

# STOP PRESS

- A group University of Adelaide students sponsored by NICTA achieved second place at the third annual ARTEMIS Orchestra competition held in Nice, France. The entry sponsored by NICTA was a robotic Concertina, which played the 48-key Stagi English Tenor Concertina. Congratulations to the whole team: NICTA's John Judge, University of Adelaide Masters students Mohsen Bazghaleh, Yudi Wang, Long Xin, Jia You, Chen Fei Yu, Yin Yuan and Dr Steven Grainger, University of Adelaide lecturer
- The first of the papers accepted by SOSP (see page 6) was written by Gerwin Klein, Kevin Elphinstone, Gernot Heiser, June Andronick, David Cock, Philip Derrin, Dhammika Elkaduwe, Kai Engelhardt,

Rafal Kolanski, Michael Norrish, Thomas Sewell, Harvey Tuch and Simon Winwood. The second paper was by Leonid Ryzhyk, Peter Chubb, Ihor Kuz, Etienne Le Sueur and Gernot Heiser

- "An affine Invariant Hyperspectral Texture Descriptor Based Upon Heavy-tailed Distributions and Fourier Analysis", by NICTA CRL's Pattaraporn Khuwuthyakorn, Antonio Robles-Kelly and Jun Zhou, has been accepted by the 6th IEEE Workshop on Object Tracking and Classification Beyond and in the Visible Spectrum, CVPR 2009
- Congratulations to the GiFi team on becoming a finalist in the ICT section of the 2009 InnoVic Next Big Thing Awards with

their Gigabit Wireless Transceiver on CMOS [http://nextbigthingaward.com/2009\\_finalists.html](http://nextbigthingaward.com/2009_finalists.html)

- NICTA sponsored the University of Melbourne's entrants in the 33rd Annual ACM International Collegiate Programming Contest. Christopher Chen, Angus McInnes and Victor Lei were coached by Bernie Pope of the University's Department of Computer Science and Software Engineering. As well as being 2009 South Pacific Champions, the team finished equal 20th in the World Finals recently held in Stockholm, correctly solving five out of the 10 contest problems in five hours. Over 7,000 teams competed in the contest this year, with only 100 making it through to the finals.

## EVENTS

## Short Courses

- 6 July** ICT for Life Sciences address by NICTA's Professor Stan Skafidas at 6pm at Brown Theatre, NICTA VRL E&EE Building 193, University of Melbourne. Refreshments served at 5pm.
- 14 July** The Big Picture Seminar Series at NICTA's Queensland Research Lab (QRL) from 4pm – 5pm. Guest speaker is Adam Greenfield, the Head of Design Direction for service and user-interface design at Nokia. Details at [http://nicta.com.au/nicta\\_events/big\\_picture/qrl\\_seminars](http://nicta.com.au/nicta_events/big_picture/qrl_seminars)
- 11 - 12 August** TechFest at NICTA ATP Laboratory and Corporate Head Office
- 13 - 14 August** ISAG/IBAG members meet at NICTA ATP

Date	Title	Presenter(s)	Location
16 – 17 Jul	Environmental Informatics	Prof. Terry Caelli, NICTA	Canberra
21 Jul	Introduction to Tactical Data Links (TDLs). The Operator's Perspective	Mr Graham Priestnall, SyntheSys	Adelaide
22 – 23 Jul	Tactical Data Information Links (TADILs)	Mr Howard Harvey, Haoi Technologies	Adelaide
24 Jul	Introduction to High Range Resolution Radar Imaging and Target Classification	Prof. Chris J. Baker, ANU	Adelaide
3 – 4 Aug	Intelligent Video Surveillance	Prof Brian C. Lovell, NICTA	Adelaide
4 – 5 Aug	Engineering Aspects of GPS Including Receiver Design	A/Prof Andrew Dempster, UNSW	Brisbane
5 – 7 Aug	Synchronization and Interconnect in Multi-Clock Domain Systems-on-Chips	Prof. Ran Ginosar, Technion, Israel	Sydney
18 – 19 Aug	Machine Learning Using Graphical Models	Dr Tiberio Caetano, NICTA	Melbourne
18 – 19 Aug	Introduction to VMF	Mr Tony Castle, SyntheSys	Melbourne
20 – 21 Aug	Combat Net Radio (MIL-STD-188-220)	Mr Tony Castle, SyntheSys	Melbourne
7 – 8 Sep	Introduction to UAV: Missions, Links and Payloads	Mr Dave Adamy, US lecturer	Adelaide
9 – 11 Sep	Concepts of Electronic Warfare	Mr Dave Adamy, US lecturer	Adelaide
14 – 17 Sep	Advance Electronic Warfare	Mr Dave Adamy, US lecturer	Adelaide
21 – 22 Sep	Introduction to Link 22	Mr Howard Harvey, Haoi Technologies	Canberra

