Research Perspectives and Network of Networks Meeting

Tuesday 29 November, 2011, London

1000	Arrival & Coffee	
1030	Welcome & Round-Table Introductions	Mike Chantler
1045	Working Together	Liam Blackwell
1100	ICT Perspectives	Mike Chantler
1140	Topic Modelling	Mike Fourman
1200	Discussion: ICT Perspectives Collaboration	Chair: Mike Chantler
1230	Lunch	
1330	Network Presentations	Chair: Ian Henning
1410	Discussion / Coffee	
1500	Round-Table Summary	
1530	End of Meeting	

In Attendance

Liam Blackwell	EPSRC
Zoe Brown	EPSRC
Gerald Buller	Heriot Watt University
Mike Chantler	Heriot Watt University
George Constantinides	Imperial College London
Dave Corne	Heriot Watt University
Tom Crick	University of Wales Institute
David Foster	University of Manchester
Michael Fourman	University of Edinburgh
Fraser Halley	Heriot Watt University
Chris Hankin	Imperial College London
Ian Henning	University of Essex
Ian Horrocks	University of Oxford
Marina Jirotka	University of Oxford
Kevin Jones	City University London
Karol Kalna	Swansea University
Nick Kingsbury	University of Cambridge
Mark Leeson	University of Warwick
Steve McLaughlin	University of Edinburgh
Peter O'Hearn	Queen Mary University of London
Anthony O'Neil	Newcastle University
Mark Plumbley	Queen Mary University of London
Andrew Rose	EPSRC
Mark Sandler	Queen Mary University of London
Alwyn Seeds	University College London
Dimitra Simeonidou	University of Essex
Bernd Carsten Stahl	De Montfort University
Phillip Willis	University of Bath

Attendee Profiles

Name	Gerald Buller
Affiliation	Heriot-Watt University
Single-photons/quantum information *Study of detection approaches and applications of single photons. These applications include single photon depth imaging approaches, and applications of quantum information processing, including quantum cryptography, quantum imaging and quantum digital signatures.*	

Name	Dr George A. Constantinides
Affiliation	Imperial College London
Photo	
Research area	Theory and practice of using parallel hardware to implement high performance and low power or low energy algorithms, especially numerical algorithms. Active research in the architectures, synthesis tools / optimizing compilers, and applications of reconfigurable hardware (FPGAs) for this purpose. I coined the term "lossy synthesis" to describe circuit synthesis techniques allowing a controlled tradeoff between quality, typically numerical accuracy, and traditional metrics such as area and power. Much of my EDA work retains a focus on lossy techniques. I also work on memory optimization, in particular efficient automated design techniques for using on-chip memory.

Name	Dr Tom Crick
Affiliation	Cardiff Metropolitan University

Photo	

My research interests lie at the hardware/software interface: next-generation microprocessor design, compilers and code optimisation, concurrency and multi-core processors, embedded systems, and high performance computing. I am also interested in the broader research area of knowledge representation and reasoning: intelligent systems and declarative problem-solving using logic programming (especially Answer Set Programming).

@DrTomCrick
http://drtomcrick.wordpress.com

Name	Professor David H. Foster
Affiliation	School of Electrical and Electronic Engineering, University of Manchester

Vision in biological and machine systems, visual psychophysics, hyperspectral imaging; colour statistics of natural scenes; modelling sensory performance; eye movements

Name	Chris Hankin
Affiliation	Imperial College London
Photo	

Professor Hankin has researched programming language semantics and semantics-based program analysis for over 25 years. He has done pioneering work on the static analysis of declarative programming languages, pointer usage in C-like languages, the analysis of protocols for ad hoc wireless networks and language-based security. He is co-author (with Nielson and Nielson) of the standard textbook on program analysis techniques. Recently he has developed (with Di Pierro and Wiklicky) a new approach to the static analysis of probabilistic systems and used this in quantifying the vulnerability of systems to certain kinds of attack and the identification and removal of covert channels.

Most recently he has applied ideas similar to the program analysis techniques to identify sub-communities in networks and has also been investigating techniques for identifying anomalous behaviour. The former uses techniques from the theory of Markov Processes and the latter is based on a Bayesian approach. He is beginning

some work on the identification of missing or hidden links and nodes in a network and also recognising and predicting intent. For the latter work, he is planning to develop ideas based on plan recognition in Artificial Intelligence and on the use of Markov Games in cyber security.

Name	Ian Henning
Affiliation	University of Essex
Optoelectronic Devices, Novel uses of Optoelectronic Devices particularly in Communication Networks, Wireless Sensor Networks.	

