NICTA has enjoyed its most successful CeBIT Australia to date, with the three-day event providing a robust platform for more than 95 NICTA staff and students to showcase 13 advanced technology projects and demonstrations.

NICTA demonstrated a driving simulation that literally placed visitors in the ‘driver’s seat’ and detected when they weren’t focused enough on driving. Also on show was NICTA’s latest spin-out, Saluda Medical, whose novel neurostimulation and recording system provides superior pain relief technology.

NICTA also took part in CeBIT’s exciting conference program. Sharing their knowledge with industry leaders were NICTA’s Jodi Steel on cyber security, Rami Mukhtar on big data and Neil Temperley on supply chain and logistics.

Government visitors to the NICTA stand included NSW Premier Barry O’Farrell, who commented that his NICTA tour was one of the best two-minute summaries of tech R&D he had ever received.

NICTA also welcomed visits from Andrew Stoner, Deputy Premier of NSW; Kate Lundy, ACT Senator and then-Federal Minister for Sport and Multicultural Affairs; Scott Ludlum, Greens Senator for Western Australia, and Greg Pearce, NSW Minister for Finance and Services.

(continued page 3)
Big Data Meets Natural Science

Data analytics and machine learning is a huge growth area in NICTA’s research and industry portfolio. The past year has seen a range of new projects developing and applying analytics to areas including financial services, asset management and ground water modelling. Last month we launched an exciting new, multi-million-dollar knowledge discovery project that will build on NICTA’s growing expertise in data analytics, ‘big data’ and machine learning expertise.

The new project aims to apply data analytics to the problem of discovery in the domain of natural sciences. The project is supported by a $4m grant from the Science and Industry Endowment Find (SIEF). NICTA is working with distinguished natural scientists in physics, plant science and geosciences - Deb Kane and Mark Westoby (Macquarie University), Dietmar Muller (University of Sydney) - along with experts from SIRCA, to explore a new paradigm for data-intensive science.

This research promises to give us a much more comprehensive picture of biodiversity, the impact of climate change and an accurate view of the past and future geology of Australia. The project brings together some of the best computer and data scientists in the world from NICTA (machine learning and analytics) with software engineers from SIRCA (software and big data) together with three of Australia’s most distinguished natural scientists in physics, plant science and geosciences, to tackle grand scientific challenges in completely new ways.

The program was launched at SIRCA’s offices in The Rocks on a clear, chilly evening last month, with the magical Vivid Festival providing a sparkling backdrop. I am confident that the discoveries we will make in the course of our research will make those lights seem dim by comparison!

Other highlights of the quarter included the successful spin-out of Incoming, a mobile video start-up company which started its life in our Networks Research Group. It attracted $1.1M in seed financing from Australian venture capital group OneVentures, US-based Citrix Startup Accelerator and NICTA.

We also launched a national ICT education program supported by $6.5M from the Department of Broadband, Communications and the Digital Economy. This program will build on the success of the GroupX project in Queensland, which contributed to a 50 percent increase in ICT enrolments in that state. You can read about these and all of our other activities and achievements over the last three months in the following pages.

Finally, I would like to let all of our readers know in advance that NICTA News will soon move to an online-only format. After ten years of paper-based and electronic distribution, we have decided it’s time to go completely digital. We will let you know about the timing of the move in the September edition of NICTA News.

Welcome, Goodbye and Thanks....
Senator Stephen Conroy, former Minister for Broadband, Communications and the Digital Economy, launched National ICT Careers Week from the NICTA stand (see full story on page 6).

Media attention focused on Gerwin Klein from NICTA’s research project with the US Defense Advanced Research Projects Agency (DARPA) featured on the Nine Network’s Today program.

Other NICTA highlights included Bill Simpson-Young, Director of NICTA’s Engineering & Technology Development group, judging a pitching competition for some Australian start-ups and Elena Kalareva winning the NASSCOM Student Award.

The success of this year’s GovHack has established Australia’s largest hacking competition as a significant collaboration and engagement platform.