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](mailto:website@nicta.com.au). If you would like to receive NICTA News online, please register at: <http://www.nicta.com.au/subscription>



Australian Government  
Department of Broadband, Communications  
and the Digital Economy  
Australian Research Council

### NICTA Members



Department of State and  
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Government



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### NICTA Partners

# NICTA NEWS

ISSUE 18 June 2009

[www.nicta.com.au](http://www.nicta.com.au)



## Continued funding provides solid foundation for ICT research and innovation

**Hello and welcome to the latest edition of NICTA News. In the following pages you will read about all of the major NICTA events and achievements from the last three months, including an exciting milestone in NICTA's education program, success at CeBIT Australia 2009 and the fabulous announcement that the Federal Government has extended NICTA's funding for a further four years.**

As part of the Federal Government's Budget in May, the Minister for Broadband, Communications and Digital Economy, the Hon. Stephen Conroy, and the Minister for Innovation, Industry, Science and Research, the Hon. Kim Carr announced an extension of NICTA's funding until mid-2015. This was great news for us and I would like to thank the Commonwealth Government, and especially Senators Conroy and Carr and their departments, for this continued support.

The new funding provides a more certain future for Australia's ICT companies to work with NICTA on research projects and intellectual property licensing and will continue to help us attract and retain the best people. This is a terrific outcome in a difficult economic environment.

News of the continued funding arrived while NICTA was exhibiting at CeBIT Australia and it certainly put a spring in the step of all those involved in demonstrating their research projects on the NICTA stand!

CeBIT Australia is an important event in NICTA's calendar each year and after only seven years it has established itself as the leading ICT trade show in the Australasian region. It provides a valuable stage for NICTA to build international relationships, meet potential business partners and promote ourselves in the media.

This year, we took ten projects to CeBIT to showcase our research excellence and commercialisation pipeline. The response from visitors to the stand and the media was positive and encouraging.

NICTA was also involved in AusInnovate as part of the CeBIT Conference Program for a second year. AusInnovate brings together the nation's three leading public sector ICT research bodies (NICTA, CSIRO ICT Centre and Defence Science and Technology Organisation) in an event that highlights key issues for Australia's ICT industries.

I took the opportunity in my role at AusInnovate to stress the importance of our industry speaking with one voice, working together to present a unified front that will improve our ability to carry recommendations through to action, and providing valuable advice and support to government. If we want to achieve maximum national benefit through ICT innovation and excellence, we cannot afford to deliver a fractured message.

The AusInnovate program featured international speakers Professor Dieter Rombach, Executive Director of the Fraunhofer Institute for Experimental Software Engineering (and one of NICTA's International Advisory Group members) and Dr Manish Gupta, Associate Director of the IBM India Research Laboratory. Senator Stephen Conroy opened AusInnovate and again showed his staunch support for NICTA's vital role in Australia's innovation system and the digital economy policy agenda.

NICTA aspires to be among the top ten ICT research centres in the world by 2020. Participation in CeBIT Australia is one way to develop the national and international recognition that this requires. We are also increasing our presence in overseas events.

As this edition of NICTA News goes to print, a delegation of 20 NICTA people is making its way home from CommunicAsia in Singapore. This was our second year exhibiting at Asia's premier business-to-business event, and already our presence has grown, with eight NICTA technologies on display.

These included some middleware for a maritime mesh network augmented with satellite communications, a system which is the result of an agreement we forged last year with the

Singaporean Institute for Infocomm Research (I2R), part of the A-Star Group. The value of international research collaborations such as this cannot be overstated. NICTA's future as a "top ten" ICT research institute relies on the development of our global profile.

