

**RESEARCH AND RESEARCH TRAINING
MANAGEMENT REPORT: 2001**

1. Introduction

- 1.1 The Australian National University's strategic goal is to consolidate its place within the top rank of the world's research-led universities.
- 1.2 The ANU is Australia's most research-intensive university, with an outstanding international research reputation, attracting many international visitors and engaging in a wide range of collaborative arrangements with universities in Australia and overseas.
- 1.3 Evidence of the University's research achievements and reputation includes:
- of thirty-three Australian citation laureates honoured by the Institute for Scientific Instrumentation (ISI) in 2001, eleven (including five of the top six) were from the ANU (representing 55% of Group of Eight laureates and 46% of all university laureates);
 - twelve Fellows of the Royal Society are current members of staff of the ANU. (The next highest number employed by an Australian university is four at the University of Melbourne (including the Walter and Eliza Hall and Howard Florey Institutes);
 - a lead participant in the successful National ICT Australia (NICTA) bid for the Commonwealth's Centre of Excellence in Information and Communications Technology;
 - a major external review of the Institute of Advanced Studies (IAS) undertaken in 1995 found that "no other Australian institution, and few institutions in the world, can match the high standards of performance attained by the Schools and Centres of the IAS.";
 - the key breakthrough that led to the award of the 1995 Nobel Prize in Physiology or Medicine to Peter Doherty and Rolf Zinkernagel came from research undertaken at the John Curtin School of Medical Research (JCSMR); and
 - many other international awards have been won by scientists from the University, such as Professor Frank Fenner of the JCSMR who has been honoured by the award of the Japan Prize (1988), the Copley Medal of the Royal Society (1995) and the Albert Einstein Award (2000).
- 1.4 The ANU has two major sections: the Institute of Advanced Studies (IAS) which concentrates on research and research training, and The Faculties (including the Institute of the Arts) which, like other universities, is engaged in teaching undergraduate and postgraduate coursework students as well as research and research training. Within the University there are also University research centres which are linked to the IAS or The Faculties academically. The coexistence of these diverse academic areas contributes to a uniquely rich environment for both students and staff. The Graduate School, which spans all sections of the university, facilitates the access of graduate students to this environment. To further strengthen the links between the

different parts of the University, the ANU has created 12 “National Institutes” around broad academic themes to generate the best research and teaching environments in their areas in Australia. These are:

- ANU Institute for Indigenous Australia (ANUIIA)
- National Institute for Asia and the Pacific (NIAP)
- National Institute of Bioscience (NIB)
- National Institute for Environment (NIE)
- National Institute of Economics and Business (NIEB)
- National Institute of Engineering and Information Sciences (NIEIS)
- National Institute of Government and Law (NIGL)
- National Institute of the Humanities (NIH)
- National Institute of Health and Human Sciences (NIHHS)
- National Institute of Physical Sciences (NIPS)
- National Institute of Social Sciences (NISS)
- National Institute of the Arts (NITA)

1.5 The University conducts research over a wide range of disciplines in the various Schools, Faculties and Centres, and promotes excellence in research by attracting and retaining high quality academic staff and by providing first class facilities to support their work. Through the IAS, the ANU plays an important and distinctive role in Australian university research training. The block funding available to the IAS makes possible longer-term and larger scale basic research than normally can be undertaken through project oriented funding. It also enables the IAS to provide an excellent environment for postdoctoral as well as postgraduate research training. The ANU thus has a special national responsibility to be a resource for the Australian higher education system and for Australian research as a whole.

Part A

2. Research and Research Training Objectives

2.1 Research and Research Training Objectives

The Australian National University was established by the federal parliament in 1946 specifically to lead the development of the intellectual capacity of the nation through research and research training in line with the best international standards. As the specially chartered national university, The Australian National University continues to conduct research at the highest levels of international ranking in all its Research Schools, Faculties and Centres and offers a unique research-led education to undergraduate and postgraduate students.

The Australian National University therefore advances the national intellectual and creative capacity:

- through broad-based research and research-led education in the disciplines fundamental to all knowledge: the humanities, the sciences, the social sciences;
- by supporting research and research-led education in a spectrum of professional disciplines;
- and additionally, by studying Australia in its various contexts.

The Australian National University’s strategic goal is to consolidate its place within the top rank of the world’s research-led universities.

Research at The Australian National University ranges from fundamental to strategic and applied, from theory to practice; and includes scholarship and creative activity. The University also prepares, as a priority, the next generation of researchers through post- doctoral training and research-based higher degrees. Research degrees at the ANU take one of two forms: they introduce students to research method and its application in a particular field (Masters), or they develop capability that allows the conduct of independent research during the course of which graduates will have made a significant and original contribution to knowledge (PhD).

The University's primary research objective is to lead our nation in tackling problems that require research strength and depth within and between disciplines.

The ANU will:

- Achieve world-class performance and excellence in fundamental, strategic and applied research, scholarship and creative activity in all fields represented in the University.
- Perform at least at National leadership level in all that we do.
- Foster innovation and research excellence in teams and individuals.
- Actively develop staff and student skills and support.
- Lead strategic initiative and change, while securing additional resources.
- Increase and improve research facilities and infrastructure for teams and individuals.
- Offer research degrees equal to the best in the world to the most able graduates.
- Secure scholarships and other support for students while providing top quality supervision and mentorship.
- Foster linkages and exchanges with other Australian and international universities to put the full resources of the national university behind the national interest.
- Develop a culture of awareness and the value of intellectual property.
- Manage intellectual property in the national interest.

2.2 **Ensuring the Achievement of the University's Objectives**

The University's performance under its objectives will be measured by:

1. Publications: Number of publications per FTE academic staff (averaged over 3 calendar years).
2. Research Income trends: Dollars per category of research grant; Success rates per category of research grant; Performance relative to other peer universities; Ratio of total grant funding to FTE academic staff; Research income as proportion of total expenditure.
3. Research Training: HDR completions – within time, by field of study.
4. Research: Honours/distinctions (cumulative; subject to definition); Impact measures: citations, patents, licences, international and national impact, opening up new avenues of research; National and international linkages; Trend data – satisfaction levels of research degree students based on questionnaires.
5. Research and research training plan.

2.3 **Contribution of research and research training to the fulfilment of the University's Mission**

The ANU's research and research training has enabled it to acquire a strong international reputation for research as Australia's most research-intensive university. This can be demonstrated by an analysis of citations from the Institute for Scientific Information (ISI) database over a ten-year period¹. This analysis (see Section 2.4) places the ANU as the best performing Australian university, ranked 21st amongst non-US universities (University of Sydney 35th and the University of Melbourne 65th).

2.4 **Areas of Research Strength**

Research strengths include both research teams and leading individual researchers in all parts of the University. Areas which have over 20 FTE academic staff, at least 20 EFTSU research students or which spend over \$5 million pa on research are listed in **Attachment A**.

Because of its research intensive nature, the University is working towards mechanisms for resource allocation which ensure that support is directed to areas which are consistent with national and institutional research priorities.

The ANU is able to maintain a pro-active approach to the determination and maintenance of research strengths. The ANU's long history of high level research performance has been largely brought about by the block funding available to the IAS. This has enabled the ANU to ensure that all research areas (other than new initiatives, areas being wound down and service areas) are nationally or internationally competitive. In The Faculties, similar principles apply to research funding, subject to the need to meet undergraduate teaching commitments. As a result all of the areas listed in Attachment A are areas of international research strength.

The breadth of ANU's international research strength is shown by an analysis of citations from the ISI database over a ten-year period². This analysis shows that the ANU ranks in the top 100 institutions in the world in the total number of citations in 10 out of 21 fields of research:

- Chemistry (73rd)
- Economics and Business (96th)
- Environment/Ecology (55th)
- Geosciences (10th)
- Immunology (97th)
- Mathematics (38th)
- Physics (96th)
- Plant and Animal Sciences (38th)
- Social Sciences (62nd)
- Space Science (21st)

This performance places it as the best performing Australian university, ranked 21st amongst non-US universities (University of Sydney 35th and the University of Melbourne 65th).

The University provides unique experimental and observational facilities in key science areas where the complexity and cost is such that the provision is best

¹ Linda Butler, Research Evaluation and Policy Project

² Linda Butler, Research Evaluation and Policy Project

concentrated in one location rather than fragmented across many Australian institutions. These facilities include:

- the Helix H1 Fusion Research Device, the Superconducting Booster Linear Particle Accelerator (LINAC)
- the Heavy Ion Accelerator Facility, Materials Modification, Characterisation, and Processing Facility
- Australian National Seismic Imaging Resource (ANSIR) (jointly managed by ANU and AGSO)
- Sensitive High Resolution Ion Microprobe (SHRIMP)
- the Australian Partnership for Advanced Computing (APAC)
- Siding Spring Observatory
- library holdings and Web-based materials of world significance on the Asia Pacific (accessed by scholars around the world)
- the Noel Butlin Archives Centre (a nationally significant collection of primary source material relating to business and labour), and
- The Centre of Excellence in Information and Communications Technology (lead consortium member).

2.5 Generic Attributes of Research Graduates

Consistent with its mission and national research role, the ANU seeks to develop research degree graduates who:

- are able to undertake independent research significant for a substantial contribution to knowledge;
- are able to relate their research to the broader framework of their discipline or inter-disciplinary fields;
- have an in-depth knowledge base and comprehensive understanding of the conceptual and theoretical underpinning of their disciplines or inter-disciplinary fields, including ethical considerations;
- are trained in computer-based technology, and relevant discipline-based technical and methodological skills;
- are independent thinkers with analytical and problem-solving skills;
- are able to analyse others' research results critically;
- are competent in written and oral communication.

These attributes are developed through individual and small group research training with supervisors and advisers within an intensive research culture, and by support from specialist learning support staff as appropriate. A Graduate School Academic and Professional Skills Program (APSP) is provided for research students, with major components including the Graduate Information Literacy Program and Statistical Consulting Unit short courses ³, and short-course training in scientific communication and other generic fields.

3. Future Directions for Research and Research Training

3.1 Future Directions

The University's broad future research directions priorities are set out in the University's strategic planning document "Preparing Ourselves". These are then developed through the University's research advisory and management structure in

³ <http://www.anu.edu.au/graduate/services/acadskills.html>

the light of national priorities, which the University currently identifies as global integration, applying information and communications technologies, environmental sustainability and biological technologies. The University is currently engaged in the debate on National Research Priorities and is also assessing its own research priorities and programs for the future.

3.2 Major Priorities, Strategies, Targets & Timeframes

The ANU is undertaking a research priority setting exercise to identify a broad framework of future research priorities which support national priorities.

Within this framework priorities set by the University, School, Centre and Faculty research priorities are determined by Directors and Deans, subject to University agreement. They are advised in this by their School, Centre or Faculty and from Research Advisory Boards (in Schools and Centres, and under consideration for Faculties) which have significant external membership.

An emerging priority area is clinical medicine. The ANU is in the process of establishing the ANU Medical School which will be innovative and rurally focussed with a strong research focus and which will have a ripple effect on the recruitment of staff and research students across the ANU.

