Senator Stephen Conroy, Federal Minister for Broadband, Communications and the Digital Economy, and Minister Assisting the Prime Minister on Digital Productivity, and Andrew Stoner, NSW Deputy Premier, opened the networking reception at 5.30pm.

“Congratulations on this year’s impressive demonstration of original information and communications technology and research,” said Senator Conroy. “Techfest is a stunning demonstration of the technologies Australia needs to fuel the digital economy and ensure its continued growth.”

NSW Deputy Premier Andrew Stoner said: “It has been a pleasure to visit NICTA today to see first-hand the way NICTA is supporting the NSW economy. NICTA is equipping university students with the skills that will enable them to make real contributions to the NSW economy.”

“The past year has been an exciting, exhilarating and exceptional one for NICTA, both in terms of building outstanding research excellence and in delivering major wealth creation outcomes for Australia in the ICT space,” said NICTA CEO Hugh Durrant-Whyte. “Over the last twelve months, NICTA has signed 56 new contracts and technology licenses, and brought in $3.5M in new contract revenue.”

NICTA welcomes the ACT Government’s announcement to extend NICTA’s funding until mid-2016, providing an additional $3 million per year over a four-year period.

ACT Chief Minister Katy Gallagher announced the funding at NICTA’s Canberra Research Laboratory in February. “I am delighted to reaffirm the ACT Government’s long-term commitment to NICTA. As the largest ICT research and development organisation in Australia, NICTA is a vital and inspiring part of Canberra’s economic landscape,” the Chief Minister said.

The ACT is a founding member of the consortium which helped establish NICTA in 2002, and said the funding was a direct investment in the ACT’s future and builds on, and extends, their previous support for NICTA which totals $26.35 million over the past nine years.

NICTA CEO Hugh Durrant-Whyte welcomed the announcement. “I would like to extend my thanks to the ACT Government for their generous support,” he said.

“NICTA is producing excellent research results with direct application to the development of robust, innovative systems for emerging markets such as smart transport, e-Health and e-Government. With the additional funding, NICTA will be able to strengthen its research outcomes in these and other areas to accelerate the development of high-impact, wealth-creating projects.”
NICTA is pleased to announce the appointment of IT industry veteran Tony Henshaw to the NICTA Board.

Mr Henshaw has worked in the industry for over 35 years, holding senior roles at Telstra, Unisys, EDS, Aspect Computing and Computer Power. Mr Henshaw recently retired from NYSE-listed IT software and services company Unisys, where he was Vice President and General Manager for the company’s outsourcing and infrastructure services business in the Asia Pacific.

He was also a member of the Federal Government’s Industry Research and Development Board for five years (1988 to 1993), including a 12-month stint as Acting Chair.

Mr Henshaw said: “The way NICTA connects university and public sector research with commercial outcomes is particularly inspiring and I look forward to working with the Board to guide NICTA as it pursues opportunities for wealth creation for Australia.”

NICTA Chairman Neville Stevens, AO, welcomed Mr Henshaw to the Board: “Tony brings a wealth of valuable knowledge and experience to his new position. His skills and experience in the commercialisation of public sector research and development in information and communications technologies will make a valuable contribution to NICTA.”

NICTA rings in 2012 with fresh ‘big data’ ideas

NICTA has enjoyed a successful start to 2012, staging our largest-ever Techfest in February, while simultaneously hosting our distinguished international business and science advisory groups. A number of NICTA teams also headed for CeBIT Hannover, where, for the first time, CSIRO’s ICT Centre joined NICTA to display a critical mass of advanced Australian information and communications technologies at the world’s largest ICT industry event.

Techfest was particularly successful this year, attracting over 600 visitors including politicians, industry guests, and a lively group of 100 high school students who came along to experience an afternoon immersed in ICT research and innovation.

At the Techfest opening ceremony, I took the opportunity to launch a ‘big data’ research effort at NICTA that I believe will yield important productivity gains for a number of key industries over the coming years.

