

STOP PRESS

- **Simin Chen, Yirin Ma and Qi Yang were awarded a Best Student Paper Prize at the 14th Opto-Electronics and Communications Conference (OECC 2009) held in Hong Kong.**
- The Gigabit Wireless Project was awarded the Innovation Excellence Award at the Innovic Next Big Thing Award on 2 July 2009.
- **Adi Botea won the Best Paper - Scalable, Parallel Best-First Search for Optimal Sequential Planning (Akihiro Kishimoto, Alex Fukunaga, Adi Botea) at the 19th International Conference on Automated Planning and Scheduling 19-23 September 2009, Thessaloniki, Greece.**
- Arun Hemraj was appointed as Director of Finance and Operations at NICTA. Arun will have responsibility for Finance, IT Services, Facilities and Risk Management, Project Management Office, Operations, Metrics and KPIs.
- **The NICTA Impact Awards 2008 Winners were announced recently. Stan Skafidas from the GiFi Project won the A. Richard Newton Excellence in Research Award and Alpna Lal from the Project Management Office won the Operational Excellence Award.**
- Matthew Thompson, NICTA QRL PhD Student won the 2009 ATSE Young Science Ambassador awarded by the Academy of Technological Science and Engineering (ATSE). Matthew will use his prize money to travel to regional areas in Queensland to share his passion for science with young people.
- **NICTA PhD Students Nina Naroditskaya, Sara Hakimi and Cindy Wang were selected as finalists for the 2009 Australian and New Zealand Anita Borg Memorial Scholarship.**
- Software by NICTA researchers took out the Gold and Silver medals in two of the major divisions of this year's International SAT (Propositional Satisfiability) competition. The winning solver, gnovelty+2, was developed by Dr Duc Nghia Pham.

EVENTS

29-30 October Science Exposed, Hyde Park Barracks, Sydney 9.30-3pm both days.

30 October QRL Big Picture Seminar – Senator Kate Lundy 'Government 2.0 – Engaging and Empowering Citizens', for more information: www.nicta.com.au/nicta_events/big_picture/qrl_seminars

19 November VRL Open Day – ICT Building, University of Melbourne 111 Barry Street Carlton Victoria. Thursday 12pm-5pm.

Short Courses

| DATE | TITLE | PRESENTER | LOCATION |
|--------------|--|--|----------------|
| 30 Sep-1 Oct | Introduction to Linux for Embedded Developers | Mr Godfrey van der Linden, NICTA | Sydney |
| 15-16 Oct | 6 Degrees of Freedom Modelling and Simulation of Aerospace Vehicles | Dr Peter Zipfel, Univ. of Florida | Melbourne |
| 19-20 Oct | 6 Degrees of Freedom Modelling and Simulation of Aerospace Vehicles | Dr Peter Zipfel, Univ. of Florida | Adelaide |
| 19-20 Oct | Engineering Aspects of GPS Including Receiver Design | A/Prof Andrew Dempster, UNSW | Singapore |
| 22-23 Oct | Engineering Aspects of GPS Including Receiver Design | A/Prof Andrew Dempster, UNSW | KL, Malaysia |
| 11-12 Nov | Intelligent Video Surveillance | Prof Brian C. Lovell, NICTA | Wellington, NZ |
| 12-13 Nov | Fundamentals of RF System Design and Simulation | Dr Rowan Gilmore, University of Queensland | Wellington, NZ |
| 16 Nov | Introduction to Tactical Data Links (TDLs). The Operator's Perspective | Mr Graham Priestnall, SyntheSys | Newcastle |
| 16-17 Nov | Wireless Vehicle Communications | Mr Chris Skinner, DISplay and Dr David Haley, Cohda Wireless | Melbourne |
| 17-18 Nov | Tactical Data Information Links (TADILs) | Mr Howard Harvey, Hai Technologies | Newcastle |

If you would like to comment on anything in this edition of NICTA News or change your contact details, please email us at website@nicta.com.au. If you would like to receive NICTA News online, please register at: <http://www.nicta.com.au/subscription>



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NICTA NEWS

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NICTA shines with world-first research and biggest-ever Techfest

Hello and welcome to the September edition of NICTA News. The last quarter has been an exciting and eventful one for us, with some terrific highlights, including a world-first research breakthrough and the overwhelming success of our annual technology showcase, Techfest.