The ARC has identified four additional emerging priority areas. An analysis shows the ANU to be very strong in each of these areas:

- Nanoscale Science and Technology
- Complex Systems Science
- Photon Science and Technology
- Genome/Phenome Research

The implementation of the White Paper, *Knowledge and Innovation*, and *Backing Australia's Ability* have had significant implications for the ANU and its future strategies in the management of research and research training. In particular, the IAS has commenced participating for the first time in all national competitive research funding schemes. The new arrangements have had the following consequences for the ANU:

- Access to project funding through the ARC and NH&MRC has required IAS Schools to develop mechanisms to integrate externally determined priorities with those determined internally.
- Availability of additional RTS places will encourage academic areas to make the best use of available staff and resources for research training.
- The limited number of APA scholarships available to the University, relative to its eligibility for RTS places, will affect the University's capacity to utilise the additional places.
- The projected fall in infrastructure funding through the Institutional Grants Scheme (IGS) will however diminish the University's capacity to adequately resource the additional RTS places it is able to fill.

In response, the University is implementing the following strategies:

- The ANU has negotiated with the ARC and NH&MRC for the removal of the caps on funding and phasing of entry of the IAS to ARC and NH&MRC programs from the 2003 funding round.
- Development of a program to promote the excellent opportunities for postgraduate research through the ANU Graduate School.

- Strengthening of the University's capacity to attract external funding.
- Expansion of the University's already extensive postgraduate and honours scholarships schemes.

As part of the University's research priorities, as set out in the 1995-2004 Strategic Plan, a principal goal is to increase postgraduate student load to 30% of total load by 2004 (27% in 2001). Consistent with this objective and the strategies adopted in response to the Government's research funding White Paper, an increase in higher degree research load is planned, with a particular focus on IAS unutilised capacity.

The higher degree research load/projections for 2002-2005 are shown in **Table 1**, in the context of the 5% RTS cap to 2004.

Table 1: Projection of Growth in Higher Degree Research Load 2002-2005

Type of Load	EFTSU			
	2002	2003	2004	2005
HECS exempt RTS load	840	882	926	1223
Domestic fee-paying	0	0	0	0
Overseas fee-paying	299	314	330	346
Total HDR load	1139	1196	1256	1569

The University's already extensive postgraduate and honours scholarships schemes have been expanded with an additional \$1.8 million of central funds p.a. from 2002 - 2004 and additional scholarship funding from schools, faculties and centres.

3.3 Allocation of research training places

Research training places, along with associated scholarships, will be selectively allocated to the University's areas of research strength, for competitive candidates of the highest quality (see 5.1).

4. Managing Research Performance

4.1 Planning and resource allocation processes

The University's current organisational structures (see **Attachment B**) were established in 2001, and include:

- an Academic Board to advise the Vice-Chancellor and Council;
- three major University committees for Research, Education, and Information Strategy;
- a Board of the Institute of Advanced Studies, a Board of the National Institute of the Arts and a Board of The Faculties that enable consultative discussion and development; and
- a new position of Deputy Vice-Chancellor (Research).

The Deputy Vice-Chancellor (Research) is responsible for research, research training, intellectual property and technology transfer at the ANU, and Chairs the Research Committee. The creation of this position has significantly strengthened and focused the University's research management function which, for the first time, is exercised across the whole University.

The Research Committee has the task of planning University research policy in response to the recommendations of the Government's 1999 White Paper *Knowledge*

and Innovation and of *Backing Australia's Ability*. The membership and functions of the Committee are set out in **Attachment C**.

Decisions on overall priorities for the IAS are also informed by advice from the Research Advisory Council which has substantial international membership. The Research Committee will now take responsibility for strategic planning with appropriate working parties.

To further strengthen the links between the different parts of the University, the ANU has created 12 "National Institutes" around broad academic themes to generate the best research and teaching environments in their areas in Australia (see 1.4). The National Institutes will involve academic staff from the University's Institute of Advanced Studies, The Faculties and Centres in groupings that build cross-disciplinary teaching and research relationships between staff and students.

Research training and teaching is supported centrally through the Graduate School and its Dean and through the Graduate Degrees Committee. This structure is responsible to the Education and Research Committees for all aspects of research training in the University. A planning review of the Graduate School will provide clear, future directions, performance indicators and a user group to assist in future development.

Within the University's overall framework of research priorities, Heads of the Institute's Schools and Centres and Deans of Faculties are responsible for research management in their respective academic areas, and for resources to support research and research training. While the institutional structure of the University and the nature of higher education funding in Australia necessitate a degree of centralised research management and accountability, the University seeks where possible to devolve the responsibility for management and resource allocation to the individual Schools, Centres and Faculties. Deans and Directors are assisted by periodic external reviews of research areas and the Research Advisory Boards of each school and centre.

Research and Discovery is supported through the Research Services Office and Intellectual Property and Technology Transfer by ANUTECH. Both of these areas are being reviewed during 2002, with future directions, performance indicators and user groups to be developed. The University encourages staff to apply for external funding in the form of grants, research contracts and consultancies. The University's policy on accepting such funding is given in *Policy On Applying For And Accepting Research Grants, Contracts And Consultancies*,⁴ and is administered by the Research Services Office and ANUTECH. University policy provides for the full costing of research projects funded by outside sources including charging, wherever possible, the full cost of school/faculty and central areas overheads. Exceptions are made for granting bodies included in the National Competitive Grants Index used for the allocation of Research Infrastructure Block Grants and in certain other cases. To ensure that research projects are properly costed, the University has introduced a costing template that must be completed for all applications for external funding.

- **Ethics**

The ANU is committed to high standards of ethics in the conduct of research. A code of conduct has been established for the responsible practice of research. Policies covering general ethical considerations, procedures for dealing with problems of research misconduct, and issues such as retention of data, publication and authorship, the role of research supervisors, disclosure of

⁴. Policy on Applying for and Accepting Research Grants, Contracts and Consultancies - <http://www.anu.edu.au/rso/policy/consult.pdf>

potential conflict of interest and special needs in different disciplines have been instituted. The University complies with the National Health and Medical Research Council Statement on Scientific Practice and the Australian Vice-Chancellors' Committee Guidelines for Responsible Practice in Research and Dealing with Problems of Research Misconduct. Three committees deal with particular aspects of ethics in research:

- ***The Animal Experimentation Ethics Committee*** monitors and regulates the use of animals in research and teaching carried out at the ANU, and ensures that the University's practices conform to the ACT Welfare Act 1992.
- ***The Recombinant DNA Monitoring Committee*** regulates recombinant DNA research at the ANU.
- ***The Human Research Ethics Committee*** considers the ethical implications of proposals for all experimental research projects involving human subjects to determine whether or not the proposals are acceptable on ethical grounds.

- ***Support for Staff Development***

Professional development of academic staff and postdoctoral fellows is the responsibility of heads of academic areas, supported by the Centre for Educational Development and Academic Methods (CEDAM). CEDAM provides programs to assist the development of academic staff including an academic leadership program.

The Research Services Office provides workshops on applying for grants, including Australian Research Council and NH&MRC Grants and Fellowships. These workshops provide opportunities for applicants to solicit feedback and advice on draft applications. In addition, the Research Services Office conducts information sessions on other granting programs, participates in induction workshops for new staff, provides presentations to individual departments and Schools on sources of external funding, and assists staff in preparing their applications.

The Graduate School provides support for doctoral candidates employed as tutors or demonstrators through the Graduate Teaching Program, a one semester, seminar-based course for teaching development.

- ***Postdoctoral Research Training***

The University places a particular emphasis on postdoctoral training, devoting a considerable part of its own resources to the provision of postdoctoral fellowships (PDF) as well as to attracting a large number of fellows funded from external sources. The Institute, in particular, has a pre-eminent role in the provision of postdoctoral training in Australia and accordingly maintains a complementary focus on postgraduate and postdoctoral training. In 2000 the University had almost 300 staff in PDF appointments, more than 10 percent of total postdoctoral positions in Australian universities.

4.2 Performance Monitoring Arrangements

- ***Reviews of academic staff***

The University has a long-standing practice of biennial reviews of academic staff to appraise all aspects of individual performance, including research plans and achievements. These reviews became annual from 2002.

- **Reviews of Academic Areas**

Since the 1970s, the University has maintained a program of systematic reviews of academic areas on a seven to ten year cycle, or when there is a major change in academic leadership. Reviews are external to the area concerned and include strong representation external to the University. Outcomes of the reviews are reported to the University Council through the Academic Boards, as is the subsequent report on implementation of review recommendations.

- **Review of the IAS**

The performance of the IAS is subject to major Government-initiated external reviews. The most recent was carried out in 1995 by a Review Committee constituted entirely of external members, half of whom were senior international academics. Eleven Committees of Review, covering each School and Centre in the IAS, supported the Review Committee. Peer assessment was the prime method used by the Review to evaluate research performance. Other indicators used to assess performance and international standing were invitations for staff to deliver lectures at major international meetings, the ability to attract distinguished overseas visitors and staff honours and awards. Bibliometric and contextual data providing comparisons between the IAS School/Centre and relevant areas at other Australian universities supplemented these assessments. The Review concluded that:

Although in individual fields and subfields the research performance of the Institute may be matched by that of another Australian institution, no other Australian institution, and few institutions in the world, can match the high standards of performance that we judge to have been attained by the Schools and Centres of the IAS.

The timing of the next review is yet to be determined. A review would be most appropriate after the transitional period of phase-in to DEST and ARC/NH&MRC grant schemes (also taking into account reporting lag time) has been completed.

- **Recent Research Performance**

As part of its performance monitoring process, the University measures a number of indices of research performance. In **Table 2**, the ANU is compared with other major research-intensive universities on two of these indicators of research quality and performance.

- **Publications and Citations**

Table 2 shows that the ANU has the largest proportion of citations to articles listed by the Institute of Scientific Information (ISI) for an Australian university over the period 1996-00. Over the decade 1992-2002 ANU non-clinical medicine research publication were cited almost 40% more often than the nearest other Australian University (Melbourne).⁵ ANU tops twice as many ISI subject areas for citations than the next nearest Australian University (Sydney)⁶.

⁵ D.J. Evans and J.W. White, Australian Universities Classification by Research Quality: A Question of Concentration and Quality. ANU internal discussion paper 717/2002, Board of the Institute of Advanced Studies, 2002

⁶ *ibid.*

Publications, and especially citations, are useful measures of university research output. It is important to note, however, that their significance as measures differs from one field of research to another.

Table 2: Major Research Universities Compared on Indicators of Research Performance

Major Research Universities	1996-00 ISI Citations ¹		Membership of the Australian Academies ²	
	%	Rank	%	Rank
ANU	14.8	1	25.5	1
Sydney	13.4	2	11.8	2
Melbourne	12.6	3	11.8	2
Queensland	11.0	4	4.2	8
UNSW	9.8	5	7	5
Monash	8.4	6	8.3	4
UWA	7.0	7	4.9	6
Adelaide	6.1	8	4.9	6
All Australian Universities	100.0		100	

1. Figures include publications in all three main indexes: Science, Social Science, and Arts & Humanities Citation Indexes.

