intl. IEEE/EMBS Conf. on. IEEE, 2015.

Ferrante, A., Gavriel, C. and Faisal, A. A. "Data-efficient hand motor imagery decoding in EEG-BCI by using Morlet Wavelets & Common Spatial Pattern Algorithms" Neural Engineering (NER), 2015 7th Intl. IEEE/EMBS Conf. on. IEEE, 2015.

Gavriel C., Thomik, A. A. C., Lourenco, P. R., Nageshwaran, S., Athanasopoulos, S., Sylaidi, A., Festenstein, R. and Faisal, A. A. "Towards neurobehavioral biomarkers for longitudinal monitoring of neurodegeneration with wearable body sensor networks" Neural Engineering (NER), 2015 7th Intl. IEEE/EMBS Conf. on. IEEE, 2015.

Ktena S. I., Abbott, W. and Faisal, A. A. "Evaluating eye-based wheelchair control interfaces in a safe virtual environment" Neural Engineering (NER), 2015 7th Intl. IEEE/EMBS Conf. on. IEEE, 2015.

Sylaidi, A., Lourenco, P. R., Nageshwaran, S., Lin, C., Rodriguez, M., Festenstein, R. and Faisal, A. A. " f2MOVE: fMRI-compatible haptic object manipulation system for closed-loop motor control studies" Neural Engineering (NER), 2015 7th Intl. IEEE/EMBS Conf. on. IEEE, 2015.

Thomik, A. A. C., Fenske, S. and Faisal, A. A. "Towards Sparse Coding of Natural Movements for Neuroprosthetics and Brain-Machine Interfaces" Neural Engineering (NER), 2015 7th Intl. IEEE/EMBS Conf. on. IEEE, 2015.

Wu, Y. and Faisal, A. A. "Towards an Integrative Spiking Neuron Model of Motor Control - from Cortex & Basal Ganglia to Muscles & Sensory Feedback" Neural Engineering (NER), 2015 7th Intl. IEEE/EMBS Conf. on. IEEE, 2015.

Xiloyannis, M., Gavriel C., Thomik, A. A. C. and Faisal, A. A. "Gaussian Process Regression for accurate prediction of prosthetic limb movements from the natural kinematics of intact limbs" Neural Engineering (NER), 2015 7th Intl. IEEE/EMBS Conf. on. IEEE, 2015.

Xiloyannis, M., Gavriel C., Thomik, A. A. C. and Faisal, A. A. "Dynamic forward prediction for prosthetic hand control by integration of EMG, MMG and kinematic signals" Neural Engineering (NER), 2015 7th Intl. IEEE/EMBS Conf. on. IEEE, 2015. [Note: IEEE/EMBS Neural Eng is the top conference for Neural Engineering]

Ben Glocker is co-editor of a recently published Springer book: J. Yao, B. Glocker, T. Klinder, S. Li, Recent Advances in Computational Methods and Clinical Applications for Spine Imaging, Lecture Notes in Computational Vision and Biomechanics, volume 20, 2015

Grani A. Hanasusanto, Daniel Kuhn, and Wolfram Wiesemann, "K-adaptability in two-stage robust binary programming**"** Journal: *Operations Research*

Grani A. Hanasusanto, Vladimir Roitch, Daniel Kuhn, and Wolfram Wiesemann, "A distributionally robust perspective on uncertainty quantification and chance constrained programming" Journal: *Mathematical Programming.*

Thomas Heinis has had a paper accepted (THERMAL-JOIN: A Scalable Spatial Join for Dynamic Workloads) at SIGMOD, one of the leading international forums for database researchers, practitioners, developers, and users to explore cutting-edge ideas and results.

Bernhard Kainz, Markus Steinberger, Wolfgang Wein, Maria Kuklisova-Murgasova, Christina Malamateniou, Kevin Keraudren, Thomas Torsney-Weir, Mary Rutherford, Paul Aljabar, Joseph V. Hajnal, and Daniel Rueckert: Fast Volume Reconstruction from Motion Corrupted Stacks of 2D Slices. IEEE Transactions on Medical Imaging, to appear, 2015. doi:10.1109/TMI.2015.2415453

P. Kouvaros, A. Lomuscio. Verifying Emergent Properties of Swarms. Proceedings of the Twenty-Fourth International Conference on Artificial Intelligence (IJCAI15). Buonos Aires, Argentina. AAAI Press. To appear. Acceptance rate: 26%. Number of submissions: 1996.

F. Belardinelli, D. Grossi, A. Lomuscio. Finite Abstractions for the Verification of Epistemic Properties in Open Multi-Agent Systems. Proceedings of the Twenty-Fourth International Conference on Artificial Intelligence (IJCAI15). Buonos Aires, Argentina. AAAI Press. To appear. Acceptance rate: 26%. Number of submissions: 1996.

A. Lomuscio, W. Penczek. Model Checking Temporal Epistemic Logic. Chapter 8 of the Handbook of Epistemic Logic. H. van Ditmarsch, J. Halpern, W. van der Hoek, and B. Kooi (eds.). College Publications, pp 397-441.

Stephen Muggleton and his PhD student Andrew Cropper have had a technical paper on learning efficient programs accepted for the IJCAI2015 conference. This is prestigious because of IJCAI's low acceptance rate.

Luigi Nardi, B. Bodin, M. Z. Zia, J. Mawer, A. Nisbet, P. H. J. Kelly, A. J. Davison, M. Luján, M. F. P. O'Boyle, G. Riley, N. Topham, and S. Furber. Introducing SLAMBench, a performance and accuracy benchmarking methodology for SLAM. In IEEE Intl. Conf. on Robotics and Automation (ICRA), Seattle, Washington USA, May 2015

Umberto Grandi, Davide Grossi and Paolo Turrini "Equilibrium Refinement through Negotiation in Binary Voting" to appear in the Proceedings of the International Joint Conference on Artificial Intelligence (IJCAI 2015), July 2015, Buenos Aires, Argentina.

Weiren Yu, and Julie A. McCann. High-Quality SimRank-Based Similarity Search. The 38th Annual ACM SIGIR Conference (**SIGIR 2015**), Santiago, Chile (To appear)

Weiren Yu, and Julie A. McCann. Efficient Partial-Pairs SimRank Search on Large Networks. The 41st International Conference on Very Large Data Bases (**PVLDB**), 2015, pp.569--580.

W. Yu, X. Lin, W. Zhang, and J. McCann. Fast All-Pairs SimRank Assessment on Large Graphs and Bipartite Domains. IEEE Transactions on Knowledge and Data Engineering (**TKDE**), To Appear, 2015.

Funding success

Alastair Donaldson was successful in bidding for a small grant from GCHQ (£36,000) for a seven week intensive project on OpenCL compiler testing.

Dr Faisal's team was awarded 2-year NIHR funding for Deep Phenotyping of Neurodegenerative diseases using human body sensor networks and behaviourmetrics

Ben Glocker has received funding as Co-I on the following projects:

- a Dunhill Medical Trust funded project "Optimising diagnosis and prediction of outcome of spinal decompression surgery in older people" lead by Dr Paul Strutton;
- an MRC DPFS funded project "Repurposing Low-Cost Consumer Technology for Motion Correction in Dementia Neuroimaging" lead by Prof Roger Gunn;
- Ben Glocker and Daniel Rueckert are Co-Is on an MRC/NIHR EME funded project "Machine learning in whole body oncology (MALIBO)" lead by Prof Andrea Rockall

Prof Muggleton has been awarded two grants during the last month. One is a NERC large grant (around £3M) led by Dr Guy Woodward at Silwood Park. Prof Muggleton's group will be involved in using Inductive Logic Programming to model the effects of global warming on marine food webs. The second accepted proposal is a Royal Academy of Engineering Newton grant which provides funding for collaboration over two years with Nanjing University on the topic of Logical-based Vision.

Awards and esteem

The GPUVerify tool, developed by Alastair Donaldson's Multicore Programming Group, has been integrated into the latest release of ARM's Mali Graphics Debugger. ARM have published a blog post showing the use of GPUVerify and the Mali Graphics Debugger together: http://community.arm.com/groups/arm-mali-graphics/blog/2015/04/14/debugging-opencl-applications-with-mali-graphics-debugger-v21-and-gpuverify

Aldo Faisal's team won the Blackwood Design Award for Assistive technology (gaze-controlled wheelchair: see below), the 500 GBP prize money was awarded to MEng student from Bioengineering, Bianca De Biasi, who was part of the project last year.

P.E. Farrell, S.W. Funke, D.A. Ham, M.E. Rognes *Dolfin-adjoint: Automatic adjoint models for FEniCS* won best poster at the SIAM conference on Computational Science and Engineering in Salt Lake City in March. The poster is on display outside Huxley 757.

Media mentions

Aldo Faisal was interviewed by the BBC following their election coverage which focussed on the use (and abuse) of Twitter, and relied for impact on the expertise of the Tavares & Faisal algorithm for social media human decision making analysis (DOI: 10.1371/journal.pone.0065774) http://www.bbc.co.uk/news/blogs-trending-32248658.
Aldo's team featured in Al Jazeera English's technology TV show "Downstream" reporting on the labs natural-gaze-controlled Wheel-Chair Technology: https://www.facebook.com/ImperialBioeng/posts/779574975431162.
Aldo Faisal was interviewed by the Financial Times (and their TV channel) on the role of personal service robotics and specifically highlighting his European project grant on Eye-controlled robotic orthotics ENHANCE. http://www.ft.com/cms/s/0/3a4a1bc6-e1d6-11e4-bb7f-00144feab7de.html#axzz3XGu0LhtC

Murray Shanahan has been getting a lot of media attention again this month following the release of Ex Machina! Here is a selection of interviews and quotes from Murray:

- USA Today (7th April 2015) http://www.usatoday.com/story/life/movies/2015/04/07/alex-garland-ex-machina/25372679/
- KPCC's AirTalk programme (South California Public Radio) (9th April 2015) http://www.scpr.org/programs/airtalk/
- Fusion http://fusion.net/story/118016/ex-machina-is-the-best-movie-about-artificial-intelligence-in-40-years/
- The Atlantic http://www.theatlantic.com/entertainment/archive/2015/04/ex-machina-and-the-virtues-of-humanizing-artificial-intelligence/390279/

Murray's book, "Embodiment and the Inner Life" has also been talked about a lot this month. In a 'Den of Geek' interview (http://www.denofgeek.us/movies/ex-machina/245285/oscar-isaac-alicia-vikander-talk-ex-machina-ai-x-men-apocalypse) Alicia Vikander and Oscar Isaac (who will be in the new Star Wars film) are asked by the interviewer if they have read Murray's book.

Events, workshops, invited talks

Marc Deisenroth is a Keynote Speaker at the EPSRC Workshop "Autonomous Citizens: Algorithms for Tomorrow's Society", organized by the Network on Computational Statistics and Machine Learning. He also gave a tutorial on "Gaussian Processes and Big Data Problems" at the Machine Learning Summer School in Gothenburg (April 2015)

Aldo Faisal is giving a plenary lecture at the Intl Conf. on Brain Engineering and Neuro-computing, 1st June 2015 (Mykonos, GR). He is also giving a plenary lecture at the 10th BGU Computational Motor Control meeting, 18th June 2015 (Beer-Sheva, IL).

Abhijeet Ghosh is giving an invited talk on "Acquisition and Modeling of Facial and Material Appearance" at the Research seminar of the Department of Computer Science at the University of York, April 22nd.

Ben Glocker is giving three invited talks at the 3rd Biomedical Image Analysis Summer School in Paris in July, at the UCL Medical Image Computing Summer School in London in August, and at the ICML 2015 Workshop on Machine Learning meets Medical Imaging in Lille in July.