Run over 48 hours on the first weekend of June, the event drew together people from government, industry, academia and of course, the general public to mashup, reuse and remix government data. GovHack is about finding new ways to do great things and encouraging open government and open data. The 2013 competition, of which NICTA was a platinum sponsor, ended with over 1000 participants registered, including over 700 hackers and 130 competition entries all competing for their share of glory, and the $170,000 in prize money.

NICTA’s Manager, Business and Technology Manager, Broadband and the Digital Economy (BaDE), Ricky Robinson, coordinated the Brisbane competition site, where the most successful entry was Old Folks United, a multidisciplinary team of engineers and designers from Red Hat, Redfish and Klyp, who took home the national Best of Digital Humanities award, as well as the Best of Brisbane award and Think Big Culture prize.

Their playful GovHack entry, BrisBert, guides the user through a history of Brisbane through the eyes of “Old Man Brisbane”, or Bert, as they dubbed this virtual persona.

Special note also goes to Team Amethyst, three enterprising tenth graders from John Paul College who won the Brisbane Spirit of GovHack award worth $1000, for demonstrating the values associated with GovHack.

#Govhack #hugesuccess #nicework
Investments in health have been critical for economic growth and the reduction of global poverty, helping bring the goal of an end to absolute global poverty within generational sight.

This was the message delivered at the 2013 ICT for Life Sciences Forum Graeme Clarke Oration, by Geoffrey Lamb, President, Global Policy and Advocacy at the Bill and Melinda Gates Foundation. Mr Lamb leads the foundation’s international policy and advocacy team, and its engagement with governments and international institutions.

The oration, under the banner of Global Health, Economic Growth and the End of Absolute Poverty: hopeful evidence and hard challenges, was well received by the 1,700 people who attended, which included many secondary school students and teachers.

The presentation started by highlighting the extraordinary successes of the past half century in reducing mortality and disease, before discussing whether these significant basic health advances have, in fact, been the easy part.

Mr Lamb noted that big investments in routine vaccination and cleaner water may already have delivered up most of their dividends and in many cases there is a “long contraction” in public finances that will make it much harder to fund future investments. He then went on to discuss how this impacts on the new question facing the global community - what needs to be done to ensure the next transformation in global health, and make the end of absolute poverty attainable?

The rich biodiversity seen throughout the world is the result of many interacting ecological processes. A multi-disciplinary team from NICTA, SIRCA, Macquarie University and The University of Sydney, will use data science to determine which of these interactions are most important in producing the world we see around us, potentially opening a window on some of the mysteries of biodiversity and showing how ecosystems will be affected by climate change and other factors.

The project will also combine publicly available geological data from Geosciences Australia with SIRCA technology that helps predict stockmarket movements, to help picture what Australia was like 1.5 billion years ago, and how its rich metal deposits were formed.

“This partnership is a great vote of confidence in NICTA’s research capabilities and ensures it will stay at the cutting edge of technology development in the years ahead. It also demonstrates Australia’s strength as a leading digital economy,” said Senator Stephen Conroy, Former Minister for Broadband, Communications and the Digital Economy.

Tackling the really tough problems
Dr Tharshan Vaithianathan

NICTA in 3D Motion

NICTA’s Dr Tharshan Vaithianathan isn’t sure what ignited his fascination with the world of science, but it’s a passion that has shaped his career path from a young age. Originally from Sri Lanka, Tharshan spent his early childhood in Nigeria and the UK before arriving in Australia in 1984. After graduating from Monash University with a degree in Electrical and Computer Systems Engineering, he worked at CSIRO for a couple of years before returning to Monash to undertake a Masters in Engineering Science and later a PhD from the UNSW in the field of Biomedical Engineering.

It was the five years he spent at the University College of London and the satisfaction he got from the technical challenges of marrying both the biology and the engineering fields together that set him on the course to NICTA. “I worked closely with medical practitioners to develop low cost portable biomedical instruments that were used routinely, making me realise how these novel systems could make an impact in treating patients and I therefore decided that this was what I wanted to do for the rest of my working career,” he said.