2. The Australian Academy of Science, the Australian Academy of Technological Sciences and Engineering, the Australian Academy of Social Sciences and the Australian Academy of the Humanities.

- ***New ARC Fellowships and Federation Fellowships***

The ANU consistently performs well in attracting ARC research fellows, as shown in **Table 3**. In 2002, the ANU ranked first in attracting recipients of ARC fellowships. Furthermore, in the 2002 round the ANU attracted 4 Federation Fellows, the best result of any university.

Table 3: 2002 Comparison of ARC Discovery Grants and Federation Fellowships

Universities	New ARC Fellowships in All Categories 2002		ARC Federation Fellows 2002		2002 ARC Discovery Grants per FTE of academic researchers ¹	
	%	Rank	No.	Rank	\$'000	Rank
ANU	15	1	4	1	18.25	1
Sydney	15	2	3	2	12.45	2
Queensland	13	3	0		11.47	3
Melbourne	12	4	3	2	10.89	4
UNSW	9	5	2	4	9.96	6
UWA	6	6	1	5	10.31	5
Adelaide	4	7	0		9.64	7
Monash	4	8	0		3.68	8
All Australian Universities	100		15		6.35	

¹ Only 25% of IAS were eligible for ARC Discovery Grant funding for 2002. Number of academic researchers derived from unpublished DEST data.

- **New ARC Large Grants**

The ANU has consistently performed very well, on a per capita basis, in obtaining ARC Discovery Grants. In the 2002 round of ARC Discovery Grants (**Table 3**), the ANU was the most successful institution in obtaining ARC Discovery per academic staff member (obtaining over \$18,500 in Large Grant funding per capita compared with \$12,450 for the second ranked institution) despite the fact that only 25% of the staff of the IAS were eligible to apply.

- **Research Income**

In 2000, the ANU received over \$208 million in research income from DEST block grants (including the IAS Block Grant) and from external funding sources, the most funding of any Australian university.

Table 4: Research Income 2000

Major Research Universities	\$m	%	Rank
ANU	208.2	13.6	1
Melbourne	155.2	10.2	2
Queensland	147.3	9.6	3
UNSW	142.3	9.3	4
Sydney	136.4	8.9	5
UWA	78.7	5.2	7
Monash	89.2	5.8	6
Adelaide	74.9	4.9	8
All Australian Universities	1526.2	100.0	

Research income includes external grants (reported in DEST's Higher Education Research Data Collection (HERDC)) plus funding from DEST block grants (Research Quantum, RIBG and the block grant to the ANU for the IAS). Excludes APAs, IPRS, RIEF.

- **External Research Income**

Given that university research income in Australia is dominated by ARC and NH&MRC funding and that to date the IAS has been ineligible for much of this funding, comparison of the ANU's performance with that of other universities using the data collected in the HERDC is misleading. The trend in research income of the ANU, however, is shown in **Table 5** for the period 1995-2000.

Table 5: ANU External Research Income 1995-2001 (\$m)

	1995	1996	1997	1998	1999	2000	2001
Australian Competitive Grants Income	14.6	15.4	18.4	19.3	19.0	21.1	19.9
Other Government	8.5	8.5	15.5	8.8	12.0	8.9	10.4
Industry and Other	12.1	9.4	10.3	11.9	13.9	14.0	20.7
TOTAL (external income)	35.2	33.3	44.2	40.0	44.9	44.0	51.0

Source: External income from DEST Higher Education Research Data Collection (excluding CRC income).

It will take some years before the IAS has full access to ARC and NH&MRC competitive funding. This measure will not be a reliable indicator of the ANU's research performance until that time.

4.3 **Benchmarking**

The University utilises a variety of mechanisms to compare its research activities and outcomes with national and international standards.

- ***Quality of staff***

As a foundation of its quality assurance processes, the University's objective is to attract and retain the highest calibre of staff available.

The University monitors (a) the proportion of its staff holding higher degrees and (b) peer recognition, as evidenced by memberships of learned academies (see **Table 2**). Account is also taken of prestigious national and international awards, major lectureships and invitations as keynote speakers. At all stages of appointment and promotion processes, the standard required is benchmarked against standards at other equivalent institutions.

- ***Citations***

The University believes it is essential to look beyond measures of income and publications if a true indication of quality of research output is to be obtained. Accordingly, with the assistance of the University's Research Evaluation and Policy Project, research performance in terms of citations per paper and citations per staff member are measured. The University's outstanding performance in producing ISI citation laureates has been noted above.

- ***Other measures of research performance***

In addition to measures based on Composite Index data, the University uses data on citations as further indicators of the quality of research output. That material was used in the benchmarking with comparator universities in the IAS Reviews mentioned above.

- ***Research training***

In addition to the strategies for monitoring research student progress outlined below (Section 5.4), the University monitors completion rates and completion times; and the employment destinations of its graduates both through the Graduate Destinations Survey and informally through supervisors and Deans and Directors.

4.4 **Incentives to Reward Research Performance**

The University maintains a wide range of research management and performance monitoring mechanisms designed to stimulate and reward research performance. These cover the range of resource allocation processes as well as staffing policies.

Incentives to reward research performance by individual staff include market and merit loadings (in appropriate circumstances), an intellectual property policy under which the originator receives a proportion of commercial returns, and study leave provisions that have scope for giving outstanding researchers significant periods at leading international research locations, provided there is clear evidence of substantial research returns to the individual and the University. Meritorious achievements are recognised in remuneration. For example, professorial staff of high distinction are appointed at a grade (Level E2) above the standard Level E grade. Staff who become Fellows of the Royal Society, or who receive equivalent international recognition are reviewed by a special committee for appointment to a Level E3 grade.

4.5 **Conflict of Interest**

The ANU has developed policies covering conflict of interest in the conduct of research and its commercialisation. This policy will come into effect in 2002.

4.6 **Structures and Resources to Support Research**

- ***Operating Grants***

From 2002, a new resource allocation process was established through the Vice-Chancellor. The new arrangements create incentives for academic areas to respond directly to institutional priorities. For research only areas, research performance and levels of research training activity and productivity will be the key criteria, along with the ability to attract external support, strategic priorities and the scope to lead to applications for external support.

- ***Institutional Grants Scheme***

In 2002, the University allocated 80% of Institutional Grants Scheme funding to faculties, schools and centres on the basis of their research performance as reflected by the DEST allocation formula. Individual faculties were then responsible for the allocation of these funds to research areas. The remaining funding was used to support central research development.

- ***Research Infrastructure Block Grant***

70% of the ANU's Research Infrastructure Block Grant (RIBG) funding is allocated to schools, faculties and centres on the basis of their research performance as reflected by the Australian Competitive Grants Index. The remaining 30% of the RIBG Grant is retained for selective allocation. Funds have been allocated to areas of research strength, to strategically important areas and to foster new developments. The allocation of 70% of funds to Faculties and Centres on the basis of their success in Australian Competitive Grants ensured that the project-related infrastructure of these grants was supported, in line with the first Objective of the RIBG program. The allocation of the remainder of the funds on a strategic basis ensured that funding was provided to areas of research strength and to areas of recognised research potential, the second and third Objectives of the Program.

- ***Major Equipment Expenditure***

The Committee on Major Equipment Expenditure funds the purchase of large equipment (\$70,000 to \$500,000) for research purposes on the basis of a highly competitive submission process based on assessments of research priorities and excellence. This includes the replacement of obsolete equipment, provision of new types of equipment and computing equipment, and special library collections. Bids are assessed on:

- the quality of the research activity to be supported by the equipment;
- relationship of the bid to the University's strategic planning;
- the strategic plans of the School/Centre/Faculty;
- the level of financial commitment to the scheme by the School/Centre/Faculty; and
- the efficiency of use of the equipment and the improved research environment.

- ***Faculties Research Grants Scheme***

In 2001 Research funds were made available to staff of The Faculties through The Faculties Research Grants Scheme. Recommendations for funding were made by The Faculties Research Grants Committee. While funds are allocated on a competitive basis, the Committee set aside a portion of available funds to support promising, early career researchers without established track records. This Scheme is will continue in a more focussed way following the cancellation of the ARC scheme that funded these grants in Australian universities.

- ***ANU-Industry Linkages Incentives Scheme***

This Scheme was introduced in 2001 and provides incentive payments to the first-named Chief Investigators who submit competitive and eligible applications to the ARC Linkage Projects Scheme for grants to be administered and undertaken at the ANU.

- ***ANU-Industry Collaboration Scheme***

The Scheme was introduced in 2001 to provide seeding funds for collaborative projects and links with industry. The Scheme aims to assist the University to develop new opportunities and links with industry partners which could lead to greater levels of external funding and enhanced links.

4.7 Recent Research Achievements

Some recent examples of research achievements are given in **Attachment D**.

5. Ensuring a Quality Research Training Experience

5.1 Allocation of research places to areas of research strength

Allocation of research training places and scholarships to areas of research strength or outstanding individual researchers is determined by two complementary allocation mechanisms. Directors and Deans allocate ANU PhD scholarships (with associated RTS places) to applicants in their specialist areas of research strength. These areas of research strength are subject to the normal IAS, Faculties and Centres performance monitoring and priority review arrangements, which include establishing new priority areas and closing low priority areas. Success in attracting ARC grants has been in The Faculties, and will be in the IAS from 2002, an important criterion in this process.

Australian Postgraduate Awards (APAs) and ANU Graduate School Scholarships (GSS) are awarded centrally on the basis of academic merit by the Postgraduate Research Scholarship Committee, with major weight given to the quality of the research proposal and background of first class Honours or equivalent applicants. Priority in allocation of RTS places is given to HDR candidates awarded scholarships, followed by other PhD, professional doctorate (by research) and MPhil candidates. An ANU Scholarship Review is underway and will report on the strategic allocation of research places.

5.2 Policies & approaches - research student supervision

The University's *Guidelines for Supervision and Candidature*⁷ define the roles of doctoral research students and their supervisory panels, comprised of at least three academic supervisors and advisers for each student. These mandatory panels

⁷ http://www.anu.edu.au/graduate/info_staff/phd_supervision.html

include external and industry advisers as appropriate, facilitating research training networks. Supervision of MPhil students is also defined in University guidelines.⁸

5.3 Policies governing students' access to resources

Admission of individual research students to candidature is subject to formal confirmation of availability of appropriate supervision and other research training resources by the Dean or Director. The University's *Policy on Minimum Allocation of Resources for Full-Time Research Students*⁹ ensures a minimum resources basis for quality research training. Each School, Faculty and Centre implements and supplements this policy framework, with research training resources normally exceeding the minimum policy requirements.

5.4 Strategies to monitor research student progress

Annual Report: All research students must produce an annual report that is reviewed by the head of the academic area, the Dean or Director and the Graduate Program Convenor. Continuing candidature is contingent on satisfactory annual progress, and progress problems are addressed in this framework.