The calibre of the PhD students we support through scholarships and world-class supervision also has an impact on our international standing, so I am very pleased to announce that more than 100 PhD graduates of our Partner and Member universities have now completed their postgraduate studies at NICTA laboratories.

Perhaps even more importantly, there are more than 270 PhD students currently undertaking their PhD research inside NICTA laboratories. This is the largest assembly of ICT PhD students anywhere in Australia. These are the people whose research will underpin the evolution of Australia's digital economy. It is terrific that NICTA is playing such a big part in their research training.

Read more about this exciting milestone in the following pages, where you will also find the latest news about an automated software debugging tool developed by our Goanna Research Project, the recent activities of our IT Department and the success of a group of NICTA-sponsored Adelaide University students whose entry into the international ARTEMIS Orchestra competition took out second place. We also put out a big welcome mat for two new Board Members and crack open the champagne for Dr Chris Nicol, our Chief Technology Officer, Embedded Systems, who recently received a prestigious ATSE Clunies-Ross award for his ground-breaking work in mobile phone technologies. Well done to all!

Dr David Skellern  
Chief Executive Officer



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## NICTA makes waves at CeBIT

**NICTA's stand at CeBIT this year was a showcase for an exciting array of fresh software applications and systems solutions.**

Two mobile applications designed for the iPhone were demonstrated publicly for the first time. The TiniWiki™ application stores the entire Wikipedia on an iPhone allowing access even when offline. TiniWiki™ leverages patent-pending technologies developed at NICTA.

Another application, the Beem™ viral distribution network technology, was also available to CeBIT exhibition attendees. The application makes distributing content to a social network easy. When a message is sent, Beem™ examines available networks, automatically selecting the best one for the message delivery.

NICTA's innovative supply chain logistics software, along with a new software testing tool that detects bugs early in the software development process, were also on public show for the first time.

NICTA's ATOMIC software solves complex supply chain logistics challenges. The first product release is a Vehicle Routing and Scheduling module for a cash logistics operation. ATOMIC is now looking for further customers and financial partners.

The Goanna debugging and code-testing software was also demonstrated. The software detects bugs early in the software development process before code is run, helping deliver code on time and on budget.



## New funding secures NICTA's future

**NICTA welcomes the Federal Budget announcement extending its funding for four years to mid-2015.**

The Minister for Broadband, Communications and Digital Economy, the Hon. Stephen Conroy, and the Minister for Innovation, Industry, Science and Research, the Hon. Kim Carr, announced additional funding of \$185.5 million over the four years from mid-2011 to mid-2015. This confirms NICTA's funding for the next six years.

"This funding strengthens the future of ICT innovation in Australia and supports NICTA's ability to build ICT knowledge and wealth for the nation," NICTA's CEO, Dr David Skellern said.

"It provides core funding which will allow NICTA to continue major existing research and education programs with certainty, as well as pursue new project and partner initiatives. We can now move with confidence to strengthen our linkages with public and private sector organisations to

build innovation into the bottom line of Australia's digital economy."

Minister for Broadband, Communications and the Digital Economy, Senator Stephen Conroy said: "With funding certainty to 2014-15, NICTA will continue to generate significant economic and social returns for the Australian community and attract increased investment from other partners."



Dr Anne Cregan

# 107 PhDs and counting...

More than 100 PhD students who carried out their research at NICTA have now graduated. This remarkable milestone, achieved in close collaboration with NICTA's member and partner universities, comes less than three years after the first NICTA-supported PhD student graduated.

"The majority of our NICTA-supported PhD graduates remain in Australia, where they make a vital contribution to the nation's ICT skills base and help build and strengthen the digital economy," said NICTA's Director of Education and Australian Technology Park (ATP) Laboratory Director Professor Aruna Seneviratne. "We are attracting extremely talented students and many of our now 107 graduates are already playing active roles in Australia's ICT industry and research communities."

More than 270 students are currently pursuing their PhD studies in NICTA laboratories, the largest concentration

of ICT PhD students in Australia. "Of the graduated PhD students who reported their first destination to us, 74 percent are working in Australia," said Professor Seneviratne.

"NICTA plays an important role fostering our national ICT skills capacity and providing a launch-pad for the commercialisation of ground-breaking research," said the Minister for Broadband, Communications and the Digital Economy, Senator the Hon. Stephen Conroy. "NICTA, the PhD graduates it has supported and current students should be congratulated for their part in the development of Australia's digital economy."