A positive impact is what he is expecting for the five Royal Melbourne Hospital stroke patients who are taking part in a clinical three-month trial of the NICTA 3D Motion Analysis at Home project that Dr Vaithianathan is working on.

“Currently when stroke patients take part in rehabilitation, they are required to be transported to dedicated motion analysis laboratories. The equipment in these specialised laboratories are bulky, expensive, costly to maintain and require a highly qualified technician to operate. In addition, the analysis is conducted in a small confined area and therefore provides only a snapshot of an individual’s motion for short periods of time and does not provide an accurate measure of what he or she does in their natural home environment,” says Tharshan.

“Using the latest microelectromechanical sensors (MEMS) coupled with unique smart algorithms, we have developed both the hardware and software required to monitor patients in their natural home environment. The hardware is a low-cost, wireless, portable device with a small form factor, capable of storing long term information. It is easily attached onto an individual’s limb with a velcro strap and the trajectory of the limb can be visualised in 3D,” he said.

This technology, called a portable motion analysis system (PMAS), provides medical practitioners, such as physiotherapists, with statistical metric information to chart in real-time their patient’s rehabilitation progress and make appropriate adjustments to optimise their patient’s individualised care.

The research is not limited to biomedical applications and can also be used in different parts of the world, the challenge of having to constantly learn new and different fields, not only in engineering, but also in medicine.

Who would you love to have at a dinner party (dead or alive) and why?
Ben Carson, who at an early age was involved with street gangs, nearly killed his best friend with a knife, then rose up the ranks to become the youngest Director of Paediatric Neurosurgery at Johns Hopkins at the tender age of 33.

If you had to choose between movies, books or music which would you choose and why?
Definitely books. I love to read and find it very relaxing, especially the autobiographies of famous people.

What do you love about working in R&D?
The flexibility in working hours, travelling and meeting people from different parts of the world, the challenge of having to constantly learn new and different fields, not only in engineering, but also in medicine.

What would be your dream holiday and why?
Far away from civilization in a cottage surrounded with beautiful snow-capped mountains with plenty of seafood to fill the stomach.

Who inspires you and why?
My dad who always has a positive attitude in life, hardly loses control of his temper and never ever gives up.

What do you consider to be the ultimate scientific discovery?
The telephone.
The disparity between the demand for ICT skills and the supply of qualified ICT workers is well documented. Having become a ubiquitous part of every aspect of our lives, ICT is without doubt one of the most rapidly growing career pathways available.

Enter National ICT Careers Week, a national event since 2008 that this year will run from 29 July - 4 August and is focusing on the theme of ICT: Start Here, Go Anywhere.

Officially launched by Senator Conroy, former Minister for Broadband, Communications and the Digital Economy, the national event brings together over 350 organisations from corporate, government and educational institutions to showcase how studying ICT is the start to a rewarding, interesting and social career that can take you anywhere in the world.

NICTA CEO Hugh Durrant-Whyte hosted this year’s launch at NICTA’s stand at CeBIT, where he also accepted his appointment as an Ambassador of National ICT Careers Week.

“NICTA produces over a quarter of Australia’s ICT PhDs who are already helping make Australian businesses more successful. ICT is the key transformer for all businesses. This is why it’s critical to have the best ICT graduates working with Australian industry to make the country globally competitive,” he said. For more information visit: www.ictcareersweek.info

Albert Einstein understood the importance of inquisitiveness when he said “I have no special talent. I am only passionately curious”. Curiosity is something that as children we have in abundance and research shows that to foster and maintain a child’s curiosity it is crucial to start with very young children who are by nature curious about their environment and natural phenomena.

And so sees the introduction by FROEBEL Australia of the ‘Little Scientists’ program, a not-for-profit initiative designed to facilitate children’s curiosity for science, maths and technology through child-appropriate, fun and playful experiments. Teachers and educators will be trained through the program and encouraged to implement the project together with the children in their care, allowing opportunity to incorporate children’s questions and provide a platform to explore the environment together.