The energy and enthusiasm displayed by NICTA staff, researchers and students at Techfest – which took place this year at Sydney's Australian Technology Park – was really wonderful to see. More than 370 external visitors came to the event, making it our most popular ever. We also exhibited more research projects than ever before, with over 30 on show.

At the same time, we hosted our international advisory groups. Distinguished members of the international science and business community visit NICTA each year in August to provide valuable feedback on our progress, along with guidance for our future research and commercialisation agendas.

This was the first time that they were able to attend Techfest, as it has previously been staged earlier in the year. All members commented favourably on the opportunity this gave them to talk with researchers in the context of a dynamic external event and see each of our projects under one roof.

Their feedback consistently acknowledged NICTA's progress across all of our strategic objectives and recommended only minor tweaks and shifts to see us on our way to being one of the world's top ten ICT research institutes by 2020. A complete list of our international advisory group members can be found on page 4.

At Techfest, we were proud to announce a world-first research breakthrough achieved by NICTA's Dr Gerwin Klein and his 12-strong team. In a feat which generates tremendous possibilities for the development of super-secure software, they have completed a machine-checked proof of a general-purpose operating system kernel. The breakthrough has been enthusiastically received by the international scientific community and worldwide media coverage has been strong.

In a nutshell, the proof means that a kernel – which is the central component of most operating systems – can be reliably protected from a variety of common worm and virus attacks. The proof also guarantees that a program will always behave as it is intended to behave. High-level defence software and complex aircraft systems are two areas where this breakthrough is likely to be applied in the future.

Congratulations to Gerwin and the L4.Verified team. The originality and audacity of their endeavour epitomises the style and breadth of research that NICTA seeks to undertake. Some of the leading voices in the world of computer science have praised their vision, including Dr K. Rustan M. Leino from Microsoft Research, Professor Lawrence C. Paulson from Cambridge University's Computer Laboratory, and Yale University's Professor of Computer Science, Zhong Shao.

And, despite taking place in an esoteric field inside computer science, this breakthrough will have important real-world applications. It is truly use-inspired. (By the way, if you're wondering what L4 stands for, it refers to a family of microkernels based on designs and implementations by renowned German computer scientist Jochen Liedtke).

It is important to remember that achievements like these take time - this particular outcome was the result of four years work by a team of 12 NICTA researchers, NICTA/UNSW PhD students and UNSW contributed staff. I know that there are more wonderful results like this in the pipeline at NICTA and I look forward to sharing these success stories with you as they emerge.

It's great to be surrounded by people who can nurture these outcomes so it is with pleasure that I welcome Dr Tim Hesketh to the role of Education Director at NICTA and Dr Sylvie Thiébaux as our new Canberra Laboratory Director. Dr David Everitt, who was previously acting in the role of Canberra Laboratory Director, will stay with us in a leadership role in the area of networked systems. He will also continue his work as Associate Director of Education at the Canberra Lab.

In this edition of NICTA News, you will also read about a fresh injection of capital for three of our spin-out companies, an exciting award for NICTA's Professor Gernot Heiser, the expansion of our successful Big Picture Seminar program and the launch of our open source portal, OpenNICTA. Enjoy!