As The Economist put it recently: ‘The world of big data is on fire’. The era of big data presents incredible opportunities such as smarter cities, stronger companies, new jobs and better, faster medicine, but poses many challenges. Managed well, data can be used to unlock new sources of economic value, and to provide fresh insights into science and the way we live. It is timely for NICTA to lead the way in capitalising on this phenomenon for the benefit of Australia.

We have just embarked on an exciting big data project that involves the application of machine learning to immense geological datasets. You can read more about this on page three of NICTA News, but in a nutshell, we are undertaking groundbreaking research to improve current methods for locating geothermal energy sources that lie several kilometres underground. We have also recently launched a big data project that is making the open source Hadoop platform easier to manage. This is a major research effort with vast commercial potential.

Finally, let me touch briefly on another exciting new project at NICTA – the Digital Productivity Showcase (DPS). This showcase was opened on the same day as Techfest by Senator Stephen Conroy, Federal Minister for Broadband, Communications and the Digital Economy and by Mark Paterson AO, Director General of the NSW Department of Trade and Investment. It is a living laboratory where research meets industry and where products and new systems for the digital economy will be developed, tested and deployed.

The showcase is led by Terry Percival and his Broadband and Digital Economy Business Team and we are grateful for the additional support of the NSW Government. Please read on for more information about the DPS and many other highlights from the first three months of 2012 at NICTA.

Hugh Durrant-Whyte
NICTA CEO

Welcome to the March edition of NICTA News.

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NICTA drives IT-enabled ‘hot rock’ search

NICTA is leading a multi-million dollar technology-enabled geothermal energy initiative announced by the Australian Centre for Renewable Energy (ACRE) earlier this month. NICTA’s robust research capabilities in machine learning and in the increasingly significant area of big data analytics will be used to locate geothermal energy sources deep beneath the surface of the Earth.

The ACRE initiative, Data Fusion and Machine Learning for Geothermal Target Exploration and Characterisation, is a two-year, five million dollar program. The ACRE Emerging Renewables Program will fund $1.9M of this total. This is the first project to receive funding under the program.

“Australia has a wealth of geothermal energy resources, but they are difficult to locate and access,” said NICTA CEO Hugh Durrant-Whyte. “We will apply NICTA’s considerable expertise in machine learning and big data analytics to create software to address these challenges.”

NICTA will work closely with the School of Information Technologies at the University of Sydney to develop machine learning algorithms, and the Schools of Earth Science at the Australian National University, University of Melbourne and University of Adelaide to apply these methods to the problem of geothermal target characterisation and exploration.

The project teams will also work with ASX-listed geothermal exploration and development companies GeoDynamics and Petratherm, as well as GeoScience Australia and the South Australian Department of Manufacturing, Innovation Trade Resources and Energy, who will provide geothermal sensor data sets and expertise in discovery and characterisation of geothermal targets.

Productivity takes front row seat at digital showcase

Last month, NICTA opened a visually exciting, purpose-built demonstration facility to showcase new digital tools to improve Australia’s productivity.

Located in the NICTA building at the Australian Technology Park, the Digital Productivity Showcase (DPS) was launched by Senator the Hon. Stephen Conroy, Federal Minister for Broadband, Communications and the Digital Economy and Minister Assisting the Prime Minister on Digital Productivity, and Mark Paterson AO, Director General, NSW Department of Trade & Investment, Regional Infrastructure & Services.

The Showcase has been designed as a futuristic space that takes visitors on a journey through a series of broadband-enabled spaces, starting with the home, then moving on to a small business setting, professional offices, big business and government zones.

Techfest wows record crowd

“These results depend on our ability to attract the best people and create the right innovation culture to deliver on real world-class outcomes,” said Durrant-Whyte. “NICTA last year hired 74 new research and engineering staff. Just as importantly, we continued to recruit and support talented graduate research students, the young innovators who do the bulk of the work, and our next generation of excellent researchers and successful entrepreneurs.”