Mid-term reviews of all PhD students' progress are carried out, normally at the end of the third semester of full time enrolment. A mid-term review of a candidate's performance and research typically includes the presentation of a written paper or a seminar presentation. The chair of the supervisory panel and the Head of Department provide the Director or Dean with a written report on the review assessing whether progress is satisfactory and any problems that have emerged and how they are to be dealt with. If progress has not been satisfactory the Director or Dean may recommend that enrolment should be terminated or recommend transfer to a Master of Philosophy course.

ANUDEQ and CEDAM: The Centre for Educational Development and Academic Methods (CEDAM) constructed an *Australian National University Doctoral Experience Questionnaire* (ANUDEQ) which was trialed in 2000-01 and will be implemented on-line in 2002. ANUDEQ gathers detailed information about the experiences of ANU doctoral candidates, and this information will be used to improve the quality of research training and services to research degree students by monitoring student feedback. Individual graduate programs also work with CEDAM to identify research training needs and to improve policies and practices to maximise student progress.

PhD examinations: Examinations are a final measure of student progress and not less than two examiners, at least one of whom must be external to the University, are appointed for each PhD thesis. A significant proportion of examiners come from overseas. Cohort completion rates for the most recently completed PhD cohorts (average over 80 percent) and thesis completion times (average of 4.5 years) are monitored by the University.

5.5 Policies and processes - research student grievances

Grievance procedures for graduate students are specified in the *Graduate School Policy Papers*.¹⁰ There is also a separate *Policy for Discrimination and Harassment*

⁸ <http://www.anu.edu.au/graduate/papers/522a-88.html>

⁹ <http://www.anu.edu.au/graduate/papers/1573b-98.html>

¹⁰ <http://www.anu.edu.au/graduate/papers/59a-89.html>

Grievance Resolution introduced in 2002.¹¹ Research students are encouraged to seek resolutions of grievances with the assistance of the Dean of the Graduate School before formal grievance processes are initiated.

5.6 Learning support for research students

Learning support is provided by specialist staff, e.g. in the Graduate School (the Statistical Consulting Unit, and the Graduate Teaching Program), and in the Academic Skills and Learning Centre (with specialist Graduate Student Advisers and courses). For example, the Graduate School provides learning support for doctoral candidates employed as tutors or demonstrators through the Graduate Teaching Program, a one semester course for teaching development.

These support facilities are detailed for research students in the *Graduate School Postgraduate Research Guide*¹². In addition, learning support has been enhanced by the Graduate School's Academic and Professional Skills Program¹³, including a Graduate Information Literacy Program¹⁴ (a joint initiative of the Division of Information and the Graduate School), and an intensive Research Workshop Program¹⁵ (jointly with the University of Canberra).

5.7 Staff development for supervisors

Higher degree research places are selectively allocated to areas where past performance indicates that a high rate of success is likely. New staff undertake staff development through a "Supervising Research Students" workshop run by CEDAM and the Graduate School each semester. This workshop is intended primarily for new or less experienced supervisors, but it is open to any staff member who is a member of a supervisory panel for a PhD student, supervising MPhil students, or a potential supervisor.

The workshop includes a presentation on University policy on supervision, a discussion of the special role of supervisory panels at ANU, an opportunity to clarify individual expectations of the supervisory role, a presentation of supervisor and research student perspectives on supervision, and an exploration of the supervisory framework and process.¹⁶

5.8 Structures & resources supporting research training

Under the aegis of the Dean of the Graduate School, reporting to the Deputy Vice-Chancellor (Research), the Graduate School is the university-wide structure responsible for the development and implementation of cross-campus policies designed to ensure and enhance the quality of the research students' research training experience. The Graduate School's campus-wide Graduate Programs, each with an appointed Convenor, bring together staff expertise from across the University to facilitate research training in the academic field, which may be disciplinary, multi-disciplinary or inter-disciplinary in character, and wherever staff

¹¹ <http://www.anu.edu.au/equity/pppframe.htm>

¹² <http://www.anu.edu.au/graduate/pubs/resguide>

¹³ <http://www.anu.edu.au/graduate/services/acadskills.html>

¹⁴ <http://ilp.anu.edu.au/grad/>

¹⁵ <http://www.anu.edu.au/graduate/registration/index.php>

¹⁶ http://www.anu.edu.au/graduate/info_staff/supervision_workshop.html

may be located. *The Graduate School Research Training Plan*¹⁷ specifies detailed Graduate School objectives and strategies for coordination and enhancement of high quality research training.

Research Schools, Faculties and Centres provide the local academic structure for research students, where they are located and where local resources are delivered. The ANU's resources for research training in areas of research strength are among the best in Australia and the university aims to provide resources as part of a research training environment for "graduate and postdoctoral education at the highest international standards"¹⁸. These resources reflect the primary research commitment and funding of the Institute of Advanced Studies (IAS) as well as the substantial research activities in The Faculties and Centres funded from external grants as well as internal funds. Research students and postdoctoral researchers (PDRs) are integrated in international quality research laboratories and groups, with PDRs working closely with research students in the natural sciences. There are a very large number of international visitors who enhance ANU's research resources for students and PDRs.

The University's Graduate Degrees Committee (GDC), chaired by the Dean of the Graduate School, provides an academic committee structure to support research training, including consideration of individual student cases. GDC is responsible to the Research Committee and the Education Committee in relation to research training and teaching in the University.

5.9 Recent achievements in research training

The major continuing achievement of ANU's research training is the maintenance of a successful PhD completion rate of over 80% of commencing PhD students (*PhD Cohort Study*¹⁹). This achievement reflects the strengths of the selection, supervisory panel, research infrastructure support and other processes at the university. The Graduate Degrees Committee reviews data on withdrawals and non-completions each year to identify any factors which require additional university action; and monitors PhD examinations at each meeting to maximise timely completions.

The successful introduction of the Graduate Information Literacy Program (GILP) in 2001, as a joint Division of Information - Graduate School initiative, has been a significant additional achievement²⁰. GILP ensures that research students can access University-wide training in computer-based technology at appropriate levels to develop information literacy skills across the full range of relevant fields. This program includes innovative, advanced courses such as *Managing the Thesis Production Process*, *The Literature Review*, and *E-Publishing of Theses and Research Papers*. Thirty courses were delivered in 2001, with an overall satisfaction rating of 4.1 out of 5. The University also offers short course training options in subjects such as supervision, communication and research methodology to assist broad professional development.

¹⁷ <http://www.anu.edu.au/graduate/GSRTMP.html>

¹⁸ ANU Strategic Plan 1995-2004, goal 5.

¹⁹ *PhD Cohort Study* (PDF), <http://www.anu.edu.au/admin/planning/stats.html>

²⁰ <http://ilp.anu.edu.au/grad/>

6. Collaboration and Partnerships

6.1 ANU Strategies and Support for Cross Disciplinary & Cross Institutional Collaboration

Cross-disciplinary Schools that span the University include the Mathematical Sciences Institute, and the Asia Pacific School of Economics and Management. The Australian National University also supports cross-disciplinary research through the establishment of cross-disciplinary centres such as the Centre for Resource and Environmental Studies, the Centre for Cross-Cultural Research, the Humanities Research Centre, the Centre for Aboriginal Economic Policy Research, the Centre for the Mind, and the Centre for Bioinformation Science. The entry of the IAS into the ARC competitive grants schemes will facilitate more movement, and cross-disciplinary interaction (including collaborative research and greater sharing of resources) between the IAS and The Faculties. The National Institutes (see 1.4 and 4.1) offer joint seminars, workshops and research programs.

The University's extensive range of research activities give it the capacity to rapidly mobilise researchers in synergistic endeavours in response to new opportunities, new technologies or national imperatives. Some of the over-arching programs have been recognised as virtual centres or 'centres without walls' and facilitate sharing of expertise and resources across disciplines in thematic joint endeavours. Cross-disciplinary programs include:

- The ANU Medical School will be innovative and rurally focussed and which will have a strong research focus. It will involve co-operation with the Departments of Health of the ACT, NSW and Commonwealth, the Canberra Hospital, and local and regional GPs and hospitals as well as JCSMR and the Faculty of Science at ANU.
- Asian Studies, which brings together the expertise and resources of the Research School of Pacific and Asian Studies, the Faculty of Asian Studies and the Faculty of Arts to provide an important international centre for the study of Southeast Asia and East Asia;
- Centre for Resource and Environmental Studies, which undertakes interdisciplinary research into a range of environmental and resource issues. Such studies focus primarily on Australia and are particularly concerned with policy options and implications;
- The Humanities Research Centre (HRC) plays a key role as an international centre for interdisciplinary research in the humanities and social sciences;
- Centre for Cross-Cultural Research, which seeks to enrich scholarly and public understandings of cross-cultural relations and histories, particularly but not exclusively in Australia and in the immediate region and to take a leading role in research on visual culture, and research using visual method;
- the Centre for Molecular Structure and Function, which involves the Research Schools of Chemistry and Biological Sciences, The John Curtin School of Medical Research, and the Faculty of Science, and aims to increase understanding of the relationship between the structure of biological macromolecules and their function;
- The Centre for Bioinformation Science (CBiS) brings together researchers with backgrounds in mathematics, statistics and quantitative biology with the goal of developing a conceptual architecture for an information-based, integrative approach to complex biological systems;

- the Centre for Visual Sciences, which involves staff of the Research Schools of Physical Sciences and Engineering, Biological Sciences, The John Curtin School of Medical Research, and the Faculty of Science in the study of visual processing mechanisms in humans, mammals, insects and computer systems;
- the Global Change Confederation, which is giving a higher profile to the established strengths at the ANU in study of climatic change and human impacts; and
- the Health Sciences Program, which will involve interaction between the Faculty of Science, The John Curtin School of Medical Research, the National Centre for Epidemiology and Population Health, the Centre for Mental Health Research, the University of Canberra and the ANU Medical School, to promote research and training in health sciences.

The University promotes internal links to optimise the use of its resources. Its great strength lies in its scale and synergies, and the lack of disciplinary constraints associated with rigid academic structures. This cross-disciplinary flexibility is achieved for research training through cross-disciplinary Graduate School Programs such as Cross-Cultural Research and by joint academic staff appointments. Other Graduate Program examples include:

- the Graduate Program in Quaternary and Regolith Studies is built on established strengths in the Research School of Earth Sciences, the Research School of Pacific and Asian Studies, the Research School of Physical Sciences and Engineering and the Faculty of Science. It has a particular focus on the integration of geologic and biotic features of the terrestrial and marine record; and
- the Graduate Program (and Centre) for the Science and Engineering of Materials, which aims to facilitate interaction between ANU researchers in the Institute and The Faculties active in materials research, and to provide a focus through the Graduate School for training in the science and engineering of materials.