Dr David Skellern
Chief Executive Officer



Contents

- 1 Letter from the CEO
- 2 World-first breakthrough heralds super-secure operating systems
ACT Government sponsors new tech cluster
- 3 Techfest sparkles at Australian Technology Park
Open source portal unveiled
Capital injection lifts NICTA spin-outs
- 4 Finance streamlines procurement
Microsoft VP joins NICTA's International Business Advisory Group
Gernot Heiser NSW Computer Scientist of the Year
- 5 NICTA researcher puts people at the heart of sensor network
- 6 NICTA eyes new vision-based technologies
NICTA appoints Education and Canberra Lab Directors
- 7 NICTA Lab News
- 8 Stop press, events and short courses



ACT Deputy Chief Minister Katy Gallagher

World-first breakthrough heralds super-secure operating systems

In August, NICTA announced a world-first research breakthrough that could make air travel safer, prevent car crashes and keep our national security data safe from bugs and other unwanted intrusions.

The completion of the world's first formal machine-checked proof of a general-purpose operating system kernel means that there is now a way to mathematically prove that software is free of a large class of errors.



NICTA Principal Researcher Dr Gerwin Klein

The proof promises a future where problems with systems governing the safe operation of aircraft and motor vehicles will be known long before the plane takes off or the car's engine starts.

The Secure Embedded L4 (seL4) microkernel also has potential applications in defence and other safety and security industries where the flawless operation of complex embedded systems is of critical importance.

"Formal proofs for specific properties have been conducted for smaller kernels, but what we have done is a general, functional correctness proof which has never before been achieved for real-world, high-performance software of this complexity or size," explains NICTA Principal Researcher Dr Gerwin Klein, who leads NICTA's formal verification research team.

The proof also shows that many kinds of common attacks will not work on the seL4 kernel. A kernel is the central component of most computer operating systems. Flaws in this kernel make the computer vulnerable to attack by worms and viruses.

The breakthrough is the result of four years' research by Dr Klein's team of 12 NICTA researchers, NICTA/UNSW PhD students and UNSW contributed staff.

ACT Government sponsors new tech cluster

Earlier this month, NICTA and the ACT Government launched a Government technology cluster to support and strengthen Government ICT industries in Australia. The ACT Government committed \$150,000 to help establish the cluster in 2009-10, with a further \$100,000 per annum through to 2011-12.

Deputy Chief Minister Katy Gallagher MLA announced the technology cluster at a NICTA Research Laboratory Showcase held in Canberra as part of the ACT Government's Business in Focus Month. "Governments around the world recognise that they must

embrace technology in their systems and business processes in order to meet the increasing expectations of the community, as well as to reduce costs," Ms Gallagher said.

NICTA's Acting CEO Dr Phil Robertson said that there was growing awareness that advanced ICT is transforming the way in which government and business services are delivered. "Internationally, in leading economies it is commonly recognised that around 40 percent of productivity growth can be attributed to the use of advanced ICT. The technology cluster initiative will help increase efficiency and position Australia more competitively."

Techfest sparkles at Australian Technology Park

NICTA's Techfest 2009 was a stunning success, with record numbers of visitors walking through the doors of the Australian Technology Park in August to see over 30 NICTA research projects and innovative ICT business ideas.

Microsoft Corporate Vice President and Chairman of Microsoft China's R&D Group, Dr Ya-Qin Zhang, delivered the event's opening address to a packed auditorium. His speech followed NICTA CEO Dr David Skellern's unveiling of NICTA's latest research breakthrough – the completion of

the world's first formal machine-checked proof of a general-purpose operating system kernel. (See a full report on previous page).

Along with this research breakthrough, NICTA's forays into high-speed wireless

networks, water infrastructure, safety and security, intelligent transport systems, bionic vision and human performance monitoring systems, to name a few, all attracted plenty of attention from a wide range of visitors and media.

Techfest also featured the first public demonstration in New South Wales of NICTA's ultra-high-speed wireless networking team's world-first 'GiFi' chip and introduced a Microsoft Visual Studio plug-in for NICTA's debugging and code-testing Goanna software.