Techfest 2012 featured research and technology from dozens of teams, including: groundbreaking technology to manage and understand massive data stores; the latest results from wireless and computer vision researchers working on the Bionic Vision Australia project to develop an Australian bionic eye; next-generation technology to make pain implants cheaper and more effective, and some exciting hyperspectral (ie light outside normal human vision) image processing software that was demonstrated in public for the first time at Techfest.
As part of a new three-year agreement with US-based surveying company GeoNav Group International, NICTA’s automatic video analysis technology will be used to help improve road safety through the creation of accurate inventories - or ‘maps’ - of road signs and power poles.

GeoNav Executive Vice President Guner Gardenhire says NICTA’s ‘AutoMap’ technology will help his company respond to increasing demand for reliable road sign surveys to address maintenance, safety and regulation issues. “In particular there is a growing demand for up-to-date sign inventories to satisfy the Federal Highway Administration’s new traffic sign retroreflectivity requirements,” he says. These new requirements aim to reduce the number of road deaths which occur at night.

GeoNav mapping vehicles equipped with video cameras drive many thousands of kilometres collecting video, LiDAR and GPS track data. NICTA personnel remotely analyse the data from Canberra and create an inventory of signs complete with their latitude and longitude. This information is incorporated by GeoNav into the sign inventories it supplies to its customers.

“The Australian ICT Stand during set-up for the main event”
taken part in the digital industry’s largest international event which saw over 4200 attendees from 70 countries.

NICTA and CSIRO join forces in Europe

With the echoes of Techfest still ringing in their ears, NICTA researchers hopped on a plane earlier this month to showcase NICTA research and innovation at CeBIT Hannover 2012.

Flying the flag for Australian ICT research, CSIRO’s ICT Centre joined NICTA’s annual exhibit to showcase research capabilities in the areas of health, broadband services, infrastructure and services, security and decision support.

Research on display included NICTA’s BrainGauge project which monitors cognitive load levels from voice in real-time, visual processing for the Bionic Eye, cloud computing, Goanna’s software bug detection and the freight optimisation route work conducted by the intelligent transport systems group.

This was the third year that NICTA has

NICTA video analysis technology takes North American road trip

The software will be taken to market in the US by Automapic, a business emerging from technology developed by the NICTA Automap team.
Dr John Markham

Using ICT to help transform the biological sciences

Dr John Markham has come a long way from his first job, writing software for a record company in Wales that was run by a Franco-Russian Count!

A Senior Researcher in NICTA’s Control and Signal Processing (CSP) group, Dr Markham’s current interests can broadly be described as developing interdisciplinary methods to aid the understanding of biological systems. In particular his work relates to the adaptive immune system and how it deals with disease.

After roles in the electronic publishing industry, at Telstra Research Laboratories and then a privately owned hedge fund, John took a position with Walter and Eliza Hall Institute (WEHI). It is here he began working on an immunology project which subsequently became a NICTA collaboration in 2007.

“As with all other walks of life, ICT is transforming the biological sciences,” says John. “This is happening through two mechanisms. First of all, more things can be measured, stored and controlled than ever before. We need research to generate new methods that improve how this data is handled. Second, techniques from ICT and the mathematical sciences may help us to understand the complexity in biological systems. For example how do many millions of cells organise themselves and work together to make something big and complicated such as the immune system or a brain?”

John’s work at NICTA’s Victorian Research Laboratory (VRL) includes collaboration with researchers from the School of Veterinary Science at the University of Melbourne, who are exploring and analysing the DNA sequences of various animal diseases and their vaccines.

“I believe this research will turn out to be the most important work that I’ve ever been associated with, the outputs having significant implications about the use of live vaccines both in animals and in humans,” says John.

“I have also been looking at how the immune system works and in particular how the numbers of different types of immune cells are controlled during and after disease.” This work is in a project Dr Markham is working on with WEHI that has generated excitement around the globe. Their findings show that, contrary to previous thinking, cells influence their own destiny. This research, recently published in ‘Science’ magazine, will support the development of mathematical models that will provide new immune therapies for autoimmune disease and improved vaccines.

In the future Dr Markham expects to see unsupervised or intervention-free extraction of data which could be used in drug screening analysis or diagnostic evaluation. This work is applicable to diseases which are caused by immune system malfunction such as type 1 diabetes and rheumatoid arthritis where the immune system attacks itself, allergic reactions where the immune system is oversensitive to harmless substances in the environment or infectious diseases which attack the immune cells themselves such as HIV/AIDS.

“Broadly, I would hope that our immunology work leads to a better understanding of disease and that this would have some practical benefits. The thing about research though is that it’s hard to predict the outcomes. If I could do that maybe I’d have been a venture capitalist and retired by now,” he says.

“Go and see live music – mainly local bands at small venues in Melbourne’s inner north.

Who inspires you and why?

I’m a big fan of Albert King, another influential R&B singer/songwriter/guitarist. He didn’t find commercial musical success until his thirties and until then made a living as a mechanic and a bulldozer driver. You have to admire his determination and perseverance. His influence as a musician and song writer on artists that followed him was far greater than his record sales would suggest. He really did change the landscape around him.

Educational background

BEng (Electronic)
Swinburne Institute of Technology

BSc (Hons) majoring in maths and physics
University of Melbourne

PhD theoretical computational physics
University of Melbourne

*For more information visit http://www.sciencemag.org/content/early/2012/01/04/science.1213230 and http://wehi.edu.au/site/latest_news/whos_the_boss_research_shows_cells_influence_their_own_destiny.
The Robots are coming!

Twenty years ago robots were confined to Hollywood movies and for the most part a bit creepy! The past decade, however, has seen great leaps occur in robotics, and Australia is now a leading light in the field.

Hugh Durrant-Whyte, NICTA’s CEO and a world-renowned robotics expert, took the opportunity at Techfest to inspire potential ICT researchers to take a fresh look at robotics as he addressed a group of 100 maths and science students from East Hills Girls Technology High School about the importance of creativity in research.

Already an integral part of our life in mainstream industries such as logistics, mining, defence and health, Hugh described how robotics can make our lives easier, more productive and safer. He spoke of robotics being the intelligent connection of perception to action and encouraged the students to think about all the possibilities out there that could be done – if only.

The competitive sides of the students were encouraged by a challenge that saw them using a representation of NICTA’s Indigo Solver technology to map out the most cost and time efficient distribution for the chosen logistics fleet. The winner received, in keeping with NICTA’s Intelligent Fleet Logistics theme, a remote-controlled car.

NICTA is sponsoring a NASA public code-a-thon called the International Space Apps Challenge, to be held 21-22 April at the Victorian Space Science Education Centre (VSSEC). With a satellite site at the Stromlo Observatory, the Challenge is open to all.

People can get involved by posting challenges and problems, registering as an individual or a team. The event is also looking for volunteers to help out as mentors or organisers.


In conjunction with the VSSEC, NICTA is running a competition for a number of Year 11 and 12 Victorian physics students and their teachers. The prizes are seats at the NICTA Big Picture Seminar to be delivered by Nobel Laureate Brian Schmidt in May, with an invitation to the dinner afterwards.

To enter or obtain more information visit http://bit.ly/y2snxb.

NICTA student pens Australasia’s top computer science thesis

Congratulations to NICTA/Griffith University graduate Silvia Richter, who has been awarded the Computing Research and Education Association of Australasia (CORE) prize for the best Computer Science thesis produced in Australia in 2011. Silvia won the prestigious CORE Distinguished Doctoral Dissertation award from a field of 17 nominations.

Professor David Abramson, Chair of the CORE Distinguished PhD Thesis award committee said that it took little time to make the decision, which was based on examiners’ reports and a supervisor support letter.

“Silvia’s examiners reports were outstanding. We were impressed by the quality and the depth of the work. Whilst we received some very good applications, Silvia’s was by far the best, and it didn’t take very long to single it out. The work is a credit to Silvia, her supervisor, the University and NICTA,” he said.