6.2 **Collaboration with Universities and Research Organisations**

The University as a whole, and the IAS in particular, is committed to a program of mutually beneficial interaction with other Australian universities including:

- secondments to and from other universities to the Institute, both on an ad hoc basis and as part of advertised programs;
- collaborative research scholarships to enable research students in the biological and chemical sciences enrolled at other Australian universities to spend between 12 and 18 months of their course at the Institute;
- the provision of course work for PhD students from other universities, e.g. intensive courses of lectures/seminars or intensive summer courses;
- the provision of visiting scholarships for students from other Australian universities undertaking a PhD in Pacific or Asian studies to spend three to six months in RSPAS;
- collaboration with national and state cultural institutions, in particular the National Museum, the National Gallery and the National Library, in joint research projects, exhibitions, symposia and multimedia projects, eg the recently created Centre for Research and Information Outreach (CRIO) joins the University and the National Museum together in an initiative that will result in

digital and multimedia productions of key research in the humanities and environmental and social sciences;

- the provision of half of the costs associated with its staff giving lectures and seminars at other universities; and
- the Institute's visiting fellowship program, and access to national facilities.

The University collaborates with researchers in universities throughout the world as well as with researchers in Australian universities and research organisations such as the CSIRO. The University's Annual Report ²¹ lists over 1200 research projects involving collaboration with researchers from other universities or research organisations around the World. In the IAS, the formal location within Schools of staff from other research organisations such as AGSO and Telecom was a precursor for the CRC concept. The University is currently working with AIMS to enable maximum use of the North Australia Research Unit (NARU).

The University and its schools and faculties have many MOUs and Collaborative agreements to facilitate research collaboration. For example, the Research School of Physical Sciences and Engineering lists the following:

- Samsung Electronics Co Ltd, Korea
- Shanghai Institute of Technical Physics (SITP), Chinese Academy of Sciences
- The Physics Department, University of Pretoria
- Institute of Advanced Energy, Kyoto, Japan
- Tsinghua University, Beijing, China
- The European Union-Australia Science & Technology Agreement, DIST
- Deutscher Akademischer Austauschdienst (DAAD) Exchange Service
- ANU-Engineering & Physical Sciences Research
- Council Agreement (ANU-EPSRC), UK (The ANU-EPSRC agreement in effect covers a range of UK universities)
- Beijing University, China
- National Institute for Fusion Science, Nagoya, Japan
- Lockheed Martin Energy Research Corporation,
- Oak Ridge National Laboratory, USA
- L'Ecole Polytechnique, Paris, France
- Royal Institute of Technology, Stockholm
- Ericsson Components AB, Stockholm
- British Telecom Laboratories, UK

The University is participating, with the University of Adelaide, in the Australian-German Joint Research Co-operation Scheme, a two year pilot scheme which is jointly funded and managed by Adelaide University, Australian National University, the Commonwealth Government Department of Industry, Science and Resources, and the German Academic Exchange Service (DAAD). The scheme aims to foster international scholarly and scientific cooperation through funding of researchers who participate in cooperative research projects between Australia and the Federal Republic of Germany.

The new ARC arrangements will further enhance collaboration between the IAS, The Faculties and other Australian universities.

²¹ . http://www.anu.edu.au/pad/pubs/annual_report/2000/AnnRpt2000.html

6.3 Regional Collaboration

The University is committed to actively pursue research collaboration in regional Australia. In addition to numerous research collaborations with the ACT Government, local CSIRO Divisions and the University of Canberra, other regional collaborations include:

- agreement to establish the Canberra Medical School between the University, Canberra University and the Commonwealth and ACT Governments;
- ARC-SPIRT funded projects being conducted by the Research School of Physical Sciences and Engineering and AOFR Pty Ltd (Fyshwick ACT) including a project on the *Design, Fabrication and Evaluation of Planar Lightwave Circuits in Organically Modified Silicate Glasses for Telecommunications and Other Applications*;
- collaboration between the Department of Chemistry, Faculty of Science and Australian Water Technology on *Surface Characterisation of cryptosporidium oocysts and giardia cysts for the Development of Novel Filtration Systems for Commercial Applications*;
- a *Special Research Centre in Applied Ethics* hosted by The Faculty of Arts in conjunction with the Charles Sturt University. The Centre is engaged in philosophy research and teaching in the Faculty of Arts and the Research School of Social Sciences;
- an ARC-SPIRT funded project being conducted by the Research School of Biological Sciences with Charles Sturt University on *Rootstock influence on the relationship between vine performance and grape quality*;
- a project on *Conservation treatments* being conducted by the RSC and the Australian War Memorial;
- research on the *Mechanism of cell death in Ross-River virus-infected striated muscle* is being conducted by JCSMR and the University of Canberra; and
- Research on *Neuronal plasticity in the adult visual cortex* is being conducted by the Psychology Division, Faculty of Science and the University of Canberra.

6.4 Industry Interaction and Commercialisation of Research

The University encourages research collaboration with industry. It has strong research links with a diverse range of companies, and continuously seeks to expand its industry linkages through participation in the Government's Cooperative Research Centres (CRCs), Collaborative Research Grants and University-Industry Postgraduate Research Award Programs, launching of companies such as Acton Lasers, and attracting other companies such as BlueLab (Taiwan) to set up R&D laboratories on campus.

The University is a participant in the following CRCs and Centres of Excellence:

- Australian CRC for Renewable Energy
- Australian Photonics CRC
- CRC for Landscape Evolution and Mineral Exploration 2
- CRC for Pest Animal Control
- Greenhouse Accounting CRC
- Tropical Plant Protection CRC
- CRC for Functional Communication Surfaces
- CRC for Smart Internet Technology
- CRC for Innovative Dairy Products (associate participant only)

- National ICT Australia (NICTA)

Collaborative R&D projects with industry include:

- *PI-88 and other oligosaccharides*. The John Curtin School of Medical Research (JCSMR) with Progen Industries Ltd;
- *Cell cycle genes*. Research School of Biological Sciences (RSBS) with Crop Design NV;
- *Collaborative chemical screening*. Research School of Chemistry (RSC) with Glaxo Smith Kline;
- *Cotton fibres*. RSBS with Aventis Crop Science and CSIRO;
- *Insect Vision & Navigation*. RSBS with the Office of Naval Research, USA;
- *Seekers & Controllers*. RSBS with the Office of Naval Research, USA;
- *Epilift*. Faculty of Engineering and Information Technology (FEIT) with Origin Energy Retail Ltd;
- *Solar trough*. FEIT with Solarhart;
- *Cellulose genes*. RSBS with Groupe Limagrain / Biogemma;
- *Phosphosugars*. JCSMR with Praxis Pty Ltd; and
- *Phytophthora - Novel Control Strategies*. RSBS with Rhone-Polenc.

6.5 Industry Collaboration Initiatives

In order to encourage industry interaction the University introduced a range of initiatives in 2001:

- ***ANU-Industry Linkages Incentives Scheme***

Provides incentive payments to the first-named Chief Investigators who submit competitive and eligible applications to the Australian Research Council (ARC) Linkage Projects Scheme for grants to be administered and undertaken at the ANU.

- ***ANU-Industry Collaboration Scheme***

Provides seeding funds for collaborative projects and links with industry. The Scheme aims to assist the University to develop new opportunities and links with industry partners which could lead to greater levels of external funding and enhanced links.

6.6 Cooperation with Government and other public institutions

The Australian National University encourages members of the academic staff to give specialist advice and assistance to Federal and State Government departments and to other public institutions, both within Australia and internationally. This help takes many forms - consultancies, membership of committees, involvement in particular projects, secondments, etc. The University's Annual Report for 2000 provides a list of over 300 academic staff involved in such activities. Highlights include:

- the Centre for Tax System Integrity is a specialised research unit within the Research School of Social Sciences set up to extend understanding of how and why cooperation and contestation within the tax system occurs. The Centre has been set up in partnership with the Australian Taxation Office;

- the Australian Centre for Intellectual Property in Agriculture undertakes research in issues relating to intellectual property law, to apply it to the scientific community and industry and rural bodies, particularly in the agri-food sector. The Centre is funded by the Grains Research and Development Corporation and the Commonwealth Government;
- the Centre for Aboriginal Economic Policy Research (CAEPR) is a multi-disciplinary social sciences research centre with a primary focus on indigenous Australian economic policy and policy development issues, including native title and land rights, social justice and the socioeconomic status of indigenous Australians. The Centre is funded by the Aboriginal and Torres Strait Islander Commission (ATSIC), the Commonwealth Department of Family and Community Services and the University; and
- the Strategic and Defence Studies Centre aims to advance the study of strategic problems, especially those relating to the general region of East Asia and the Pacific. Participation in the Centre's activities is not limited to members of the University, but includes other interested professional, diplomatic and parliamentary groups including the Australian Defence Force.

7. Intellectual Property, Commercialisation and Contractual Arrangements

The University actively seeks to manage its intellectual property to maximise its return on investment in research and ensure the transfer of technology for public benefit. Overall responsibility for the management of intellectual property in the University rests with ANUTECH and the Research Services Office, both overseen by the Deputy Vice Chancellor (Research).

7.1 Strategies for the identification, assessment and protection of IP

The ANU has established ANUTECH Pty Ltd (“ANUTECH”) to manage intellectual property protection and the commercialisation of research results. ANUTECH is a wholly owned subsidiary of the ANU. The company employs skilled staff to spend time on campus talking to University staff to determine their research areas, to identify opportunities that may have commercial potential and to discuss with them the opportunities for commercial exploitation of their research. Once a project with commercial potential is identified ANUTECH staff undertake an extensive review of the patent and publication databases to determine whether the technology is patentable. In addition, ANUTECH staff undertake a review of the potential markets for the technology, identify any competing technologies and collate a list of potential commercial partners that will be approached during marketing of the technology. Where a technology is complex and beyond the capabilities of the ANUTECH staff external experts are contracted to undertake a review of the potential opportunity.

ANUTECH manages protection of intellectual property with the assistance of external patent lawyers. The company has one FTE whose responsibility is patent management and management of the databases relating to patents. In addition, where appropriate, business development staff assist in determining issues such as in which countries applications should be lodged and when and how examiner opinions should be addressed. In all cases research staff who are inventors on a patent maintain a constant involvement on the application by assisting in the preparation of responses to examiner opinions. In addition, ANUTECH manages the ANU’s portfolio of trademarks and other registered intellectual property.

7.2 **Criteria and processes for the selection of commercialisation strategies**

Determination of an appropriate commercialisation strategy is undertaken by ANUTECH staff in consultation with the researcher and Deputy Vice Chancellor (Research). In general, the nature of the technology, the ongoing interests of the researcher, the potential market for the technology and consideration of potential routes to market and the undertaking and costs required to get a product to market determine the appropriate strategy. Technologies that may be considered “platform technologies”, that is they can be applicable to a broad range of applications, will be considered for a commercialisation strategy that involves the formation of a start-up company. In contrast, technologies that are “one product” are more likely to be considered for licensing to a larger organisation, however grouping of technologies together into a “package” for a start-up company is also a considered option.

7.3 **Equity Policy**

The ANU holds equity in a number of start-up companies that have been formed to commercially exploit intellectual property arising from ANU research. Currently there is no “equity policy” but the ANU Investment Office manages the equity obtained by the University through commercialisation. Researchers involved in the generation of the research may also hold equity in new company.