Left: Techfest shines at the Park

Capital injection lifts NICTA spin-outs

NICTA spin-out companies Open Kernel Labs, Audinate and Monitoring Division are eligible for follow-on funding under the Federal Government's Innovation Investment Follow-on Fund (IIFF).

Senator Kim Carr, Minister for Innovation, Industry, Science and Research, said the IIFF will make \$64 million available to 11 fund managers to provide follow-on investments into early-stage companies.

IIFF is a venture capital fund which enables early stage companies to continue to develop and to commercialise research.

"In the difficult investment environment the world is experiencing at the moment, the value of this kind of support for start-up companies cannot be overstated," NICTA Director of Commercialisation Rob Fitzpatrick said. "The availability of this funding will make a real difference to the future of each of these young companies," he added.

Open source portal unveiled

In the spirit of collaboration and openness, NICTA has gathered all of its open source software in a single, publicly accessible online location – OpenNICTA.

This new portal, at www.opennicta.com, makes it easy to view and download NICTA's growing portfolio of licensed open source releases. It provides a window on some exciting NICTA developments and showcases many of our brilliant researchers and students.

The website includes access to, among other software, the breakthrough OKL4 embedded hypervisor, the CAMkES

runtime framework solution for software developers to build microkernel-based operating systems quickly and reliably, and the Armadillo C++ linear algebra library.

By logging into www.opennicta.com, users can find all of NICTA's open source software and view video footage of NICTA's world-class researchers as they describe and explain the software they and their teams have developed. As NICTA licenses more software releases, they will be added to OpenNICTA.

Finance streamlines procurement

NICTA's Finance team provides financial accounting, management accounting, taxation and budgetary control and planning services to NICTA's corporate and research teams.

The team strives to deliver a high quality professional service that contributes to an increased understanding and awareness of financial issues, including the presentation of data in a transparent manner.

Holly Devlin is the area's Financial Controller. She is responsible for the management of the Finance function covering internal and external reporting, all processing activities and implementation of the Finance strategy, policies and procedures. Holly advises NICTA laboratories and business units on financial performances and coordinates the budgeting and forecasting processes.

"Our real aim is to provide an efficient and effective service that allows the researchers to get on with their research," said Holly. "To this end, we have established a new process to help individual Project Leaders manage their budgets more effectively. The CEO now approves a budget for the life of a research project." This frees Project

Leaders from frequent budget approval-seeking processes and allows them to get on with their jobs. "Previously, they didn't have a formal process to follow," Holly explained.

This year, the Finance team accomplished several major milestones. They are currently in the testing phase of a web-based application as part of the new online procurement project. The final stage is due for completion by the end of this year. New, more effective travel and credit card policies have been rolled out across the organisation, and an online facility to register and pay for NICTA short courses will be delivered shortly. Finance has also been involved in the set up of two new NIPR subsidiaries, an interim

structure prior to spinout. "This year has been all about process changes and improving internal controls," said Holly.

The Finance team has eight members including Holly and Director of Finance and Operations, Arun Hemraj who is now focusing more on the operational aspects of the organisation.



Holly Devlin

Gernot Heiser wins NSW Computer Scientist of the Year award

NICTA congratulates Professor Gernot Heiser on winning the Engineering, Mathematics and Computer Sciences category of the NSW Scientist of the Year Awards. "It's a great honour to receive this award," said Professor Heiser. "I'd like to thank Industry and Investment NSW for its vision in establishing these awards, and also my world-class team of staff and students at NICTA and UNSW. Without them I could not have succeeded."

The NSW Scientist of the Year Awards is an initiative of Industry and Investment NSW through its Office for Science and Medical Research. The awards were established last year to recognise New South Wales' leading researchers who are doing cutting edge work of economic, health, environmental or technological benefit to the state.

Professor Heiser heads one of the world's leading computer operating systems research groups at NICTA.