Silvia’s thesis, Landmark-based Heuristics and Search Control for Automated Planning, contributes to improvements in the efficiency of planning systems, i.e. systems that can reason about problems and compute sequences of actions that will achieve a certain desired goal. Abdul Sattar, NICTA Research Leader and Professor and Director of Griffith University’s Institute for Integrated and Intelligent Systems (IIS), was Dr Richter’s Principal Supervisor, with Dr Charles Gretton, NICTA researcher, one of her Associate Supervisors.

Silvia recently moved into the corporate world where she is leading IT projects for German car manufacturers.
First Prize in the Digital Future UNSW Taste of Research (ToR) Poster Presentations

Congratulations Summer Scholar Germaine Phua who won the first prize in The Digital Future as part of the UNSW ToR poster presentations. Germaine’s poster was titled “Read between the lines: Search query based re-identification.” The shortlist included 10 posters with all the shortlisted students describing their accomplishments during ToR time in a 2 min presentation. Kudos also to NICTA’s Arik Friedman for doing such a great job with Germaine!

Best Student Paper Award – Waynes Tushar

Congratulations to NICTA PhD student Waynes Tushar from CRL for winning the 2012 Australian Communications Theory Workshop (AusCTW) Best Student Paper Award in Wellington, New Zealand. The title of the paper was “Non-cooperative Power Control Game in a MultiSource Wireless Sensor Network” and was co-authored with NICTA researchers David Smith, Tharaka Lamahewa and Jian (Andrew) Zhang.

Diagnostic Genomics – Successful Trials of the CUP Diagnostic Test

Congratulations to Adam Kowalczyk, Fan Shi and researchers who have worked on NICTA’s Cancer of Unknown Primary (CUP) diagnostic test over the last few years. Developed with collaborators Peter MacCallum Cancer Institute, Circadian and Healthscope, Circadian has just reported that Australian oncological trials of the diagnostic test have shown that the test can detect the primary source of cancers with more than 90 percent accuracy over 15 different tumour types. This is a great example of the power of collaboration to produce outcomes that can truly change (and save) lives.

Healthscope is expecting to launch the test commercially in Australia, New Zealand, Malaysia and Singapore within the next couple of months, with Circadian following in the rest of the world.

Appointments to Editorial Boards

• Well done to Aniban Mahanti who has been elected to the editorial board of the IEEE Internet Computing journal. IEEE Internet Computing provides journal-quality evaluation and review of emerging and maturing Internet technologies and applications. The magazine targets the technical and scientific Internet user communities as well as designers and developers of Internet-based applications and enabling technologies.

• Congratulations to Marcus Foth who has been elected to the editorial board of Computers, Environment and Urban Systems. The publication is an interdisciplinary journal publishing cutting-edge and innovative computer-based research on environmental and urban systems, that privileges the geospatial perspective.

• Well done to Alban Grastien on being elected to the editorial committee for Revue d’Intelligence Artificielle. The publication covers all aspects of artificial intelligence, held in high regard by experts and students alike because of its rigour, originality and scientific quality.

Congratulations to the NICTA Impact Award Winners 2011

The NICTA Impact Award Winners for 2011 were announced at Techfest 2012. The Impact Awards recognise and reward employees who make an outstanding contribution to NICTA’s vision, mission and values, in the operational and research excellence and wealth creation categories. Congratulations to the following winners.

Operational Excellence

Carly Perry, Coordinator, Infrastructure, Transport and Logistics for outstanding contribution to the Business Team in 2011.

(Joint Winners) Research Excellence

Adam Kowalczyk, Control and Signal Processing, for contribution to Cancer Genomics research.

Leonid Rzyhik, Software Systems, for producing a major advance in operating systems through verification and design of device-drivers.

(Joint Winners) Wealth Creation

Intelligent Fleet Logistics - who turned academic ideas into practical results. This has generated commercial revenue for NICTA, and will deliver significant savings for transport companies.

Over the period to 2020, the impact on the NSW economy is estimated to be slightly over $1bn in present value terms.

Business Adaptation and Interoperation - The Business Adaptation and Interoperation project team has made major impact in software engineering practice in Australia. The positive impact on practice can be felt across a number of industries, including financial services, government sector, telecommunication, media, defence and health.

Congratulations to the IP Award Winners 2011

Well done to the NICTA IP Award Winners for 2011!

NICTA’s Best Invention Prize (Inaugural) 2011

Winner: Method for Measuring a Neural Response to a Stimulus (“Evoked Response Telemetry Method”) - John Parker, Peter Single and Dein Karantoni.

The Evoked Response invention elegantly solves a difficult signal processing problem – reading the very low power response of a group of nerves after applying a high power stimulation. The invention has already provided a deeper understanding about the functioning of the nervous system resulting in an article that has appeared in the March 2012 issue of Pain. Eventually this invention may serve as a foundation of a device that will provide better relief to sufferers of chronic pain.

The 2011 FB Rice Prize for Best Patent Activity at NICTA

Winner: Antonio Robles-Kelly and the Spectral Imaging team, Awarded for this team’s diligent engagement in the filing of seven patent families initiated during the last three years.
events

NICTA’s Big Picture Seminars
Nobel Laureate Professor Brian Schmidt, Australian National University
The Accelerating Universe & the hunt for dark energy: A crazy result that broke our understanding of the nature of the Cosmos.
When: Tuesday 15th May, 2012
Where: The Spot Basement Theatre, University of Melbourne
Registrations for this event will open Monday 16 April.
Email katya.baxter@nicta.com.au for more information

CeBIT Australia and Aus Innovate
CeBIT Australia is the leading business event in the Asia Pacific region for Information and Communications Technology driving business strategy.
NICTA, together with CSIRO and DSTO is hosting the 1 day AusInnovate on 22 May, focusing on how ICT R&D collaboration is transforming smart infrastructure and services.
When: 22 – 24 May 2012
Time: 10am – 6pm
Where: Sydney Convention & Exhibition Centre, Darling Harbour

CommunicAsia
CommunicAsia has established itself to be the unparalleled one-stop ICT event platform in Asia. Into its 23rd year, CommunicAsia 2012 highlights the newest technology innovation in the ICT industry in the like of today’s digital convergence landscape. Products being showcased ranges from the latest technologies in applications, solutions to hardware. The show has proven to be the choice platform for product launches and announcements in the region.
When: 19 – 22 June 2012
Time: 10.30am – 6pm
Where: Marina Bay Sands, Singapore

In January over eighty of Australia’s brightest young minds met for ten days to take part in intensive programming, robotics and web development as part of the 2012 National Computer Science School (NCSS).
Over the course of NCSS, students are given insights into their future careers, taking part in mock interviews with industry mentors, and presenting an ‘elevator pitch’ to a panel of technology entrepreneurs. Matt Barrie, CEO of Freelancer.com and Sydney University alumnus, said he is “continually blown away by the students at NCSS.”
The students learn and refine their programming skills, interact with cutting edge technologies and make new contacts with other ICT students from across Australia.
Attendees are split into streams which involve lectures, lab work and a major project. The Python stream sees students honing their web development skills by creating new social networking websites and the Embedded programming stream involves programming a Roomba robot on a rescue mission.
This stream is run by NICTA’s Dr John Judge with the students working with NICTA ed1 boards to build, program, debug robots - even programming victory songs and dance numbers into a successful rescue routine. Site visits to Macquarie Group, Atlassian and Google, also inspired the students.

Roomba moves to the rumba beat
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AusInnovate: Australia Goes Broadband – Capturing Opportunities
22 May 2012, Sydney

NICTA invites you to join us at CeBIT 2012
22-24 May
Register now with the following promo code nicta88 for complementary exhibition entry.
www.cebitalia.com.au