David Ham and the Firedrake project team will be hosting the FEniCS '15 workshop on automated simulation technology at Imperial 29 June - 1 July 2015. Further details are at http://www.firedrakeproject.org/fenics_15

Kin Leung reports that the inaugural workshop for the Centre for Information and Communications Research (iCore) was successfully held on 17 April (Friday) at the EEE Department. More than 100 colleagues, including from DoC, were among the attendees. The objective of iCore is to promote research among colleagues at the College and with industries, government organisations and other universities in a wide area of information and communications technologies (ICT). While the Centre focuses on underpinning ICT theories, it also emphasises on multi-disciplinary research including smart environments, transportation, healthcare, energy grids and defence, to name a few topics. Colleagues are cordially invited to affiliate with the Centre. Please visit www.commsp.ee.ic.ac.uk/~icore or contact Kin Leung at kin.leung@imperial.ac.uk for information.

Ruth Misener is participating in Imperial Festival this year (http://www.imperial.ac.uk/be-inspired/festival/) with her collaborators from Chemical Engineering. Their booth is titled "Making and Healing Blood: An Engineering Approach".

Prof Stephen Muggleton has agreed to give a keynote talk on his recent research at IJCAI2015 in Buenos Aires. IJCAI is the world's largest international conference on Artificial Intelligence. The keynote presentation will be included as part of the new Machine Learning track. Prof Muggleton will also be a keynote speaker this year at the International Conference on Inductive Logic Programming, which will be held in Kyoto.

Luigi Nardi (http://wp.doc.ic.ac.uk/lnardi/) was invited by NVIDIA to speak at the GPU Technology Conference (San Jose April 4-8). We was also invited to give talks at AMD, Google and Qualcomm, all concerning his work on the SLAMBench framework for performance/energy/accuracy analysis of SLAM algorithms.

Major committee/advisory board memberships

Marc Deisenroth is Area Chair for NIPS 2015

Aldo Faisal was appointed to the NSF review panel for ICT grants in Neural Engineering & the US BRAIN initiative.

Abhijeet Ghosh is serving on the IPCs of the Eurographics Symposium on Rendering (EGSR) 2015, CVPR Workshop on Computational Cameras and Displays (CCD) 2015, and CAD/Graphics 2015.

Kin Leung serves as the Chairman of the IEEE Fellow Evaluation Committee for Communications Society (ComSoc). This is his last year on the committee, after serving as a committee member in 2009 to 2011 and as its chairman from 2012 to 2015

Alessio Lomuscio is co-chairing the 22nd International Symposium on Temporal Representation and Reasoning (TIME 2015) to be held in Kessel, Germany, September 2015. Proceedings published by IEEE. Special Issue published in Information and Computation.

Student achievements

Summer Jones, MEng first year, has just won the Best First Year Poster in the annual BCS Lovelace Colloquium. Her poster "Towards Eradicating Memory Loss Using Computational Neuroscience" discussed the use of silicon prosthetic implants in the brain to mimic healthy neurons.

PhD student Jérémy Riviere won 1st prize in the DOC Google poster competition 2015 for his project "Mobile Surface Reflectometry". Jérémy has also been selected as a finalist for Qualcomm Cambridge Innovation Fellowship 2015 for his proposal "On-site acquisition of surface reflectance".

The following PhDs and MSc's from Aldo Faisal's lab and their conference submissions were selected for talks:
PhD) Constantinos Gavriel, IEEE Body Sensor Networks (Cambridge MA)
(PhD) Andreas Thomik, 60th Annual APS meeting (San Antonio, TX)
(PhD) Ariadne Whitby, 60th Annual APS meeting (San Antonio, TX)
(PhD) William Abbott, 15th Annual Visual Sciences Meeting (St. Pete Beach, FL)
(PhD) William Abbott, 60th Annual APS meeting (San Antonio, TX)
(MSc) Marta Garnelo, 60th Annual APS meeting (San Antonio, TX)
(MSc) Ira Ktena, IEEE/EMBS Neural Engineering (Montpellier, F)
(MEng) Bianca De Biasi was the runner up in the IMech Student poster competition with her ongoing MEng on embodiment and cognitive representation.

MEng student Bianca De Biasi was runner-up at the IMech Poster Competition for her MEng project in Dr Faisal Lab.

Alumni News

Guido Jouret (PhD 1991, supervisor John Darlington) has recently been appointed CTO at Nokia Technologies. Further details are here: http://recode.net/2015/04/14/nokia-technologies-names-former-cisco-executive-guido-jouret-as-cto/