Microsoft VP joins NICTA's International Business Advisory Group

Dr Ya-Qin Zhang, Corporate Vice President of Microsoft and Chairman of Microsoft China R&D Group has joined NICTA's International Business Advisory Group (IBAG). Dr Zhang was a member of NICTA's original International Science Advisory Group (ISAG) in 2003/2004. We are delighted to welcome him back. Other ISAG/IBAG members are:

Mr Duane Zitzner, HP, Executive Vice President, Retired; Mr Narayana Murthy, Infosys, Chief Mentor Officer and co-founder of Infosys; Mr Bob Bishop, Silicon Graphics, Vice Chairman and former CEO; Ms Heather Killen, Hemisphere Capital, Founder and Managing Partner; Dr Jean Vuillemin, Ecole Normale Supérieure & former Scientific Director, INRIA; Prof. Dieter Rombach, Fraunhofer Institute for Experimental Software Engineering, Executive Director; and Director of ICT Cluster; Prof. Jeffrey Ullman, Stanford, Professor Emeritus of Computer Science; Prof. Rodney Brooks, Panasonic Professor of Robotics, MIT (on leave) and Founder, Chairman and CTO, Heartland Robotics, Inc; Dr Stuart Feldman, Google Labs East Coast, Vice President Engineering, and Sir John Taylor FRS, FREng, Chair, Roke Institute.

NICTA researcher puts people at the heart of sensor network

Ricky Robinson might be one of NICTA's youngest researchers, but he's old enough to remember the 'tech wreck' that tore a swathe through over-inflated Internet stocks at the turn of the last century. In just six days in March 2000, the NASDAQ lost nearly nine percent of its value, and the slide continued for the rest of the year and into 2001.

At the time, Ricky was working in Silicon Valley, doing a five-month internship at Sun Microsystems Research labs. "There were no more free bagels," he recalls. Few companies were spared the economic fall-out, but Ricky's internship held, and he has fond memories of his time at Sun: "Elements (of that work) have made their way into some versions of (Sun's) Java Virtual machine."

A couple of years later, Sun invited him back, but by then he was deeply involved in his PhD studies back in Australia, so he stayed put. Completing his postgraduate studies at the University of Queensland in 2005, Ricky started working at NICTA's Queensland Lab in 2006. He was one of the lab's first full-time researchers, employed on the SAFE Networks Project, where he worked on managing sensed environmental data that was used to trigger adaptation in routing protocols and applications.

"SAFE Networks was about adaptive wireless mesh networks and I was working on context management," Ricky explains. "It was about managing sensed environmental data and using that to try and adapt the way the network routes packets. It was looking at how to route around damaged areas of the network."

But it was another of Ricky's undertakings that piqued the interest of his fellow researchers – a new peer review paradigm called Citemine.

Citemine is a tool for reducing the burden of peer review, expediting feedback and

publication times. It generates novel publication metrics for authors and the manuscripts they write, and uses these metrics to provide more useful orderings of search results. "We'd like to see whether our underlying mechanism can be used to improve search in domains beyond research publishing, such as the Web as a whole," Ricky says.

Citemine now has its own web site at <http://citemine.com> and has secured nearly \$120,000 in Market Demand Validation and Proof of Concept grants from NICTA's commercialisation team.

Up until the Web came along, the Internet was obscure. The Web put a human face on the Internet.

Building on the experience he gained in the SAFE Networks project, which wound up in mid-2008, Ricky has assembled a team to tackle the problem of information overload in urban environments.

"At its core the Street Project is about facilitating group awareness of the city. It will mine information from the city via sensors or repositories of data – for instance Census data or flooding data. We're trying to allow people, Government departments or groups to create their own



Ricky Robinson

picture of what's happening in the city, take the data and put it in a form that tells them something useful."

Ricky is hoping his work on the Street Project will put a human face on sensor networks: "Up until the Web came along the Internet was obscure. The Web put a human face on the Internet so it became something ordinary people can use. We are trying to take that human-centered approach to sensor networks, which are now at the same stage as the early Internet."