The Minister for Innovation, Industry, Science and Research Senator the Hon. Kim Carr said that the Government has provided funding for a further four years for NICTA to continue its success. "NICTA is a key

asset in Australia's innovation system as it demonstrates ICT's ability to transform our economy," Senator Carr said.

NICTA's Chief Executive Officer Dr David Skellern acknowledged the importance of the Federal Government funding announced by Senator Conroy and Senator Carr in the recent Budget. "Having our funding extended has a dramatic impact on our ability to deliver a world-class education program and will help ensure a resilient ICT skills base for Australia," said Dr Skellern. "Congratulations to all of the PhD graduates and students now undertaking their PhDs in NICTA laboratories around Australia."

## Opportunity knocks at CommunicAsia

A group of NICTA researchers and NICTA executives has just returned from a successful trip to CommunicAsia 2009, Asia's premier business-to-business telecommunications event. This is the second year that NICTA has participated in CommunicAsia.

NICTA technologies on show included TiniWiki™, our new application designed for the iPhone that stores the entire Wikipedia on a phone; Badumna, P2P technology to support online games; ATOMIC, software that solves complex challenges in supply chain logistics and Goanna debugging and code-testing software.



NICTA Research Group Manager Dr Max Ott (right) talks to a CommunicAsia visitor

## Dr Chris Nicol wins ATSE Clunies Ross Award

Dr Chris Nicol, NICTA's Chief Technology Officer Embedded Systems, won a prestigious Australian Academy of Technological Sciences and Engineering (ATSE) Clunies Ross Award.

The prize recognises Australia's pre-eminent scientists and technologists who have bridged the gap between research and the marketplace.

"It is a great honour to receive this award," Dr Nicol said. "I hope that it serves to highlight the important contribution that use-inspired technological innovation makes to Australia's digital economy and perhaps inspire more young people to consider careers in the field of information and communications technology."

Dr Nicol won the award for his work on mobile phone technology that affects daily communication on a global scale. He developed low-power broadband

integrated circuit design techniques that have been widely adopted in mobile phones and other systems.

ATSE Clunies Ross Foundation Chairman Mr Bruce Kean AM FTSE said Dr Nicol's work with smart technology applied to products like cars and airplanes – technology inside products – offers "tremendous promise".

# IT – keeping NICTA connected

**The Information Technology Business Unit at NICTA holds national responsibilities for all IT infrastructure and services. Led by Max Vit, IT Director, this team of fourteen people provides IT presence and support to all major NICTA sites. The IT team has three streams: Technology Services, Business Solutions and Customer Services.**



IT looks after infrastructure such as NICTA's network, email, storage, Internet connectivity, remote access, network folders, backups and videoconferencing. They take care of all vendor applications like the NICTA website, wiki, Finance and HR systems and build in-house applications to support internal groups including legal and the project management office.

IT runs all support functions for around 700 users across six NICTA sites. The business manages a mixed operating system environment where Windows and Linux users take up in excess of 90 percent of the user base with Mac OS users completing the picture. "This makes the NICTA environment fundamentally different from many other organisations where service delivery is often managed by strict Standard Operating

Environments and Service Level Agreements," says Max. "We realise that this approach does not provide the flexibility required by our researchers, so we see ourselves not as police, but as facilitators and enablers. Our aspiration is to enable research," he adds.

IT has several key projects on the move. Storage capacity is being expanded and the cluster is being improved in response to researcher needs. They are also carrying out work to improve website performance and reliability, introducing a secondary Internet link, improving videoconferencing, and working with researchers to provide more service interfaces to non-Windows users for NICTA mail and calendaring.

At all times, Max says IT tries to achieve a balance of service, offering the flexibility and

adaptability required by researchers and at the same time ensuring the governance, service expectations and accountability demanded by the company's corporate structure. "In my five years at NICTA, I have witnessed IT's approach evolve from a very relaxed engagement through to a more rigid style, to the present time, where I think we are commencing to achieve an effective balance between flexibility and control."