Name	*Marina Jirotka*
Affiliation	*University of Oxford*
Photo	

Marina Jirotka is Reader in Requirements Engineering, Associate Director of the Oxford e-Research Centre, Deputy Director of the UK Digital Social Research Programme and Fellow of St Cross College. Her research interests have long been concerned with bringing a richer comprehension of socially organised work practice into the process of engineering technological systems with a focus on supporting everyday work and interaction.

Early in her career she developed the use of video-based ethnographic research for use in Requirements Engineering. This work was done in collaboration with BT and helped solve problems for City of London trading rooms, service centres and control rooms. Over her research career, she has developed close relationships with an extensive network of companies including those in the healthcare and pharmaceutical sector, such as BT Healthcare and Health Direct; in Government, NHS and DSTL; in IT, Microsoft and IBM; in Finance, Societe Generale and Barclays; and in Consultancy, McKinsey and KorteQ.

From 2003, her research focussed on e-Research applications, particularly e-Health. As a requirements engineer on a flagship eScience project, eDiaMoND, she became interested in notions of collaboration and trust in clinical practice and in the sciences more generally.

In 2006 she became a James Martin Research Fellow and joined the Oxford e-Research Centre, and in 2007 she was awarded an ESRC/SSRC visiting fellowship to UCLA, and PARC to develop a systematic understanding of data sharing to inform the design of e-Research systems.

She has led research projects into:

- identifying the importance of intellectual property rights in collaborative medical *databases. (ESRC Copyright Ownership of Medical Data in Collaborative Computing Environments)*;

- investigating approaches to embedding applications in e-Research domains (*EPSRC Embedding e-Science Applications: Designing and Managing for Usability*):
- identifying the social shaping of e-Research infrastructure and disciplinary concerns. (*ESRC Ethical, Legal and Institutional Responses to Emerging e-Research Infrastructure, Policies and Practices*).

Through collaborations with industry, government and other organisations, other research projects have focussed on the Digital Economy. She has been involved in determining the research agenda on two Digital Economy clusters: she led one investigating the emergent practices and capabilities of social networking systems, and explored how to develop understandings of services, exchange and interaction that benefit the UK economy (*EPSRC Innovative Media for the Digital Economy*); and was co-investigator on a second that explored the economic, social, legal and regulatory issues to emerge in the next generation of the internet (*EPSRC Opportunities and Challenges in the Digital Economy: an Agenda for the Next-generation Internet*). In October 2009 she was appointed Deputy Director of ESRC's National Strategic Directorate for the e-Social Science Programme.

Most recently, she is leading an EPSRC project into a Framework for Responsible Research and Innovation in ICT in collaboration with De Montfort University.

Name	Kevin Jones
Affiliation	City University London

Over the last 25 years, he has worked on many aspects of correctness, in both software and hardware, ranging from formal approaches through to practical issues of testing in industrial environments. His recent work has focused on systems that cross domains, such as analog and digital systems.

His current research interests are focused in 3 main areas:

1. Formal and pragmatic approaches to correctness of complex systems, particularly AMS hardware and other kinds of "hybrid systems";
2. Formal models and tools with applicability to the security domain, particularly quantitative techniques applied to system level issues;
3. Digital control of power applications, particularly the use of communication to change the system level efficiency of power use.

Name	Karol Kalna
Affiliation	Swansea University
Photo	

I am a senior lecturer at College of Engineering, Swansea University and an EPSRC Advanced Research Fellow undertaking research on the grant "Modelling of Carrier Transport in Ultra Thin Body Transistors". My research is focused on the modelling of advanced semiconductor devices using ensemble Monte Carlo (MC) simulations and quantum-mechanical (QM) methods. I collaborate with Prof. A. J. García-Loureiro, University of Santiago De Compostela, Spain, on parallel finite element 3D drift diffusion and novel finite element 3D MC simulations for sub-100 nm thin-body Si MOSFETs. I have pioneered the introduction of III-V MOSFETs for digital applications, correctly predicting the best III-V materials candidate for the channel of an n-type MOSFET; InGaAs. This led to the current surge in research to replace Si in the MOSFET channel with III-V semiconductors for future digital technology generations. He was a co-investigator in the EPSRC grant "III-V MOSFETs for Ultimate CMOS" investigating nano-scaled III-V MOSFETs and in the EU FP7 STREP grant DUALLOGIC, a consortium of nine EU partners. I am also a PI recently started an EPSRC project "Multiscale Modelling of Metal-Semiconductor Contacts for the Next Generation of Nanoscale Transistors" in collaboration with Dr. P. Sushko, UCL, investigating nanoscaled metal contacts fabricated for III-V MOSFETs. I worked on quantum cascade lasers with Prof. A. Shore and on the role of electron-electron and electron–phonon interactions in quantum well lasers during his PhD thesis and later with Prof. F. Peeters at Antwerp University. His interests also include Si, Ge, and GaAs nanowire (NW) transistors simulated using 3D Non-Equilibrium Green's Functions (NEGF).