Ricky expects this project to take three to four years to complete.

With its interface between human and built environments, the Street is the sort of place that Ricky likes to hang out. "I was originally interested in flows of information, networks and connectedness. I think that is why I became interested in computer science," he says. "But ultimately I guess I'm a people person. I've always been attracted to where people and technology overlap."



NICTA eyes new vision-based technologies

The Vision Processing for the Bionic Eye (VIBE) Project is developing computer vision-based technologies to process signals for visual prostheses. This will help enable the development of a bionic eye.

Human blindness is caused by the degradation or death of cells in the eye that receive light signals. Full or partial blindness is a condition suffered by tens of thousands of Australians. Age-related macular degeneration and retinitis pigmentosa are two of the leading causes of blindness worldwide.

The VIBE research team is undertaking a three-year project to develop methods to process the video streams coming from a wearable multi-camera system. The processing of the streams will produce information that could assist a person with visual impairment.

The information can be presented to the

wearer via a retinal implant (such as that being developed by Bionic Vision Australia), or via tactile or audio interfaces. The prototype version we demonstrated at Techfest and other events looks rather like a set of night vision goggles.

At the heart of the process are algorithms that can detect and process video and motion. This technology is being integrated into a complete system, in conjunction with the research partners.

The NICTA team is using its combined expertise in computer vision research, particularly in the areas of visual motion



recovery and object identification and detection. We collaborate with the ARC Centre of Excellence for Vision Sciences (ANU), the Centre for Eye Research Australia (University of Melbourne) and Bionic Vision Australia.

The next step for the NICTA team is to refine the technology, based on feedback received from focus groups. The development of pre-clinical trial devices for user testing will then be undertaken.

NICTA appoints Education Director and Canberra Research Laboratory Director

NICTA made two important appointments in recent months - Dr Sylvie Thiébaux to the position of Canberra Research Laboratory Director, and former University of New South Wales' School of Electrical Engineering and Telecommunications Head, Dr Tim Hesketh, to the position of Education Director.

Dr Thiébaux is an Associate Professor at the Australian National University and has been working at NICTA since 2003. Prior to her

Dr Tim Hesketh

appointment as Laboratory Director, she led a NICTA project which developed tools to diagnose problems in complex systems such as smart energy grids.

"Seeing NICTA develop so rapidly into a world-class research organisation and a key player in Australia's ICT innovation system has been very exciting and I am thrilled by the opportunity to take the Canberra Research Lab to the next stage," said Dr Thiébaux.

"This is an exciting time to take the reins of the Canberra Laboratory. We will continue to focus on delivering research outcomes to Australia in the areas of e-government, bioengineering and critical infrastructure management, and further strengthen our leading research capabilities in computer vision and automated data analysis."

Dr Hesketh's appointment will mean NICTA now has a dedicated Education Director to

drive its education initiatives. Previously the responsibility was held by NICTA's Australian Technology Park Laboratory Director Professor Aruna Seneviratne.

"I have been impressed with the program NICTA has developed to equip ICT PhD students with the practical and academic skills to develop and commercialise groundbreaking information technologies," said Dr Hesketh.

Dr Sylvie Thiébaux



NICTA Lab news

Victoria Research Laboratory

Congratulations to networked systems student Yiran Ma who recently secured an Alcatel-Lucent Bell Labs funded internship to spend nearly four months working with collaborators at their facility in Stuttgart, Germany. Yiran is supervised by in-kind contributor Bill Shieh and Stan Skafidas and is part of the group that was recently awarded the Best Student Paper Prize at this year's Opto-Electronics and Communications Conference. Another of Bill's students, Simin Chen, has also been awarded an internship and will be in Stuttgart with Yiran until the end of the year.