7.4 **Strategies to interact with industry partners**

Research staff are encouraged to liaise with industry partners in relation to their research in order to promote areas of common interest and a mechanism for marketing the University’s research capabilities. Staff are encourage to apply for government supported linkage programs and the entry of the Institute of Advanced Studies into the ARC in 2001 resulted in a number of successful ARC Linkage Program grants being accepted. In addition the ANU undertakes a number of collaborations with industry partners including Progen Industries Ltd, Johnson & Johnson Research, Glaxo SmithKline, Biogemma, Aventis CropScience, Origin Energy Retail Ltd and BP Solar.

As part of its marketing of University research to potential commercial partners ANUTECH holds regular meetings with potential investors and industry representatives to discuss technologies with potential commercial application. ANUTECH is also an integral part of an initiative between Unisearch (University of NSW), the Business Liaison Office (University of Sydney), University of Technology Sydney and the Australian Technology Park-Innovations called “from Bench to Business”. The aim of *from Bench to Business* is to enable access for potential partners in industry and investment communities to new technologies by providing an opportunity for the commercial arms to showcase technologies to this audience. The first showcasing event was successfully held in November 2001 and attracted an audience of ~60 individuals from the industry and investment communities.

7.5 **Ownership of IP**

The University’s policy on intellectual property seeks to protect the ANU’s rights to intellectual property generated at the ANU, having regard for the rights of staff and students and appropriate reward for creativity and endeavour. The ANU IP Policy requires that staff and students take appropriate steps to protect the University’s IP. Under the policy IP generated by staff in the course of their work is owned by the ANU. ANU does not claim ownership of copyright except under particular circumstances as set out in the policy.

Under the ANU IP policy students own IP generated by them in the course of their studies. In circumstances where the University may seek to commercially exploit intellectual property generated by students it will ask students to assign their IP to the University and the student will then be recognised under the distribution scheme for the sharing of financial benefits of commercial exploitation.

7.6 **Incentives to staff to encourage research commercialisation**

Contained within the ANU IP Policy are Schedules that establish the parameters for sharing of net income received as a result of commercialisation of research results. In general terms originators of commercialised research stand to gain 35% of net income. Where the route for commercialisation is through the formation of a start-up company individual researchers will often receive benefit through direct shareholdings in the new company. A staff member who wishes to become a director of a company must first obtain approval from the Finance Committee²², who will consider the application in light of whether the activities proposed would be contrary to the broad interests of the University, any potential conflicts of interest and the good standing of the business activity or company. In taking up a position as director or adviser to a company a staff member must comply with the University's Conflicts of Interest policy.

7.7 **Intellectual Property Policy**

The University's current IP Property Guidelines are provided at **Attachment E**. These are under revision, and the new guidelines will be provided once they are confirmed by Council – scheduled for November 2002.

²² Under Consulting Policy

PART B

(i) Areas of research strength: research students (EFTSU) in 2001

	HDR students	HDR commencing students
<u>ALL AREAS OF RESEARCH</u>		
Science & technology	472.6	75.3
Health & medical research	69.4	9.4
Arts, humanities & social sciences	601.1	104.7
Total, all areas of research	1143.1	189.4

	HDR students	HDR commencing students
<u>AREAS OF RESEARCH STRENGTH ONLY²³</u>		
Science and technology		
Mathematical Sciences	27.9	4
Biological and Environmental Sciences	122.9	18.5
Information, computing and communication sciences	33.6	8.3
Engineering and Technology	33.3	4.5
Chemical Sciences	60.8	12.5
Physical Sciences	65	13
Earth Sciences	40.3	4
Other Science and technology	88.8	10.5
Sub-total	472.6	75.3
Health and medical research		
Medical and Health Sciences	69.4	9.4
Sub-total	69.4	9.4
Arts, humanities and social sciences		
Studies in human society, behavioural and cognitive sciences	12.4	2
Communication and Media Studies	6.8	1.8
Language and culture	238.3	33.4
Policy and political science	64.3	13.8
History, archaeology, philosophy and religion	162.8	27.5
Economics	65.1	12.6
Law, justice and law enforcement	15.8	4
The Arts	35.6	9.6
Sub-total	601.1	104.7
Total, areas of strength only	1143.1	189.4

²³ Note: The University's National Institutes (see page 2) cover all principal areas of research. All Institutes contain (by design) significant cross disciplinary linkages and multiple memberships and are thus not able to be directly listed under any particular area of research above. They each build critical mass in their area of interest and unify the University's research effort.

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(ii) *Areas of research strength: research income in 2001 (\$000)*

	Category 1	Category 2	Category 3	Category 4
All areas of research				
Science & technology	12,169	3,621	10,144	2,514
Health & medical research	3,071	2,342	6,537	0
Arts, humanities & social sciences	4,666	4,388	4,011	0
Total, all areas of research	19,905	10,351	20,692	2,514

(iii) *Research strength: research active staff in 2001*

	Number of staff who generated research income 1.)	Number of staff who generated publications	Number of staff eligible to supervise HDR students 2.)	Staff who supervised HDR students as principal supervisors 3.)	Individuals who supervised HDR students as associate supervisors
All areas of research					
Science & technology	297	645	310	285	Not available
Health & medical research	59	171	70	63	
Arts, humanities & social sciences	149	348	371	293	
Total, all areas of research	505	1164	751	641	

- Note:
1. Only 25% of IAS staff were eligible to apply for Australian Competitive Grants in 2001.
 2. Level B and above academic staff.
 3. This includes students for 2001 and preceding years of enrolment.

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- (iv) *Quality of research training experience*
- (a) **Provide tables detailing the results for the 2001 Graduate Destination Survey. Institutions with more than 10 students who completed a research qualification during the year should also provide the results on a ‘whole of institution’ basis of the 2001 Postgraduate Research Evaluation Questionnaire (PREQ) and/or other reviews, surveys or mechanisms used to receive student feedback.** (Note that this material will be published as part of the institution’s Research and Research Training Management Report.)

1999 and 2000 Postgraduate Research Experience Questionnaire (PREQ)

More than 93 per cent of ANU PhD and MPhil graduates indicated overall satisfaction with their higher degree research experience in 2000. Over 90 per cent of ANU research graduates also expressed satisfaction on scales associated with Skill Development, Clarity of Expectations and Infrastructure.

Broad Agreement on the PREQ Scales, PhD and MPhil graduates 1999 and 2000

Scale	1999	2000	
	ANU	ANU	National
Supervisor	80.3	83.7	86.6
Skills Development	98.1	98.3	97.6
Intellectual Climate	84.1	84.3	80.4
Infrastructure	90.2	90.0	83.8
Thesis Examination	81.0	88.8	85.9
Clarity of Expectations	94.4	94.3	95.0
Overall Satisfaction	95.1	93.9	92.7

Note: Number of respondents ANU 142 (1999) 149 (2000); National 2276 (2000)
 Broad agreement represents responses indicating 3, 4 or 5 on a scale from 1 (strongly disagree) to 5 (strongly agree)

2000 and 2001 Graduate Destination Survey (GDS)

The methodology for obtaining graduate destination information from higher degree research students is changing. The number of HDR graduates surveyed as part of the GD/CEQ in 2000 and 2001 was limited and does not match the cohort surveyed by the PREQ. The Graduate Careers Council of Australia (GCCA) have now changed the methodology so that the GDS and PREQ are sent out together as one survey and HDR graduates are excluded from the GDS/CEQ cohort. The discrepancy in the cohorts for the PREQ and the GDS needs to be taken into account when reading the following table.

As indicated in the table below, 30 of the 40 research graduates who responded to the survey in 2001 were employed full-time, two were employed part-time and seven were undertaking further studies. Of those who were employed, 24 indicated their sector of employment was higher education, primarily as postdoctoral or research fellows. The average salary for the 40 graduates employed full-time was \$54,334.

Table (iv)(a) Activity of research graduates within four months of completion

Activity	Number of Responses		Proportion (%)	
	2000	2001	2000	2001
Employed full-time	22	30	79	75
Studying full-time	1	7	4	17
Employed part-time, seeking full-time employment	2	2	7	5
Unavailable for employment	3		11	
Unemployed		1		3
Total responses	28	40	100	100

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(b) Qualities of staff who supervised HDR students in 2001

	Share of supervising staff (%)
The share of supervisors who hold research qualifications	90 ¹
The share of supervisors who undertook formal supervisor training in the year	6 ²
The share of supervisors who have supervised HDR students to completion in the year	43.5 ³

- 1 Partially estimated due to the limitations of available data as a consequence of the implementation of a new human resources management system.
- 2 Note that ANU has been conducting this training as part of formal induction training for new and less experienced supervisors since 1996. Over this period 216 persons (and a further 34 from industry) have attended.
- 3 Number of supervisors who have supervised to completion - others may have been involved at earlier stages.

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(v) *Patenting and related activities by the institution and/or related entities*

1. How many Australian and international patents were held by the university and/or its controlled entities, including the institution's commercialisation company at 31 December 2001? Include patents held by employees acquired in the course of their employment, but not students.	Australian	International
	127 applications 51 granted	128 applications 52 granted
2. Of the patents referred to in question one above, how many were granted for the first time in 2001?	0	4
3. How many patents were granted during 2001 to a commercial subsidiary of the university or other affiliated institution, in addition to any patents accounted for in question 2 above? Include patents held by employees acquired in the course of their employment, but not students.	0	0
4. How many patents held by the institution or its controlled entities were sold or transferred to another entity or firm in 2001?	0	
5. How many licences were issued by the institution or its controlled entities in 2001? How much revenue was generated by these licences?	Number	Value \$
	3	\$1,347,194
6. How many spin-off companies did the institution or its controlled entities generate in 2001? In relation to each spin off company, what equity stake did the university take? What equity stake, if any, was allocated to the originator of the IP? Spin off company #1..... Name Spin off company #2.....Name	0	
	Equity by university	Equity by originator
	0	0

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ATTACHMENT A

Table 1 Areas of Research Strength

Field of Research	Academics * FTE	Research Students EFTSU	Other supporting staff FTE	Total human resources FTE	Total expenditure \$ (000s)
Mathematical sciences	37	30	12	79	7,678
Physical sciences	81	72	121	275	34,973
Chemical sciences	55	51	58	165	17,428
Earth sciences	45	51	79	175	19,626
Biological and environmental sciences	131	180	219	530	51,605
Information, computing and communication sciences	33	39	34	106	14,116
Engineering and technology	29	45	37	111	12,590
Medical and health sciences	85	91	157	333	34,602
Economics	47	71	42	161	15,710
Policy and political science	33	85	34	153	13,014
Studies in human society, behavioural and cognitive sciences	53	162	76	291	22,028
Law, justice and law enforcement	24	20	16	60	6,514
The arts	24	36	18	78	8,241
Language and culture	21	68	11	101	5,716
History, archaeology, philosophy and religion	50	133	54	236	17,589
TOTAL (incl non-research strengths)	759	1,152	977	2,888	284,391

Source: ABS R&D Collection 2000

* **Note:** These are research academic FTE, comprising full-time research-only academic staff at 1 FTE and full-time teaching and research academic staff at 0.3 FTE.

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ATTACHMENT B

ANU ADMINISTRATIVE ORGANISATION CHART



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ATTACHMENT C

The University Research Committee

Establishment of the Research Committee

There is to be a subcommittee of the Board called the Research Committee.

The Research Committee is established to advise on and implement the research policies of the University.

The Research Committee may, within a strategic policy framework approved by the Council, make recommendations to the Board on the following matters or, if the Council so directs, determine those matters on behalf of the Council:

- (a) the research priorities of the University, having consulted relevant Heads of Research Schools, Deans of Faculties Directors of University Centres;
- (b) the means by which the University's research performance may be maximised;
- (c) research training, in consultation where appropriate with the Graduate Degrees Committee;
- (d) the University's statutory reporting requirements on research;
- (e) quality assurance in relation to research policies and programs.

The Research Committee may:

- (a) refer a matter to a Research School, the Institute of the Arts, a Faculty or University Centre for consideration and report;
- (b) request a head of a Research School, the Institute of the Arts, a Faculty or University Centre to provide such information as the Committee requires on the academic operation and activities of that area;
- (c) establish subcommittees or such other committees as it determines;
- (d) provide comments to the Academic Board, and through the Board to the Council, the Finance Committee or the Vice-Chancellor on policies relating to the allocation of University resources.

The Research Committee must provide advice and reports to the Academic Board, as the Board directs, on matters relating to the Committee's functions.

Constitution of Research Committee

The Research Committee consists of the following members appointed by the Council:

- the Deputy Vice-Chancellor (Research);
- the Dean of the Graduate School;
- 2 nominees of the Postgraduate and Research Students' Association nominated by that Association, one being a postgraduate student in the sciences research stream and the other being a postgraduate student in the humanities research stream;
- the President of the Australian National University Students' Association Inc., or his or her nominee;
- 5 members of the academic staff of the University elected from the members of the Board of the Institute of Advanced Studies, 2 of whom are Heads of Research Schools;

- 3 members of the academic staff of the University elected from the members of the Board of The Faculties and the members of the Board of the Institute of the Arts, 1 of whom is a Dean or Director;
- 1 member of the academic staff of the University Centres nominated by the Vice-Chancellor after consultation with Directors of University Centres;
- 2 persons nominated by the Vice-Chancellor after consultation with Deans and Directors;
- 1 member of the general staff elected from the members of the Board of the Institute of Advanced Studies.

The term of appointment of each nominated or elected member of the Committee is to be as set out in the instrument of appointment.

The Vice-Chancellor is an *ex officio* member of the Research Committee and may be represented at meetings of the Committee by the Deputy Vice-Chancellor.

Note: The following officers are also expected to be in attendance at meetings of the Research Committee:

- *Head of the Research Services Office*
- *Deputy Vice-Chancellor (Education)*
- *Pro Vice-Chancellor (Academic Development and Information Services)*
- *the Director, Scholarly Information Services.*

Chair of Research Committee

The Deputy Vice-Chancellor (Research) is the Chair of the Research Committee.

ATTACHMENT D

SELECTED ANU RESEARCH HIGHLIGHTS 2001/2002

Biorobotics

From flying bees to autonomous aircraft.

Honeybees locate food sources kilometres away from their nest and return home quickly and unerringly. Our recent research explains how bees see in 3-D, avoid obstacles, orchestrate smooth landings, and estimate distance flown. Some of these insights are being incorporated into novel vision and navigation systems design for autonomously flying aircraft, or robots, with important applications in industry, space and defence.

(*New Scientist*, August 2001). Parts of this work have also recently been featured as cover stories in *Science* (287, 851-53, 2000) and *Nature* (411, 581-83, 2001).

Professor Mandyam Srinivasan is Director of the Centre for Visual Sciences, Research School of Biological Sciences, ANU and is a Federation Fellow (M.Srinivasan@rsbs.anu.edu.au)

Understanding the Shape of Plants

In plants, the cytoskeleton determines the shape and size of cells, and therefore regulates development. Microtubules are one of the major elements of the cytoskeleton. They orchestrate cell division and morphogenesis, but how they disassemble and reappear at different locations is unknown. Recently we discovered a gene, *MORI*, which is essential for organising plant microtubules. This work has important implications for understanding plant growth and development.

(*Nature*, Vol 411, 31 May 2001, pp 610-613)

Dr Geoffrey Wasteneys is a Laboratory Leader in the Plant Cell Biology Group, Research School of Biological Sciences, ANU (Geoff.Wasteneys@anu.edu.au).

International Law

The *Boundaries of International Law* considers issues of sex and gender in public international law. The absence of women in the development of international law has produced a narrow and inadequate jurisprudence that has legitimated the unequal position of women world-wide rather than confronted it. The aim is to encourage a rethinking of the discipline of international law so that it can offer a more useful framework for international and national justice. This is the first book-length application of such theories to international law.

(Charlesworth, H. and Chinkin, C., *Manchester University Press*, August 2000) - Winner of the 2001 American Society of International Law Certificate of Merit for path breaking research.

Professor Hilary Charlesworth is Director of the Centre for International and Public Law, Faculty of Law, ANU (CharlesworthH@law.anu.edu.au)

Restorative Justice

Violent crime is a problem at an unacceptably high level in Australian cities and vast sums are being spent on private security, police, etc to combat it.

Lawrence Sherman, Heather Strang and John Braithwaite worked with the Australian Federal Police to develop a restorative justice innovation that required offenders to meet

victims in the company of their own family and closest friends. The group discussed the consequences of the crime and what should be done to repair the harm. A restorative justice agreement was signed by key participants. Criminal cases were randomly assigned to a normal court hearing or the restorative justice conference.

(Braithwaite, J., *Restorative Justice and Responsive Regulation*. New York: Oxford University Press, 2002, Chapter 3.)

Professor John Braithwaite is Head of the Regulatory Institutions Network in the Research School of Social Sciences, ANU and is a Federation Fellow (John.Braithwaite@anu.edu.au).

Genetic susceptibility to diabetes

Our research on mice bred for their susceptibility to type 1 (juvenile onset) diabetes has shown that a variant form of a gene called 2M stops the mice from developing diabetes. This is the first diabetes-susceptibility gene to have ever been discovered and has the potential to lead to the development of a human vaccine if the same gene variant is identified in humans.

(Hamilton-Williams, E.E., Serreze, D.V., Charlton, B., Johnson, E.A., Marron, M.P., Müllbacher, A., & Slattery, R.M. (2001). 'Transgenic rescue implicates beta 2-microglobulin as a diabetes susceptibility gene in non obese diabetic (NOD) mice.' *Proc Natl Acad Sci USA* 98, 11533-11538.)

Dr Robyn Slattery is the leader of the Autoimmunity/Genetic Susceptibility laboratory in the John Curtin School of Medical Research, ANU (Robyn.Slattery@anu.edu.au).

Education, employment and reducing youth crime

Property crime can be reduced by 20 percent - if long-term youth unemployment can be eliminated. A unique partnership between RSSH's Economics Group, the NSW Bureau of Crime Statistics and Research and officers from the Department of Education, Training and Youth Affairs has examined the relationship between youth unemployment, education and property crime, uncovering some very striking results.

For the first time econometric examination of 'break, enter and steal' offences in NSW was linked with youth unemployment duration, and supplemented with data related to education participation and high-school completion rates. The results show that young male long-term unemployment is strongly correlated with property crime. Conversely, completion of Year 12 serves to reduce the incidence of break, enter and steal.

This research clearly demonstrates the significant benefits from collaboration between criminology and labour economics, traditionally fields with little or no interaction.

The paper was presented at the 30th Annual Australian Conference of Economists, and is published in the CEPR's Discussion Paper Series.

Professor Bruce Chapman is Director of the Centre for Economic Policy Research, Economics Group, Research School of Social Sciences, ANU (bruce.chapman@anu.edu.au)

Integration of Real-World Robotics and Real-Time Vision

Visually guided robots operating in a real-space and in real-time environment are a key challenge for the autonomous systems community and for any practical application of vision technology. At the ANU an autonomous car as well as an autonomous submersible are employed as demonstrators and rigorous experimental platforms. By 2001 both platforms reached a state of preliminary experiments with closed loop real-time visual control on the autonomous submarine. The visually guided submarine (KAMBARA) excited great interest at the international conference on intelligent robots and systems 2001

including an immediate invitation to give the same paper also at the main underwater engineering conference (OCEANS). Collaborations are established with industrial partners (via a CRC project) as well as with relevant academics from Australia and internationally.

Silpa-Anan, C., Brinsmead, T., Abdallah, S., Zelinsky, A. (2001) 'Preliminary Experiments in Visual Servo Control for Autonomous Underwater Vehicle', Proceedings of the IEEE International Conference on Intelligent Robots and Systems, Maui, Hawaii, October/November

Webers C., Zimmer, U.R. 'Motion Control of Mobile Robots - from static targets to fast drives in moving crowds', Autonomous Robots, to appear in Vol. 12, No. 3

Web-site for the ANU autonomous submersible and car:

<http://www.syseng.anu.edu.au/rsl/sub/>

<http://www.syseng.anu.edu.au/rsl/car/>

Active adsorption filtration

It is estimated that between 250 and 500 million people are infected by the *Cryptosporidium* parasite each year in developing countries. This pathogen, being resistant to chlorine, is also a problem in developed countries for swimming pools and drinking water.

A collaborative research project involving scientists from both the ANU and Sydney Water, has led to the discovery of a novel process, called 'active adsorption filtration', which efficiently removes *Cryptosporidium* oocysts from water supplies via the use of a filtration cartridge containing an active material, trademarked as "CryptoBlast". Surprisingly, the oocyst shell is also ruptured by the forces of adsorption onto CryptoBlast, making the parasite non-infective.

We have so far submitted two patent applications aimed at protecting these technologies and are still at the development stage with regards to the evaluation of the material CryptoBlast for use in a wide range of applications. A spin-off company, Karley Technologies, has recently been formed to facilitate the commercialisation of these applications.

Karaman, M.E., Pashley, R.M., Shanker, S.R., & Bustamante, H. 'Microelectrophoresis of *Cryptosporidium parvum* oocysts in aqueous solutions of inorganic and surfactant cations' *Colloids and Surfaces A*, 146(1/3), 217 (1999).

Shanker, S., Bustamante, H., Pashley, R.M., & Karaman, M.E. 'Method of Water Purification.' PCT International Publication Date : 23 September 1999.

Bustamante, H., Shanker, S.R., Pashley, R.M. & Karaman, M.E. 'Interaction between *Cryptosporidium* oocysts and water treatment coagulants' *Water Research* 35(13), 3179-3189 (2001).

Karaman, M.E., Pashley, R.M., Shanker, S.R., & Bustamante, H. 'Destruction of *Cryptosporidium* Oocysts by Adsorption onto Active Solids' International PCT Application (Submitted, May 2001).

