Annual Report to Members
2004
NICTA’s Mission

To be an enduring world-class research institute in Information and Communications Technology (ICT) that will generate national wealth.

The means by which we will achieve our mission are:

Research

- Attracting and retaining the highest quality research staff
- Focusing our research efforts toward areas of importance to Australia
- Working collaboratively internally and with external partners
- Conducting research to the highest standards of excellence
- Being recognised as one of the world’s top ICT research centres
- Providing leadership for high-quality ICT research throughout Australia.

Commercialisation

- Building a strong entrepreneurial culture
- Fostering open relationships with the Australian business community
- Optimising the economic benefit of NICTA’s research to Australia
- Making a measurable impact on Australian ICT competitiveness.

Education

- Partnering with Australian universities to increase the quality of Australian ICT PhD graduates
- Supporting the placement of research students in industrial and research internships as part of their training
- Increasing the number of highly qualified ICT researchers educated within Australia.

Linkages

- Building high-quality partnerships with Australian businesses, multinationals, research institutions, and universities
- Leveraging the support of our members and Australian government agencies
- Serving as a focal point for the development of ICT industry clusters.
About NICTA

National ICT Australia (NICTA) is funded by the Australian Government’s Department of Communications, Information Technology, and the Arts and the Australian Research Council through Backing Australia’s Ability and the ICT Research Centre of Excellence programs.

NICTA is a company limited by guarantee. Its members comprise:

- The Australian National University (ANU)
- The University of New South Wales (UNSW)
- The NSW Government
- The ACT Government.

NICTA’s alliance partners include:

- The University of Sydney
- The Victorian Government
- The University of Melbourne
- The Queensland Government
- Griffith University
- The Queensland University of Technology
- The University of Queensland.

From this powerful union a national laboratory has emerged based on the foundations of research, commercialisation, education, and collaboration. With a focus on fundamental and use-inspired research, NICTA attracts, develops, and networks exceptional talent for Australia’s future prosperity.

NICTA’s research laboratories are located in Sydney (NSW), Canberra (ACT), Melbourne (VIC), and Brisbane (QLD), with outreach programs in Perth (WA) and Adelaide (SA).

NICTA is governed by a Board of Directors. The Board is assisted by three sub-committees:

- Governance and Remuneration
- Audit and Finance
- Evaluation.

The committees are made up of Board members and are supplemented by others as required.

Two external advisory groups also support the Board with senior international membership:

- International Scientific Advisory Group (ISAG)
- International Business Advisory Group (IBAG).

These advisory groups provide valuable strategic and commercial counsel to the NICTA Board.
2004 Highlights

NICTA has achieved a great deal in its first full year of operation. By the end of 2004 NICTA was established as an organisation. We had a truly national presence, a concrete research agenda, visible research outcomes, significant enrolments in the NICTA-endorsed PhD program, a sound start on our patent portfolio, and rapid personnel growth in line with our plans, resulting in 385 staff and students by year-end.

As we head into 2005 NICTA is on a solid foundation with substantial infrastructure and a strong outlook to the future.

Truly National

- June; NICTA announced its Victoria Laboratory
- July; NICTA announced its Queensland Laboratory

NICTA now encompasses six sites:
- Northbourne Avenue, Canberra
- ANU, RSISE Building, Canberra
- Australian Technology Park, Sydney
- UNSW, Kensington campus, Sydney
- Adelaide Street, Brisbane
- Melbourne University, Melbourne.

New partners attracted in 2004:
- Victorian Government
- Melbourne University
- Queensland Government
- Griffith University
- Queensland University
- Queensland University of Technology.

Research

- NICTA’s research focus is now broadly aligned with our two Priority Challenges:
  - From Data to Knowledge
  - Trusted Wireless Networks.
- NICTA has 16 research programs running across Australia and 41 individual research projects.
- The Visual Information Access Room at ATP Laboratory was launched in 2004 and showcases pioneering speech and gesture fusion technology.
Enriching ICT Education

- High quality students and supervisors recruited
- A NICTA program of enhanced coursework established
- 132 NICTA-endorsed PhD students across the country.

Feeding the Commercial Pipeline

- Commercialisation infrastructure established in 2004 including key personnel, IP management policies and procedures, and defined internal education programs
- Commercialisation pipeline commenced through initiatives such as the Entrepreneur-In-Residence program
- First four provisional patents lodged.

Building an Organisation of Exceptional Talent

We continue to recruit some of the world’s most talented researchers, with staffing levels rising dramatically over the course of 2004.