NICTA has also agreed to support a leading testbed for the National Broadband Network following the establishment of the Institute for a Broadband-Enabled Society (IBES). Along with the Victorian Government's \$2 million funding for IBES, NICTA's VRL will support the initiative through becoming a Lab partner, making its state-of-the-art Terabit Networking Laboratory available to IBES. It will work with IBES on joint research

projects into future broadband technologies.

At the end of June, VRL staged a successful research showcase event at Queen's Hall in the Parliament of Victoria in Melbourne to celebrate the fifth anniversary of the laboratory's opening in 2004. John Lenders MP, Treasurer and Minister for Information and Communication Technology, opened the event. Included in the showcase was NICTA VRL's research into water information networks, our ICT contribution to the development of a bionic eye and the latest from the ultra-high-speed networks team that developed the 'GiFi' chip.

Canberra Research Laboratory

Dr Brendan Godfrey, Director Air Force Office of Scientific Research (AFOSR), visited NICTA in September. He spent time with a select group of NICTA CRL and ANU researchers who presented technical talks. He also visited ATP listening to technical talks presented by NICTA researchers. Dr Godfrey then presented

the inaugural NICTA Global Horizons lunchtime seminar. He spoke of AFOSR's international activity in Australia and ways in which researchers can engage with the AFOSR.

CRL delivered a very successful showcase and eGovernment cluster launch earlier this month. The speeches delivered by Deputy Chief Katy Minister Gallagher and Senator Kate Lundy were sincere in their conviction that a continuing collaboration with NICTA was of long-term benefit to the ACT and Australia (see page 2 for further information).

Congratulations to InterfereX for picking up one of four awards at the Canberra Division 2009 Engineering Excellence Awards. Team members include Mark Reed, Matt Ruan, Ming Zhao, Andrew Sutton, Tim Murphy, Briely Marum, Sajjad Siddiqi and Gaurav Mitra. The project is now in the running for the national award which will be announced later this year.

Lastly, Professor Dr Dieter Rombach, full professor at the University of Kaiserslautern and Executive Director of the Fraunhofer Institute for Experimental Software Engineering IESE visited CRL on 19 August.

Spotlight on Queensland Research Lab

The Queensland Research Lab will host its second Big Picture Seminar event on 30 October. Senator Kate Lundy, who was the Federal Shadow Information Technology Minister for three years and has participated in every Senate Inquiry relating to telecommunications and Information Technology for the last thirteen years, will deliver a talk on Government 2.0 – Engaging and Empowering Citizens.

Web 2.0 tools and online communities are now a part of normal society. Governments around the world are looking at how they can better interact with citizens, better serve citizens and better empower citizens to innovate for themselves.

Senator Lundy will discuss how she is experimenting with Web 2.0 technologies and methodologies.

Her world-leading Public Spheres program - an initiative that utilises online streaming and Twitter, among other technologies, to further promote interaction between the government and the public - is changing how people think about public policy development and the part a citizen can

directly play, especially those too busy to engage in traditional ways.

QRL is planning to run four Big Picture Seminar events per year. The series of events has been established to communicate the exciting and rapidly evolving vision of ICT around the globe. Speakers will be drawn from industry leadership, government policy makers and world-leading experts in technical fields.

The presenter for the first Seminar, held in July, was Mr Adam Greenfield, Head of Design Direction for Service and User-Interface Design at Nokia.

His talk was entitled 'The City is Here for You to Use'. Mr Greenfield spoke about how over



From left to right: QRL Series Convenor Stefan Lehmann (Researcher), Prof. Penelope Sanderson (COSE Research Leader), Speaker Mr Adam Greenfield, Prof. Terry Caelli (QRL Lab Director)

the past few years the 'computer' has begun to disappear into the fabric of everyday life. Things as ordinary and seemingly familiar as running shoes, have been re-imagined as networked devices, invested with unexpected new abilities.

For more information about the Seminar being presented by Senator Kate Lundy please visit www.nicta.com.au/nicta_events/big_picture/qrl_seminars.