Highly successful in Germany, FROEBEL Australia recently launched the program in May at NICTA’s Future Living Logistics Lab, with representatives from FROEBEL Australia, the German Consul General Hans-Dieter Steinbach, Kristian Wolf, Executive Director of the German-Australian Chamber of Industry and Commerce and NICTA’s CEO, Hugh Durrant-Whyte.

The first Australian partners have already been found: Big Fat Smile and Haver Australia with Big Fat Smile CEO, Bill Feld, already enrolling his 40 childcare centres into the Little Scientists coursework. For more information please visit www.littlescientists.org.au.

Developed with OMC International, an Australian maritime engineering company, the technology has helped set an all-time loading record at Australia’s largest port, Port Hedland. Elena will continue to extend her algorithms within the transport and logistics area, one of the most economically significant sectors of Australia’s economy.

“Not only is Elena’s contribution innovative, it is clearly a valuable business application. The fact that it was designed in collaboration with industry made it an even more compelling candidate for this year’s NASSCOM Awards,” said Julian Day, CEO, Consensus, the company that manages the NASSCOM Innovation Student Awards program.

Congratulations to Elena Kelareva, NICTA-sponsored PhD student at The Australian National University, who was awarded the NASSCOM Innovation Student Award at the ICT Celebration dinner at this year’s CeBIT Australia.

The award, which recognises innovation in Australia’s universities, highlighted Elena’s research which enables ports to increase their capacity by improving the efficiency of their scheduling.

Elena’s intelligent software automates the process of determining sailing times of ships through the port so as to find better solutions to allow more cargo to be loaded onto the same set of ships, or more ships to sail on each high tide.

Left: PhD student Elena Kelareva receiving the NASSCOM Innovation Student Award from Glenn Archer, AGCIO (Australian Government Chief Information Officer) Department of Finance and Deregulation

NICTA News

6

NICTA student sails away with a win

ICT: International Career Track

Albert Einstein understood the importance of inquisitiveness when he said “I have no special talent. I am only passionately curious”. Curiosity is something that as children we have in abundance and research shows that to foster and maintain a child’s curiosity it is crucial to start with very young children who are by nature curious about their environment and natural phenomena.

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Congratulations to Joel Beeren for winning the UNSW University Medal 2013. This award is based on undergraduate students who show highly distinguished merit in their program. Joel currently works as a proof engineer in NICTA’s SSRG.

Congratulations William Billingsley
William Billingsley, Senior Research Engineer, together with several co-authors, was awarded the David Carrington Prize for the Best Australasian Software Engineering Education Paper. The award was shared between their two papers ‘Using Continuous Integration of Code and Content to Teach Software Engineering with Limited Resources’ (published at ICSE2012) and ‘A Comparison of Two Iterations of a Software Studio Course Based on Continuous Integration’ (published at ITiCSE2013).

Best Paper Award
Congratulations to Bernard Blackburn, PhD student, who was awarded Best Paper at the Real Time and Embedded Technology Applications Symposium (RTAS) in the USA as part of Cyber-physical Systems Week. His paper ‘Seqoutil: a framework for model checking binaries’ presents a new framework for reasoning about compiled programs and demonstrates how the framework has been applied to refine the timing analysis of the seL4 microkernel. The paper was co-authored with Gernot Heiser.

NICTA in ‘Nature’
Congratulations to Manuel Cebrian who had two papers published in prestigious journals in June. ‘Limited communication capacity unveils strategies for human interaction’ was published by Nature Scientific Reports and ‘Urban characteristics attributable to density-driven tie formation’ by Nature Communications.

National Institute of Informatics (NII) Internship Awarded
Congratulations to MLRG student Siyuan Chen who has been awarded an internship with the NII working on ‘Identification of specific object in video and image’.

Nicholas Engerer - Associate Lecturer position
Congratulations to Nicholas Engerer from MLRG who was recently awarded an Associate Lecturer position at the Fenner School of Environment and Society (ANU), commencing in the 2004 Weather, Climate and Fire and ENVS 2004 Australia’s Environment.