Name	Mark Leeson
Affiliation	School of Engineering, University of Warwick
Photo	

Communication system performance optimisation using a combination of mathematical analysis, numerical methods and simulation. As part of my work, I have employed techniques from Computational Intelligence (CI) such as evolutionary algorithms to solve difficult problems such as the allocation of wavelengths in optical networks and the design of radio antennas. Recent specific areas include:

Network Coding: The consideration of transmitted information as a modifiable mathematical entity forms the basis of network coding, increasing the capacity of communication networks without using extra hardware. It is not necessary for all nodes in a network to code but the decision as to which ones do is NP-hard. My recently completed EPSRC Grant (EP/F033591/1) was the first one to be funded in this area in the UK.

Nanoscale Communications: Today, the term nanotechnology has spread into popular culture but the first step towards forming networks of nanoscale devices is the determination of the appropriate means of inter-device communication. I received a RAEng Leverhulme Senior Research Fellowship on this topic for 2010-11.

Biodiversity for Ad Hoc Network Security: Maintaining an adequate computer network security level is a co-evolving process between improved security techniques and more sophisticated attack methods. Ecological research has found that the spread of viruses can be reduced by an increased range of organisms (biodiversity) promoting resistance to ecosystem disturbances by tolerating them and an artificial equivalent to this has great appeal.

Name	Prof Stephen McLaughlin
Affiliation	Heriot-Watt University
Photo	
Signal Processing and Communications.	

Name	Mark Sandler
Affiliation	Queen Mary University of London
Digital Music and Audio Semantic Media (especially Music and Audio) Digital Signal Processing	

Name	Dimitra Simeonidou
Affiliation	University of Essex
Research area	High Performance Networks

Name	Bernd Carsten Stahl
Affiliation	De Montfort University
Photo	
Bernd Carsten Stahl is Professor of Critical Research in Technology and Director the Centre for Computing and Social Responsibility at De Montfort University, Leicester, UK. His interests cover philosophical issues arising from the intersections of business, technology, and information. This includes the ethics of ICT and critical approaches to information systems.	

Notable current and recent projects:

Title / Topic	Granted by	My Role	Time Frame	Website
CONSIDER (Civil Society Organisations in Designing Research Governance)	EU FP7	Coordinator	02/2012-01/2015	www.consider-project.eu
Framework for Ethics in ICT (led by Marina Jirotka, University of Oxford)	UK EPSRC	CI	09/2011-03/2014	www.responsible-innovation.org.uk
IDEGOV (Identification and governance of emerging ethical issues in information systems)	CIGREF	PI	08/2011-07/2012	
ETICA, Ethical Issues of Emerging ICT Application	EU FP7	Coordinator	04/2009-05/2011	www.etica-project.eu

Name	Mike Chantler
Affiliation	Heriot Watt University
Photo	

After graduating with a first in Electronic Engineering from Glasgow University in 1979 Mike spent six years in the software engineering industry during which time he formed a graphics company that operated mainly in the Netherlands. He gained his PhD in image processing from Heriot-Watt in 1994 where he is now a Professor of Computer Science.

Mike currently leads the Digital Tools theme of Heriot-Watt's £7.4M Innovative Manufacturing Research Centre which focuses on people-centred design tools, digital interaction and crowd sourcing. He also chairs Heriot-Watt's newly formed cross-university theme in Creativity Design & Innovation that is bringing together Scientists, Engineers and staff from Heriot-Watt's Textiles & Design School to perform truly cross-disciplinary research.

Current projects that he's involved in include:

- Digital Sensoria – a Digital Economy funded project joint with Brunel, UCL, Imperial and UAL that is developing multimodal methods for communicating perceptions of design;
- ICT Perceptions – an EPSRC Network that is adapting our crowd-sourcing and data visualisation techniques to help ICT researchers and other stakeholders understand the structure and evolution of the ICT (and other) research portfolios; and

Several IMRC funded projects in image retrieval, appearance measurement and crowd-sourced visual feedback.

Notes: