

RSISE Annual Report to ANU Council 2004 submitted via APOLLO Friday 4 February 2004

Q1*PLEASE PROVIDE THE NAME OF THE PERSON TO WHOM QUESTIONS REGARDING THE SUBMISSION SHOULD BE DIRECTED.

Lee Burns, Business Manager

Q2* PLEASE SELECT THE AREA TO WHICH THE SUBMISSION RELATES

Research School of Information Sciences and Engineering

Q3 LIST ANY IMPORTANT HONOURS AND/OR AWARDS THAT HAVE BEEN RECEIVED BY STAFF IN YOUR AREA.

Professor Brian Anderson, ANU Chancellor's Special Commendation and Medal, July 2004

Professor David Hill, ARC Federation Fellowship, July 2004

Professor Richard Brent, ARC Federation Fellowship, July 2004

Professor Rodney Kennedy, Fellow of the Institute of Electrical and Electronics Engineers, November 2004

Q4 LIST ANY SIGNIFICANT OUTREACH ACTIVITIES CONDUCTED IN YOUR AREA IN 2004

The Australian Communications Theory Workshop, Newcastle, February 2004. The School contributed strongly to this workshop through membership of the organizing committee, the technical program committee, and by editing and publishing the 200 page proceedings. The workshop attracts over 100 researchers from around Australia.

Machine Learning Summer School, Berder, France, September 2004. Professor John Moore and Dr Knut Hueper presented several lectures for students and researchers who are interested in Machine Learning. The goal of the Summer School is to present some of the topics which are at the core of modern Learning Theory. The next Summer School will be hosted at RSISE 24 January to 4 February 2005.

Nonlinear control methods and Tools: When and how to use them? ANU, November 2004 organised by Dr Alexander Lanzon. Speakers included Professor Petar Kokotovic (University of California, Santa Barbara), Professor Miroslav Krstic (University of California, San Diego) and Professor Iven Mareels (University of Melbourne).

Workshop on Geometric Optimisation, ANU, November 2004 organised by the NICTA/SEACS program in Canberra, focused on the recent results and trends in geometric optimisation with a view to applications in robotics, vision, control, statistics

and computer graphics. RSISE staff and students and NICTA Adjunct staff, were joined by guest speakers from the University of Melbourne and from the University of Würzburg in Germany.

The Australasian Conference on Robotics and Automation, ANU, December 2004. Co-chairs were Dr David Austin (RSISE) and Dr Nicholas Barnes (NICTA). This three-day conference brought together seventy-nine leading robotics researchers from Australia, New Zealand and Germany. The single-track conference included forty-eight paper presentations and demonstrations.

NICTA Task Forces, December 2004. Task forces in artificial intelligence, logic and telecommunications were developed for schools to take the excitement of information sciences and engineering research into secondary classrooms. Each task force comprises early career researchers from NICTA, PhD students from RSISE and MSI, and undergraduates from FEIT. Several school visits were appreciated by secondary staff and students in ACT high schools.

Summer Scholar Program, December 2004. The School's strong commitment to exposing high-calibre undergraduates to our research over the summer was enhanced further this year by the availability of extra scholarships and projects from NICTA. A total of thirty-six students from a very strong field were selected for the program this year.

Logic Summer School, ANU, December 2004. This was the thirteenth logic summer school which continues to gather strength each year. Lecturers from the ANU and University of NSW, with guest lecturers from South Africa and Japan, presented courses on logic as a core intellectual subject and a fundamental component of artificial intelligence and formal methods for software engineering. The summer school attracted advanced undergraduates and research students from Australia, New Zealand and Europe.

Q5 LIST THE KEY ACHIEVEMENTS OF YOUR AREA AGAINST 2004 GOALS

OVERVIEW

In 2004 the School continued to build its working relationship with NICTA. Fifteen School staff members have Research Resource Agreements (RRAs) with NICTA and these strengthen the research relationships between the entities. In addition, new administrative arrangements with NICTA to stabilise support services to PhD students and NICTA adjunct staff were introduced in late 2004.

Apart from continuing to build the working relationship with NICTA, the School's other two immediate goals in 2004; first to attract approximately 15-20 research students per annum in 2004 and 2005; and second, to grow RSISE as an essential component of the University's Institute of Advanced Studies are well under way.

In respect of the first immediate goal, in 2004 the School attracted eighteen new PhD candidates, graduated five students and concluded the year with fifty-seven continuing students plus five students with theses under examination.

To further enhance the PhD student experience, Faculty Board approved a new PhD study plan for use by non-NICTA students in RSISE. This means that supervisors are asked to follow guidelines to flexibly integrate intentional plans for coursework, domestic and international networking, supervisory pattern and financial accountability. The study plan was designed to dovetail into new University requirements introduced concurrently.

In respect of the second immediate goal, ANU Council approved the establishment of the ANU Institute of Engineering and Information Sciences (ANU IEIS) comprising the Faculty (FEIT) and the School as a new academic organisational unit commencing in 2005. The aim now is to build upon the research capacity of both the Faculty and the School by taking advantage of the increased cooperation among staff and to facilitate staff mobility so that research opportunities are maximised.

The School also examined its structure during 2004 and integrated the departments of Systems Engineering and Telecommunications Engineering to form a new Department of Information Engineering.

An examination of former plans for the Computer Sciences Laboratory to grow to 24 academics will be a feature of the development of ANU IEIS in 2005.

The following is a list of the key achievements against local area goals in the Computer Sciences Laboratory and the Department of Information Engineering.

DEPARTMENT OF INFORMATION ENGINEERING

*To consolidate a Vision Systems Group, with NICTA funding: The Group now has one additional Professor (Terrence Caelli), four Level B academics and five PhD students.

*To provide leaders to the broader Australian research endeavour: Former RSISE researchers are now working in positions with CSIRO (Chief of the ICT Centre) and NICTA (Canberra node Director and the Chief Scientist).

*To exploit the robotics research platforms with ARC, CRC and NICTA support: There are now twelve PhD students and seven staff working with four major projects.

*To build on the theoretical strengths in systems engineering: There is now a Federation Fellow, Professor David Hill, in the area of Complex Systems. ARC grant and NICTA support involves eight academic staff and nine PhD students.

*To assemble the strongest team internationally in the new field of Spatial and Continuous, Multidimensional Communication Systems: With the appointment of several NICTA adjunct staff to the former Department of Telecommunications

Engineering (now part of Information Engineering) the School has the strongest international team of researchers in this field.

COMPUTER SCIENCES LABORATORY

*To strengthen its research efforts in automated reasoning and machine learning: CSL made good progress on consolidating the relationship between the laboratory and NICTA and now almost all CSL staff have Research Resource Agreements (RRAs). The laboratory continues to explore new research directions that the increased collaboration with NICTA brings in areas such as complexity theory, optimisation, and artificial intelligence.

*To continue its strong outward focus: The year produced another strong outcome in the various research areas of the Computer Sciences Laboratory and it will continue its strong outward focus especially with activities such as the logic and machine learning summer schools.

Q6 LIST YOUR AREA'S KEY DIRECTIONS FOR 2005

(Note the key directions will become the goals on which you report for the 2005 Annual Report).

The establishment of the ANU Institute of Engineering and Information Sciences (ANU IEIS) comprising FEIT and RSISE provides the opportunity to develop elite research-led coursework programs, enhance cooperation among staff and facilitate staff mobility to provide the best university staff and student experience in research, research training and teaching.

Under the ANU IEIS structure the School will:

*Increase its PhD student numbers in line with the enhanced availability of supervisors provided by NICTA researchers with ANU Adjunct status.

*Continue to develop strategies to increase its proportion of female students beyond the present 21% percent.

*Continue to build highly relevant PhD Study Programs that produce graduates that are in strong demand by both academia and industry.

*Develop a robust and responsive web-based research training management system that is customised to the support of its distinctive PhD Study Plans and is scalable to handle up to 150 PhD candidates.

*Collaborate with FEIT in developing an elite 4-Year Undergraduate degree in Computer Science to be known as the Bachelor of Computer Science (Honours).

*Consolidate the combined Department of Information Engineering while building the strength of Telecommunications and Systems Engineering with NICTA, ARC and other support.

*Adjust to the significant increase in PhD student numbers in the Department of Information Engineering with appropriate new courses and new supervision styles.

*Put in place future leadership in Robotics and Signal Processing as current leaders move to research leadership roles outside the school or to Emeritus Professorships.

*Fill two senior posts that will impact on the Computer Science Laboratory's research profile and use this opportunity to branch out from the previous main research areas of automated reasoning and machine learning into related synergistic areas.

*Build critical mass in computer sciences by increased cooperation and collaboration with the Department of Computer Science in FEIT (both in research and teaching) that has been brought about by the establishment of ANU IEIS.