***IT has several key projects on the move. Storage capacity is being expanded and the cluster is being improved in response to researcher needs.***

## NICTA welcomes two new Board members

**NICTA has welcomed two new Board members, Professor Barney Glover and Mr George Campbell and farewelled three members, Professor Paul Greenfield, Dr Michael Sargent and Professor David Karpin.**

"I would like to thank the retiring Board members for their contribution to NICTA," NICTA Chairman Mr Neville Stevens AO said. "The experience and advice these people have shared with NICTA has been invaluable."

Professor Paul Greenfield was one of the longest serving members of NICTA's Board. He was appointed to the Board on 5 November 2002.

Dr Michael Sargent chaired NICTA's Governance and Remuneration Committee during his tenure and Professor David Karpin served on NICTA's Audit and Finance and Commercialisation Committees.

New Board member Professor Barney Glover took up the position of Vice-Chancellor for Charles Darwin University in February this year. Mr George Campbell served as a Senator for New South Wales from 1997-2008.

All of this makes IT an interesting and challenging place to work. People in IT work on a wide variety of tasks. You could find yourself looking after a printer, fixing a broken SAMBA share mount, troubleshooting a slow web server, doing some BASH, tweaking a VB script, helping out with backing up a mobile phone, fine tuning an application, coding a prototype, performing a Linux install, fine tuning an LDAP query, doing a Windows patch upgrade or lending a hand carrying a monitor – you name it!

IT is a collaborative place that values flexibility and willingness to change direction if necessary. "Our IT team has the ability to adapt to NICTA's business priorities as they change and evolve over time. Our focus is on intent – the technology will follow," says Max.

# In profile: Ralf Huuck, bug hunter

**NICTA Senior Researcher and Goanna Project Leader Ralf Huuck is a busy man. Apart from his research work at NICTA, he is preparing Goanna for a formal spin-out and is keeping up his work as a Conjoint Senior Lecturer with the UNSW School of Computer Science and Engineering.**

In this role, he teaches students about algorithmic verification such as model checking, abstract interpretation and data flow analysis.

Dr Huuck's teaching interests have been reflected in his work on Goanna, where he and his team have developed a system that automatically detects bugs early in the software development process. The Goanna research project started as a pilot project at NICTA in 2005.

Earlier in his career, Dr Huuck completed a PhD at Germany's University of Kiel in the area of software technology. "I was working on the design and analysis of embedded systems theory and software," he says. Although Dr Huuck started his career as a theoretical computer scientist, he is also a proponent of realistic applications and solving problems that matter in the real world.

It is this interest that led him to a role at NICTA. He saw an opportunity when he was engaged in Postdoctoral research at UNSW School of Computer Science and Engineering. "At this time NICTA had just been created," Dr Huuck recalls, "The organisation was a research start-up and I saw a good opportunity to create something new, different and exciting."

Dr Huuck found that he could take on more responsible and higher impact research tasks than he could in Germany, with NICTA's use-inspired research focus providing potential traction in solving

real-world problems: "It is a different environment from uni – you can do more things outside the realms of the ivory tower."

Unlike some computer scientists, Dr Huuck did not always have his mind set on a career in the field. His choice of a combined Computer Science and Business degree for his undergraduate studies was made more in the spirit of intelligent gamble than as a moment of vocational clarity. "A friend of mine signed up to Computer Science so I followed! It was probably a lack of decision-making that led me here," he jokes.

## ***The Goanna research project started as a pilot project at NICTA in 2005***

Any sense of indecision did not last long. Dr Huuck has worked consistently as a computer scientist since then in a career which has included involvement in several projects funded by the German government and the European Union. He has held several visiting researchers appointments in France, Australia, Japan and Hong Kong.

Dr Huuck is a published author in more than 30 scientific proceedings, and has been a speaker at dozens of international conferences. He has led the research and

development of the underlying Goanna technology at NICTA for over three years and was responsible for transforming a unique idea into a new product. At the end of June this year, he co-chaired the 4th International Workshop on Systems Software Verification (SSV'09) Real Software, Real Problems, Real Solutions, in Aachen, Germany.

Recent papers by Dr Huuck include: Automatic Bug Detection in Microcontroller Software by Static Program Analysis by Ansgar Fehnker, Ralf Huuck, Bastian Schlich, and Michael Tapp, and, Goanna: Syntactic Software Model Checking, by Ansgar Fehnker, Joerg Brauer, Ralf Huuck, Sean Seefried. The first paper was presented at the 35th International Conference on Current Trends in Theory and Practice of Computer Science (SOFSEM), January 24-30, 2009, Czech Republic. The second paper was presented at the 6th International Symposium on Automated Technology for Verification and Analysis (ATVA), October 20-23, 2008 Seoul, Korea.



# Goanna eyes market

**Goanna is a fast, scalable and precise static code analysis solution that detects bugs and other software vulnerabilities automatically at development time, potentially saving money for software developers and keeping product launch timetables on track.**

Goanna is the implementation of four years' scientific research at NICTA and is the first static code analysis solution based on model-checking technology to detect bugs during software development.

Recently, the Goanna team – which is poised to spin out of NICTA as Red Lizard Software – made the software available as part of an online, 30-day free trial. The software can be downloaded at the Red Lizard website at [www.redlizards.com](http://www.redlizards.com).

“Our solution is like a sophisticated spell-checker for software,” explains Goanna Project Leader Ralf Huuck. “It detects issues that are otherwise hard to find by traditional testing methods, such as crashes, memory leaks or security vulnerabilities.”

Goanna is well-suited to C/C++ software developers, particularly in embedded systems industries such as consumer electronics, automotive, aerospace, telecoms, networks and defence. Goanna is now available for C/C++ and is provided as a plug-in for the Eclipse IDE (Integrated Development Environment) version 3.4. It supports gcc or gcc-based compilers up to version 4.4.

Presently, Goanna targets Linux-like environments, but the team is hard at work preparing for the launch of a Microsoft Visual Studio plug-in scheduled for release in July 2009. “Between now and then, we are putting effort into optimising our website and engaging the market,” says Dr Huuck.

“We’re well on track to spin out,” says NICTA’s James Campbell, who is spearheading Goanna’s commercialisation as Red Lizard Software. “The website is there, the software is there. We’re now in business!”

The Goanna solution integrates seamlessly into the Eclipse IDE and reports bugs in a similar fashion to a compiler, but offers additional tools to trace warnings. Goanna checks different classes of code deficiencies including memory leaks, buffer overruns, memory corruptions and null point dereferences.

At present, Goanna has six team members, but over the years has benefited from the research efforts of many distinguished researchers and students, some of whom still work inside NICTA on other projects. Today’s team comprises Project Leader Ralf Huuck (who is profiled on page 5) along

with Ansgar Fehnker, Paul Steckler, David Crawshaw, Sean Seefried and James Campbell.

The Goanna research project started as a pilot project at NICTA in 2005. It set out to investigate the applicability of model checking to systems software and emerged with a novel approach to software static analysis that builds on model checking tools and techniques.



## Top conference accepts NICTA papers

**Congratulations to the ERTOS Group at NICTA’s Neville Roach Laboratory, which has just had two papers accepted by the prestigious ACM Symposium on Operating System Principles (SOSP).**

SOSP is considered one of the most competitive conferences in all of computer science. It is quite a coup to have not only one, but two papers represented there. SOSP, which runs only once every two years, is usually

dominated by papers from US research giants like MIT, Microsoft Research and Stanford University.

“This is a remarkable success story for NICTA and UNSW, and proves beyond doubt that its use-inspired, impact-oriented research has established NICTA’s ERTOS group as one of the foremost operating systems research groups in the world,” said ERTOS Group Leader and UNSW John Lions Professor of Operating Systems Gernot Heiser.

Apart from the two NICTA papers, one of the only other non-US papers to be

accepted was co-authored by NICTA/UNSW alumnus Andrew Baumann.

The NICTA papers accepted by SOSP are entitled “seL4: Formal verification of an OS kernel” and “Automatic device driver synthesis with Termite”.

The first paper was authored by Professor Heiser and 12 other authors from NICTA and UNSW. The second paper also had multiple authors. See full details in the “Stop Press” section on the final page of NICTA News.

# NICTA Lab news

## Victoria Research Laboratory

NICTA students Yiran Ma, Qi Yang and Simin Chen and in-kind contributor Bill Shieh caused a stir at the recent Optical Fibre Communication Conference held in San Diego (OFC 2009). In the coveted first spot in the post deadline paper session, Bill presented to the capacity crowd on the team's demonstration of a world-record-breaking transmission of 1.2 Tb/s of data over 600 km of fibre using coherent optical OFDM.