Patrik Haslum Co-chair ICAPS
Patrik Haslum will be program Co-chair of ICAPS 2015, which will take place in Israel. ICAPS is the premier forum for researchers and practitioners in the field of planning and scheduling.

Sanjay Jha - appointed Area Editor
Sanjay Jha from NRG has been appointed an Area Editor of the ACM Computer Communication Review (CCR) Journal. Congratulations!

Congratulations Dr Sherif Sakr
Dr Sherif Sakr, SSSR senior researcher, has been invited to author a series of IBM Developerworks articles in the area of large scale graph-based query processing. IBM Developerworks is a highly regarded source of developer technical content and reaches millions of readers around the world.

Hanna Suominen shortlisted for L’Oréal Women in Science Fellowship
Congratulations to senior researcher Hanna Suominen who has been shortlisted for a 2013 L’Oréal Australia and New Zealand Women In Science Fellowship.

Well done Sylvie Thiebaux!
Research leader Sylvie Thiebaux has been elected to a three-year term as Councillor of the Association for the Advancement of Artificial Intelligence.

Pascal Van Hentenryck – Editor and Teacher
Pascal Van Hentenryck has been announced as an Associate Editor of the Journal of Artificial Intelligence Research, meaning he is now Associate Editor of the two premier journals in artificial intelligence. He also recently developed and launched ‘Discrete Optimization’, a brand new Coursera online learning course, which he will present.

Ours is an education company that partners with the top universities and organisations in the world to offer free online courses for the global community. Pascal is one of only six professors in Australia invited to be part of this new learning initiative. To date he has 40,000 students registered in the course.

PLoS ONE publication co-authored by NICTA’s Karin Verspoor
Congratulations Karin, Director of Health Technologies, for the publication of Approximate Subgraph Matching-Based Literature Mining for Biomedical Events and Relations. The paper was also featured in the new PLoS Text Mining Collection! http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0060954.

Cindy Wang co-recipient of Best Dissertation Award
Congratulations to Cindy Wang, former NICTA PhD student, in the ORG on winning the 2013 International Symposium on Automated Planning and Scheduling (ICAPS) Best Dissertation Award. This award honors outstanding PhD theses in any area of automated planning and scheduling.

Well done Aaron Defazio, Qinghua Lu, Liang Zhao and Bernard Blackburn
Congratulations to Aaron Defazio, Qinghua Lu, Liang Zhao and Bernard Blackburn for winning the 2013 Best Paper Award at the International Conference on Automated Planning and Scheduling.

Well done NICTA’s Optimisation Research Group!
ORG researchers and students had 10 papers accepted in The International Conference on Principles and Practice of Constraint Programming (CP2013) in Sweden in September. That represents 21% of the technical conference! ORG authors include: Peter Stuckey, Pascal Van Hentenryck, Geoffry Chu, Christopher Mears, Guido Tack, Maria Garcia de La Banda, Andreas Schutt, Thibaut Feyd, Sylvie Thiebaux, Manuel Cebrian, Van Den Briel, Nina Narodytska, Toby Walsh and ORG student authors: Kevin Leo, Kathryn Francis, Paul Scott and Terrence W.K. Mak. ORG also has 50% of the invited talks at CP2013.

Invited Talks & Keynotes

Glenn Geers, NICTA’s Technology Director of Infrastructure, Transport and Logistics Business Team, was a keynote speaker at the IEEE Advanced Logistics & Transport Conference in Tunisia.

Serge Gaspers and Toby Walsh gave invited talks ‘Backdoors to Satisfaction: Parameterized Complexity and Detecting’ and ‘Exploiting Subproblem Tractability / Global Scheduling Constraints under Structural Restrictions’ respectively, at the First Symposium on Structure in Hard Combinatorial Problems in Austria.

Pascal Van Hentenryck gave invited talk on ‘Paths to Software Engineering Evidence’ at the Symposium on the Future of Software Engineering in Germany. This was a contribution to the Festschrift for the 60th birthday of Prof Dieter Rombach.