Staff Numbers @ Dec 2004

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2004 has seen NICTA move from its establishment phase to become an organisation with reach, capacity, and focus. We now have the capability to deliver on the vision of creating an enduring world-class research institute in Information and Communications Technology that generates national wealth.

NICTA has now extended its footprint across Australia to become a truly national organisation. We have built our core sites in the ACT and NSW, and our outreach activity has secured agreements for the development of new laboratories in Victoria and Queensland. The Victorian Research Laboratory, announced in June, is already making a significant contribution to NICTA. In July, NICTA signed agreements with the Queensland Government and three Queensland universities to establish a NICTA laboratory in the state. With our project collaborations with Defence Science and Technology Organisation and The Western Australian Telecommunications Research Institute, in Adelaide and Perth respectively, we believe we have achieved a balanced national presence with resources of significant mass at our core sites.

NICTA’s research effort aims to resolve problems of industry, community, and national interest. In May, we announced our Priority Challenges, Trusted Wireless Networks and From Data to Knowledge. Priority Challenges are the organising principles that direct NICTA’s use-inspired research and provide the framework for meaningful collaboration across the various NICTA sites.

While our work has largely been guided by the original Centre of Excellence proposal, we have been very conscious that we operate in a very dynamic economic, social, political and technological environment both globally and nationally, and that we must continually review our overall strategy and program of activities in the light of external developments and our own experience. Given the completion of our establishment phase, the Board decided in 2004 to institute the development of a strategic plan for 2005-2015. This will provide a set of updated strategic and operational objectives that will shape NICTA for several years. The plan is also intended to articulate the clear benefits that NICTA will deliver to the Australian ICT industry and, more widely, to the Australian economy and society.

NICTA’s progress to date could not have been achieved without the foresight and continuing commitment of our members, the support of our partners, and the ongoing and significant support of the Australian Government.

It is also extremely gratifying that the Australian Government saw fit to announce in May 2004 its intention to extend its funding until 2011 with additional funding of $251 million for that period. This decision gives us a measure of surety that is critical to capitalising on our start-up successes, particularly in continuing our recruitment of the high quality talent necessary to build a world-class organisation and entering into appropriate medium-term commercial arrangements.

The Board and management look forward to continued progress and growth in 2005 across NICTA’s four pillars of research, education, linkages, and positive economic impact. We plan to launch very large research projects that address major national and commercial challenges, enhance and expand our education program to develop future researchers with a high level of commercial skills, ramp up our commercialisation activities to capitalise on the outputs of our research, and extend our linkages to other world-class research organisations as well as select large, medium, and small commercial enterprises.

In conclusion, I would like to acknowledge the contributions of the management team, led by Dr Mel Slater, who will depart NICTA on 31 May 2005, for helping build the foundation for Australia’s ICT Centre of Excellence.

Neville Roach AO
NICTA’s development and achievements over 2004 are a testament to the quality of the team formed over the past two years. During 2004, NICTA concentrated on building our talent pool and attracting world-class people to our laboratories. At the end of 2004, NICTA had 385 exceptionally talented staff and students underpinning this great organisation.

The cultural growth across NICTA is one of the most significant achievements in 2004. NICTA comprises many inherited cultures from its seconded staff and staff recruited from many different environments. Each has brought their own legacy and values. Each has contributed to the emergence of a national Centre of Excellence.

NICTA is building a culture based on a flexible attitude; an excitement and dynamism to stimulate the Australian ICT industry; an open and collaborative approach to external interactions; exceptional personal and professional behaviours; and an entrepreneurial spirit. Through a series of deliberate initiatives – ranging from the use of internal competition for research funding to our internal communication program – the concept of NICTA as a unique enterprise is emerging.

NICTA now has 132 PhD students across the country. Postgraduate training is an exciting area which has the potential to influence the future of Australia’s ICT industry and increase innovation in small to medium enterprises. NICTA is therefore ensuring that education is a major focus in 2005.

Industry experience will be an important part of NICTA’s approach to education. In November, we announced an agreement to offer up to 21 NICTA-endorsed PhD students internships with Telstra. We expect areas of focus will include Internet Protocol (IP) networking, wireless broadband technologies, Internet/IP security, and encryption. The four-year internship agreement will commence in late 2005, with the first four interns placed within the Telstra Technology Innovation and Product (TTIP) business.

Our ability to bring our research to market is a make-or-break issue for NICTA. We are building our commercialisation capacity by working internally with researchers, building external business development networks, and developing relationships with venture capitalists. There is a great deal of external interest in our work and cultivating this will continue to be a priority in 2005.

We are forming strong links with local and international industry. For example, in August we established a partnership on Trusted Wireless Networks with Daintree Networks. We are also working on a range of partnerships with both multinational companies and local firms. In the area of public sector research, NICTA has also taken a lead in drawing other institutions into the development of a roadmap for future cooperation in research.

Building NICTA has been made possible by the commitment of many people within and outside the organisation. We thank the Commonwealth, our members, partners, collaborators, and staff for their ongoing support and having the imagination to drive Australia’s ICT future.

Mel Slater
Research Report

In setting its research agenda, NICTA is guided by the idea of use-inspired research that combines fundamental understanding with the objective of producing results that offer benefits to Australia. The commitment to use-inspired research is expressed in the development of Priority Challenges. These provide areas of focus for research engagement at both program and project levels. 2004 was an important year for setting NICTA’s research agenda. During the year, Priority Challenges, internal contestable funding, important research infrastructure, and a project portfolio of 41 projects were all established.

2004 also saw NICTA-employed research staff achieve a majority over seconded research staff. Three program leaders were recruited or confirmed. Professor Rodney Kennedy was confirmed as Program Leader for Wireless Signal Processing (WSP) when a second Research Resource Agreement was concluded with the ANU. Dr Chris Scott was appointed to lead the Queensland Laboratory and Dr Peter Cheeseman, formerly of NASA Ames, was appointed to the position of Program Leader for the Symbolic Machine Learning and Knowledge Acquisition (SMLKA) program.

Quality of Service Seeker (example project)

Project Overview

Topic: Mobile phone users often have to walk around a wireless space trying to establish a communications link and find acceptable quality of service (QoS).

Aim: To provide wireless network service quality and support a future environment where personal area networks can run multiple devices and applications.

Duration: 18 months.

Participants: Networks and Pervasive Computing (NPC) research program.

Key Points

- A QoS map is communicated to the user’s device as they approach a new space to enable embedded software to ascertain whether the required service is available.

NICTA projects are focused research activities with a leader, budget, timeline, and deliverables. They are of short duration, typically spanning one to three years. Projects are oriented towards collaboration between NICTA programs and external public and private sector entities. It is largely through the application of research expertise to specific problems and challenges that NICTA researchers relate to industry and the community.
Visual Information Access Room (VIAR)

On Thursday, 25 November 2004, NICTA officially launched the Interfaces, Machines, and Graphic Environments Visual Information Access Room (VIAR). Located at the Australian Technology Park offices, the VIAR is built to reflect the office of the future.

The launch was an opportunity for our members, partners, industry, and media representatives to view the research being undertaken by the IMAGEN group.

The Minister for Communications, Information Technology and the Arts, The Hon. Senator Helen Coonan, launched the facility, noting that, “NICTA is well on the way to achieving many of its goals and the VIAR demonstrates how far they have come.”

The night showcased a variety of projects currently being researched by the group, including a traffic management system where critical incident control room operators can use voice and hand gestures to call up maps, live camera feeds, and phone the police and ambulance.

The Perceptual Effective Multimodal Interaction (PEMI) project, lead by Fang Chen, a project leader in NICTA’s IMAGEN program, has contributed greatly in speech and gesture research. Fang has a strong background in speech processing and multimodal systems. She has contributed to speech synthesis algorithms, natural language dialogue systems, and user centred study multimodal interaction systems for PC and handheld devices.

Attended by approximately 70 guests, the night was well received. The VIAR created a lot of interest in the media, with ABC News broadcasting a story on the night of the launch featuring NICTA’s CEO Mel Slater and project leader Fang Chen.

This event proved to be a success for the whole of NICTA, generating a lot of positive media coverage and feedback.
Scientific Excellence Recognised

Throughout the year, numerous NICTA researchers, scientists, and students received awards for their achievements.

Researcher wins prestigious award for best thesis

Gerwin Klein, a researcher in NICTA’s Formal Methods program, was awarded the prestigious German Association for Informatics (GI) Award for his PhD thesis, Verified Bytecode Verification, which he completed at the Technical University Munich in Germany. The prize is awarded to the best thesis completed in computer science throughout Germany, Austria, and Switzerland. Gerwin’s award was announced on 22 September in Ulm, Germany, during a symposium called Informatik 2004.

Chief Scientist receives ANU’s highest award

NICTA’s Chief Scientist, Professor Brian Anderson, received the Australian National University’s highest and most prestigious award, The Chancellor’s Special Commendation and Medal. Professor Anderson was awarded the prize ‘in recognition of his outstanding record of achievement in the field of engineering and his superb contributions to the university’.

NICTA students win IEEE symposium award

NICTA and University of Sydney students Adel Ahmed, Colin Murray, Tim Dwyer, Lee Song, and Ying Xib Wu were awarded the student prize at the 2004 International IEEE Symposium on Information Visualisation. The competition required participants to visualise the IEEE InfoVis publication database, which was maintained over the past ten years. The NICTA/University of Sydney visualisation of the citation network was based on 3D graph visualisation techniques.

Student awarded national Fulbright Scholarship

NICTA research engineer James Cowling was awarded the Fulbright Scholarship in telecommunications. This is one of the most prestigious ICT scholarships available in Australia and only one scholarship is awarded each year in telecommunications. James is currently working on fundamental mobility issues in the Nightingale project in the NPC program.
Education

NICTA is enriching ICT education by broadening PhD training through incorporating elements of wider technical and business education via coursework and extending training, including internships, networking, and commercialisation planning.

2004 was an important year for establishing the foundations of NICTA’s education pillar. NICTA’s priorities include an emphasis on research excellence; provision for deepening and broadening coursework; sponsorship of networking and collaboration; brokerage of internship and exchange opportunities; and facilitation of pathways from research discovery to commercial application. These were pursued in both international and national arrangements.

The number of NICTA-endorsed students has exceeded what could have reasonably been forecast in the AAP 2004 because of the commencement of the Victorian Research Laboratory in July, and the establishment of its population of 20 students in its first six months of operation brought the 2004 NICTA-endorsed PhD students to a total of 132.

The inaugural NICTA Summer Scholars Showcase, held at the ATP Laboratory in December, presented the research and research ethos to prospective applicants for PhD candidature with a partner university. More than 100 invited students, nominated by partner universities, attended. Participants were high-calibre undergraduate students drawn from twelve Australian and New Zealand universities who were likely to complete their undergraduate studies at Honours 1 level within the next two years.
NICTA researchers developed 12 new courses in 2004. These were developed for repeat presentation in university settings. They were approved under standard institutional policies for handbooks and timetables for recognition towards award requirements.

Defining and building student pathways to NICTA engagement were major themes in 2004. These pathways are tailored according to specific laboratory situations. They engage undergraduate students either during their normal semester program (often by joint supervision of their university projects) or via involvement in extra-curricular research activities such as summer projects. They also involve secondary students, typically in partnership with university initiatives, in which NICTA’s researchers and research agenda are highlighted.

Under the development of the training network, NICTA students undertook visits to industrial and academic institutions, often contributing to extending collaboration between NICTA and the host. NICTA aims to achieve a placement program which will eventually support the placement of up to 10 per cent of its student population into industry and academic institutions for a portion of their candidature.

Nine placements were undertaken in 2004. A major step towards a more structured program of internships and placements was reached during the year when arrangements were concluded for a four-year internship agreement with Telstra Ltd. The agreement will provide up to 21 internships for NICTA-endorsed PhD students in the ICT field. Areas of focus will include IP networking, wireless broadband technologies, Internet/IP security, and encryption. This will commence in late 2005, with the first four interns placed within the Telstra Technology Innovation and Product (TTIP) business.
Commercialisation

Commercialisation activities at NICTA represent a concerted effort to link research and education output to marketable technology. In 2004 the commercialisation program within NICTA was scaled up to meet the increasing expected research output.

2004 saw the appointment of a manager for commercialisation and IP and the establishment of commercialisation training and awareness courses. These courses focus on delivering a range of seminars and workshops to support greater appreciation of the complexities and risks associated with delivering research to the market.

The key elements of this program are:
- IP Induction
- Commercial Immersion Training
- Role Model Seminars.

Commercialisation infrastructure was also established to allow commercial scoping of NICTA's research to commence. As a result of this activity NICTA filed four provisional patents in 2004:
- The first disclosure was in the Networks & Pervasive Computing program and is in the wireless quality of service arena.
- Two provisional patents were filed in the first quarter in the passive optical networking area out of the Victorian Research Laboratory’s CUBIN program.
- NICTA’s fourth provisional patent application, which covers a method of detecting shapes and will assist in road sign detection, was developed in the ASSeT program.

In 2004 NICTA also established an Entrepreneur-in Residence (EiR) program. The EiR program involves engaging an experienced entrepreneur to work with a research project for a fixed period to evaluate the commercial potential of the research. They are initially engaged for a few months to work on the initial business case for the research opportunity, but if the opportunity shows real potential they can be engaged for up to 12 months.

The entrepreneur is an individual who has a history of successful venture capital-backed, start-up company development, together with extensive experience and connections with investors and potential industry partners.