The post deadline session at OFC is traditionally the session that sees some of the biggest advances in optical communications announced and is always the highlight of this premier optical communications conference. As well as the post deadline paper, Bill presented an invited paper announcing new insights into multi-level multiplexing using a combination of digital electronics, analog electronics and analog optics, attracting plenty of attention.

## Australian Technology Park (ATP) Laboratory

NICTA hosted an Embedded Programming workshop for 60 high school students at ATP as part of the recent ATSE Clunies Ross Extreme Science Experience <http://www.extremescience.com.au/>.

In teams of three, the students were introduced to the concept of programming on embedded systems and participated in practical exercises using Arduino boards. The students were asked to wire up a circuit with a three colour LED and modify programs controlling the LED on the Arduino board.

## Neville Roach Laboratory

Students at NRL are now running their own seminars. About 30 students and supervisors attended the first session which was held on 29 April. It was a chance for students to get together, listen to a talk and then enjoy – what else? – pizza.

In the first session, NICTA's Toby Walsh gave a talk on thesis-writing. Rafal Kolanski started proceedings with a "lightning talk" on developing applications for Nokia s60 phones using Python. There has been one more session since and they will continue on a regular basis at NRL.

In May, NICTA-sponsored PhD students got together for a soccer game and BBQ at the Sam Cracknell Pavilion at the University of New South Wales. NICTA's two Sydney laboratories held the event, which was attended by PhD students and supervisors and staff from UNSW.

The game started with two teams with five players in each and by the time it finished there were more than 20 people playing. Special mentions for the superior skills of Raymond Sheh, Leonid Rzyzhk, and Carlos Aydos! Although no official scores were kept, it is believed that the game was a three-all draw!

## Spotlight on Canberra Research Lab (CRL)

This is the first of a series of NICTA lab "spotlights" which will focus on a different laboratory in each edition of NICTA News. The first cab off the rank is NICTA's Canberra Research Laboratory.

CRL has been particularly active this year with external events targeted at the ACT business community, Government departments, and our international connections.

Through our expanding seminar series, training courses, and related events, CRL is strengthening alliances with professional societies and industry associations with representation in the ACT.

We kicked off the year with a NICTA e-Government Seminar in February, which was run as a networking event connecting NICTA and the Australian Computer Society (ACS). Around 35 people from the ACT's ICT industry and Government agencies attended. The topical theme of the seminar - Green ICT, Virtualisation Technology, and Modelling of Carbon Emissions Trading scheme - was well received by the audience.

Next up was a NICTA training course in March on the subject of Managing Performance Risks in Service Oriented Architectures (SOA). NICTA's Paul Brebner

and Dr Liam O'Brien presented some fascinating data in this two day training course attended by 13 people from a range of research and development organisations from across Australia.

In April, CRL hosted a joint event with the Australian Information Industry Association (AIIA). Tony Hill presented on *IPv6: global imperative or platform for innovation for Australia?* to a captive audience which connected NICTA once again with the ACT's business, Government and educational communities.

To mark the 125th anniversary of the foundation of the Institute of Electrical and Electronic Engineers (IEEE), the ACT section of the IEEE commenced a series of monthly meetings at CRL in May. We were privileged to have Klaus Weber speak about the Elongate Solar Cell technology that is being developed at Australian National University (ANU).

Also in May, 23 delegates from the China Aerospace Science & Industry Corporation (CASIC), accompanied by a translator and

guide visited the lab. CASIC is an extra-large sole proprietorship directly controlled by the Chinese centre Government.

In other events, Peter Friedland and David Atkinson from the Asian Office of Aerospace Research and Development (AOARD) based at Arlington Virginia, visited NICTA's Kensington, Victoria and Canberra Labs to explore potential funding opportunities. In the NICTA meetings, AOARD was given a comprehensive overview of NICTA projects in the areas of software verification, constraint solving, automated reasoning, planning and diagnosis, human performance improvement and autonomous vehicles. NICTA CRL is now in discussions with AOARD regarding funding for specific projects.

The Human Performance Improvement (HPI) Project team based at CRL once again participated in the Australian Science Fair in Canberra. Many school children voted the NICTA stand and particularly the HPI "How high can you jump and how fast can you run?" activities as the most "fun" and "memorable" at the Fair.