Philipp Kilby gave an invited presentation at the inaugural ‘Optimisation In Industry’ conference on ‘Logistics for Fast-Moving Consumer Goods: A Focus on Profits’, highlighting the research NICTA has been applying to logistics for fast-moving consumer goods. The Optimisation in Industry conference is set to become an annual event, showcasing projects where Optimisation techniques are contributing to real-world outcomes.

Researcher Victor Pillac was invited to present a workshop ‘Computational Aspects of Vehicle Routing’, at the VRP2013: European Spring School on Vehicle Routing, Angers, France, to an audience of international PhD students and young researchers.

Pascal Van Hentenryck gave a keynote talk ‘Optimization over transportation networks’ at The AMPL workshop on Mathematical Optimization over Transportation Networks hosted by Monash University in Clayton.

KEY:
SSRG – Software Research Group
MLRG – Machine Learning Research Group
ORG – Optimisation Research Group
NRG – Network Research Group
Technology Showcase: NICTA meets Wodonga

Technology is rapidly changing the way we live, learn and work. In the future every business will be an ICT business. See some world-leading technology being developed by NICTA, Australia’s largest and most successful ICT centre of Excellence.

The showcase will include demonstrations and presentations on topics such as:

- The preparation for and management of natural disasters
- Technologies for improved diagnosis and treatment of cancers and brain tumors
- The development of an Australian bionic eye
- Tools to assist farmers with crop decision making, and
- Vehicle collision avoidance technology.

When: Tuesday 30 July 2013
11.00am - 4.00pm

Where: Health Sciences Building 6, LaTrobe University
Albury-Wodonga Campus
University Drive, Wodonga, Victoria 3689.

RSVP Monday, 22 July 2013
To register email: Katya.Baxter@nicta.com.au

For more information on all of NICTA’s events please visit: www.nicta.com.au/events

NICTA in the news

The Sydney Morning Herald looked at how new advances in health bio-informatics are giving clinicians the ability to fight diseases more accurately. It highlighted three programs NICTA’s VRL is involved in related to treatment of cancer and other conditions, including better treatment of the one-third of cancers whose original source is unknown.

NICTA’s Postdoctoral researcher Geoff Macintyre said these so-called carcinomas of unknown primaries were among the top 10 most common causes of cancer-related deaths. http://www.smh.com.au/t-pro/business-it/scientists-take-data-approach-to-beat-disease-20130513-2yj3o.html

NICTA’s CEO, Hugh Durrant-Whyte, spoke to the Australian Financial Review about how mobile phones ubiquity can affect productivity and that boosting performance could be as simple as turning off our phones. http://www.afr.com/p/national/work_space/it_exec_constant_connection_can_AjoB0Ex9DEV88xYcWG6xqi

In Cosmos magazine NICTA’s Tiberio Caetano and Rami Mukhtar, AKA decision makers, talk big data and the future brave new world in which scientific principles are almost ubiquitous – for better or for worse. Tiberio Caetano says that all of the decisions people make in their daily lives are based on a very crude understanding of the world. In the future these decisions will be driven by data. Rami Mukhtar says that being able to predict movements and buying habits isn’t as difficult as we might think because human beings are creatures of habit.

http://www.cosmosmagazine.com/features/the-decision-makers/

Papers co-authored by NICTA researcher Manuel Cebrian continued to attract an immense amount of media coverage.

Two Nature papers in the past quarter, both noted in our People and Achievements page, generated much of this:

- ABC: http://www.abc.net.au/science/articles/2013/04/19/3740905.htm
19/4/13: Shopping habits predictable to a point
- ABC: http://www.abc.net.au/science/articles/2013/04/02/3726067.htm
2/4/13: Social media has limited mobilisation power

For more information on all of NICTA’s events please visit: www.nicta.com.au/events

NICTA gets Wired for Wonder

NICTA is proud to be a sponsor of the two-day Wired for Wonder event. For more information visit www.wiredforwonder.com