These individuals will have experience in raising funds for a high-tech venture and will have successfully executed a business plan.

In 2004 NICTA initiated its first EiR placement to assess and develop the commercial potential from work in XML databases.
Networks and Linkages

Networks and linkage activity reinforces the idea of NICTA as an ‘open institute’ and expresses how NICTA expects to develop its research within a use-inspired framework.

NICTA networks with the external market on two levels. These being firstly, by establishing and building research excellence, and industry in the form of networking and linking with a variety of businesses including SMEs to large multi-national. The industry relationships established provide both opportunities for NICTA to develop its understanding of ICT markets and to draw on these relationships as a source of research inspiration.

Research Networks and Linkages

Research linkages provide important opportunities for NICTA researchers to maintain their activities at the leading edge of research and to validate their work by presenting it to their peers at national and international levels.

During 2004 NICTA established a wide range of links that support both national and international research efforts through collaboration, joint publications, and where appropriate, joint projects.

At a national level, program linkages and project collaborations were developed that include a wide range of institutions and organisations.

The integration of NICTA’s research with international centres and activities has occurred across a number of programs. During 2004 NICTA hosted 118 international researchers involved in teaching, research, and publication activities over a period of three weeks or more. A total of 72 teaching or research visits to international institutions were recorded for 2004.

International Visitors

Highlights from the program of visitors and visits conducted over the year include:

- Dr Yuri Ismailov, Ericsson Research, Stockholm, Sweden, visited the Networks and Pervasive Computing program during April and May. The visit involved authoring a joint paper with Professor Seneviratne on Naming for the IEEE Communications Magazine.

- Dr Colin Ware, Director of the Data Visualisation Research Laboratory (http://www.ccom.unh.edu/vislab/) at the University of New Hampshire visited the Humans Understanding Machines (HUM) program for two weeks from 29 March 2004. During this visit he gave a series of lectures.

Major Research Visits

In May and June, Professor Ross Jeffery visited the Fraunhofer IESE to work with Dr Juegen Muench on an industrial project for the redevelopment of major systems in a state government department.

In November the Chief Operating Officer and Laboratory Director, ATP visited Intel Labs, UK and Ericsson Sweden. At Intel discussion focused on common areas of interest in sensor technology and adhoc networking, as well as secure operating systems and kernels.
Industry Networks and Linkages

Industry links not only provide opportunities for collaborative research but enable NICTA to provide support to local firms through its increasing research, education, and commercialisation capabilities.

Workshops and seminars were conducted in areas as diverse as appliances, transport, digital media, and biotechnology to determine the scope for collaboration on a sector basis. These activities brought NICTA researchers into discussion with major suppliers, SMEs, and industry sector leaders. This is part of a continuing process of bringing leading users of ICT into NICTA to identify grounds for project collaborations.

In the area of SME activities, NICTA established a Website registration facility for Australian businesses to register to receive ongoing information about NICTA. A series of breakout days was also hosted for SMEs.

Throughout the year a series of linkage events were organised and supported to promote Australian ICT research and activity to industry and the community, the principal activities for the year were:

- Focus on Business: Canberra
- Technology Futures Conference: Adelaide
- Software Engineering briefing: Sydney
- CeBIT 2004: Sydney
- International Science Advisory Group Public Event: Sydney
- ICT Outlook: Canberra
- ATP Open Day: Sydney.

Research linkages provide important opportunities for NICTA researchers to maintain their activities at the leading edge of research and to validate their work by presenting it to their peers at national and international levels.
Left to right (from top left) -
Neville Roach AO, Neville Stevens AO, Mel Slater, David Skellern, Paul Geenfield, Anthony Blake AM, Alice McCleary, Graham Goodwin, Su-Ming Wong, Brand Hoff
Financials

NICTA’s total expenditure for the twelve months to 31 December 2004 was $43.9 million, including $1.3 million for depreciation and amortisation.

The total cash contributions for the year was $33.5 million, which included the total of $25.0 million from the Commonwealth Government ($11.3 million from the Department of Communications, IT and the Arts and $13.7 million from the Australian Research Council).

In addition to cash contributions from Members and the Commonwealth, NICTA received $12.5 million as in-kind contributions from the Australian National University ($5.9 million), the University of NSW ($4.1 million), the University of Sydney ($1.5 million), and Melbourne University ($1.0 million).

After taking into account all grant revenues and revenues from ordinary activities, the net surplus for the year was $3.4 million.

Total assets at year-end comprised $45.8 million, of which $18.9 million was cash and $4.5 million was property and equipment. After recognising deferred revenue and other liabilities, the total net equity at year-end was $12.5 million.