Professor Ric Pashley is a Professor in the Department of Chemistry, Faculty of Science, at the ANU (Richard.Pashley@anu.edu.au).

3D structure determinations by NMR

Nuclear Magnetic Resonance (NMR) spectroscopy is the only technique besides X-ray crystallography by which the three-dimensional (3D) structure of proteins can be elucidated at atomic resolution. In contrast to X-ray crystallography, NMR achieves structure determinations in aqueous solution and is thus highly amenable to high-throughput studies, including structure-guided drug design.

Gottfried Otting came from the laboratory of Professor Kurt Wüthrich at the ETH-Zürich, where the technique of 3D structure determinations by NMR was originally developed. In his own laboratory at the Karolinska Institute in Stockholm, his research group focused on development and refinement of NMR techniques for the structure analysis of proteins and protein-ligand complexes and determined the structures of more than 10 proteins.

The research resulted in over 130 publications over the past 15 years, with several of the ideas implemented in commercial software packages by the NMR manufacturers or resulting in commercially available hardware accessories. With its strong background in basic and original research, the group brings a unique level of expertise to Australia, for the benefit of university and industrial laboratories, where NMR is a widely established technique for the chemical and structural analysis of small and large molecules.

Liepinsh, E., Baryshev, M., Sharipo, A., Ingelman-Sundberg, M., Otting, G., Mkrtchian, S. (2001) 'Thioredoxin fold as a homodimerization module in the putative chaperone ERp29: NMR structures of the domains and experimental model of the 51 kDa dimer'. *Structure* 9, 457-471.

Dr Gottfried Otting will be taking up a Federation Fellowship at the beginning of April in the Research School of Chemistry, ANU (Gottfried.Otting@anu.edu.au).

East Asian financial arrangements

The interest in regional financial arrangements heightened following the East Asian crisis and around the huge growth in international capital flows over recent years. Japan is at the centre of consideration of new arrangements for financial cooperation within the ASEAN+3 (Japan, Korea, China) group of countries. The objective of our research is to analyse regional and Australian interests in alternative approaches to regional financial cooperation, including policy dialogues in the region, different forms of financial cooperation and current arrangements. These subjects are of critical importance to Australia's interests and position in East Asia. This major project is supported by Japan's Ministry of Finance and the Australian Government. The results are to be published in a series of books by Routledge.

Related research has been published in Gordon de Brouwer, *Hedge Funds in Emerging Markets*, Cambridge, 2001 and Gordon de Brouwer (ed.), *Financial Markets and Policies in East Asia*, Routledge 2002.

Professor Peter Drysdale is Executive Director of the Australia-Japan Research Centre, ANU (peter.drysdale@anu.edu.au) and is coordinating this research with Professor de Brouwer (gordon.debrouwer@anu.edu.au)

Archaeology in East Timor

Timor, lying between mainland Asia and Australia has long been recognised as the most prospective stepping stone island for finding evidence of early watercrossings by *Homo sapiens* into Australia. No archaeological research has been possible in East Timor for over 25 years. Recent excavations have produced a record of human occupation dating back over 35,000 years. They also document the introduction of new faunal species and crops about 4000 years ago, following which major extinctions within the endemic fauna occurred. Eight new rock art sites have also been located.

(O'Connor, S., Spriggs, M. & Veth, P. 2002. 'Excavation at Lene Hara Cave Establishes Occupation in East Timor at least 30,000-35,000 years ago'. *Antiquity* 76)

Dr Sue O'Connor is a Senior fellow in the Department of Archaeology and Natural History, Research School of Pacific and Asian Studies, ANU (soconnor@coombs.anu.edu.au)

Structure of the Local Universe

The Two Degree Field Galaxy Redshift Survey (2dFGRS), undertaken using the Anglo-Australian Telescope, has now mapped 200,000 galaxies in the largest-ever survey of the structure of the local universe. The data have been used to determine fundamental cosmological parameters such as the mass density of the universe and to study the properties and formation history of the local galaxy population.

Nature, 410, 169-173, 2001. For project details, see <http://www.mso.anu.edu.au/2dFGRS>

Dr. Matthew Colless is Senior Fellow in the Research School of Astronomy and Astrophysics, ANU, and the Australian Principal Investigator on the 2dF Galaxy Redshift Survey (colless@mso.anu.edu.au)

Children and Divorce

Many studies have shown social and psychological disadvantages for children from divorced families. *Children in Changing Families* concludes from the authors' and others' research that existing theories of parental loss and absence do not provide satisfactory accounts of how these disadvantages come about. It proposes a life course framework where children's development is influenced by many factors both before and after separation, including family conflict, parents' mental health and the quality of parenting.

(Pryor, J. and Rodgers, B., *Children in Changing Families*, Blackwell Publishers, August 2001.)

Dr Bryan Rodgers is a Senior Fellow at the Centre for Mental Health Research, ANU (BryanRodgers@anu.edu.au).

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ATTACHMENT E

NOTE: The current version of IP Property Guidelines is provided here. These are under revision, and the new guidelines will be provided once they are confirmed by Council – scheduled for November 2002.

THE AUSTRALIAN NATIONAL UNIVERSITY *Intellectual Property Guidelines* (1281E/1998)

The Council of the University approved this policy statement at its meeting on 13 November 1998, except for one paragraph. It was confirmed by Council in the following form on 11 December 1998. It replaces paper 2634B/1986.

Contents

1. [Introduction](#)
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3. [Objectives of this Policy](#)
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 - Staff
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12. [Signing on Behalf of the University](#)
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1. Introduction

- 1.1 These guidelines have been developed to provide for the staff and students of the Australian National University (ANU), as well as the wider community with whom the University interacts, a statement of its policy and practices with respect to all

types of intellectual property (IP) generated through their employment or enrolment at the University. The policy statement is of broad application, and it is recognised that individual issues could arise which this policy does not explicitly cover and with respect to which discretion may have to be exercised.

- 1.2 The policy statement has been prepared taking into account the Australian Vice-Chancellors' Committee Discussion Paper on Intellectual Property (1993), the model document issued by the National Tertiary Education Union (1994), and IP policies adopted by other Australian universities.
- 1.3 The University encourages creativity, scholarship and innovation and affirms the principle that knowledge and ideas should be available within the public domain for the benefit of the entire community. To this end, the results of University research should be published and widely disseminated. Without resiling from this principle, the University continues to be prepared to protect University IP and encourage its commercial development when this could be of financial benefit to the University, its employees and Australia.
- 1.4 This policy statement has to be read in the light of Australian law, as it is determined from time to time. While such a policy statement cannot determine or change the law on these matters, it does attempt to set down clearly how the University broadly proposes to manage IP rights and related issues in a manner that will best meet its policy objectives. Neither is it envisaged that this statement should override any formal contracts entered into – either previously or subsequently – by the University with respect to IP.
- 1.5 Given the importance of these matters, the University accepts the need to bring this policy regularly to the attention of its staff and students. Staff will be asked to acknowledge this policy as part of their contract of employment with the University.
- 1.6 The University reserves the right to modify or add to this policy at any time provided that any such policy change will in normal circumstances only apply to works, inventions and other subject matter in which IP rights subsist that come into being after the effective date of the change. In exceptional cases or unforeseen circumstances, the Vice-Chancellor may vary or depart from the terms of this policy if, in his judgement, doing so would better achieve the overall objectives of the policy, after consultation with those parties who have a direct interest in that case.

2. Definitions

- 2.1 The *University* is The Australian National University (ANU). The policy position of the University set out in this statement applies to all of its Schools, Faculties, Centres, Divisions, and other constituent parts such as the University Library, and to its wholly owned companies, such as ANUTECH Pty Ltd, unless the contrary intention appears.
- 2.2 *Intellectual Property (IP)* includes any discovery or other material whether capable of protection by way of patents, trademarks, copyright, circuit layouts, plant varieties, trade practices, and design legislation or not. *IP* also includes, where relevant, goodwill, know-how and confidential information.
- 2.3 *Commercialisation* is the process of gaining financial benefit and, in the present context, the financial benefit is gained from the IP of the ANU. *Commercialisation* includes protecting, managing and developing the commercial value of IP and research, most commonly through the creation of linkages with industry and the creation of commercial enterprises linked by formal legal agreements to the ANU.

- 2.4 *Staff* includes full-time academic and general staff employees of the University, and part-time employees to the extent that they make use of University facilities.
- 2.5 *Student* means any person, who is enrolled in a course, or in a course-unit or subject offered by the University, or who has been given permission by the University to audit a course-unit or subject, whether undergraduate or postgraduate.
- 2.6 All reference in this policy to *Deputy Vice-Chancellor* means the Deputy Vice-Chancellor or his/her agent.
- 2.7 In this policy, unless the contrary intention appears, a reference to *a member of staff* or *a student* includes a reference to that person's executors, administrators, successors and assigns.

3. Objectives of this Policy

- 3.1 This policy aims to establish a sound framework for the encouragement of invention, creative works and technology transfer. In doing so, it seeks to strike a balance between the interests of the University, and its staff and students. It also seeks to balance the significant public funding of University activity against the increasing need for the University to look to sources other than the Government for its funding.
- 3.2 The University's policy objectives in this area include:
- to sustain the climate for innovation and invention;
 - to provide a framework whereby staff and students are stimulated to identify, protect and develop the commercial value of potentially valuable research results and other creative work and to engage successfully in technology transfer;
 - to promote a better understanding of the various rights which the law gives for the protection of creative effort and thereby stimulate the proper protection of the University's economic investment in that effort;
 - to provide incentives for individuals and departments to encourage research and development and to pursue commercially valuable projects;
 - to encourage the establishment of collaborative research links with organisations outside the University;
 - to recognise student rights to IP generated in the course of their study at the University while at the same time asking student researchers, where it is relevant, to assign or licence rights to the University in exchange for participation in certain research programs so that the University can properly protect the IP embedded within its research and teaching programs and can manage new IP generated through such programs; and
 - to protect the moral rights of staff and students with respect to their intellectual achievements.
- 3.3 The factors relevant to a decision by the University on whether it will take action to protect its IP include:
- the effect on the University's research program;
 - the advice of the originator(s) of the IP;

- whether protection will be of value to the development and subsequent industrial application of the IP, especially involving mutually beneficial arrangements for the University and Australian industry;
- whether there is a possibility of others obtaining protection or commercially valuable IP incorporating the results of work carried out in, and owned by, the University;
- whether protecting the IP will increase its value as a means to attract support for further research and development in the University and/or to provide royalty and other income to the University, its staff, and any students involved;
- whether such action is desirable for protecting the University's reputation or maintaining the University's interest in the quality and technical efficiency of production under appropriate research and development licensing or joint venture agreements; and
- whether such action is desirable in the national interest to preserve public equity.

4. Issues of Ownership

Staff

- 4.1 The University understands itself to be essentially a community of scholars committed to the generation, preservation and transmission of knowledge. For this reason, the employment arrangements which have been agreed with *academic staff* do not require them to work fixed hours but instead, unless some variation has been specifically agreed, "to devote the whole of [their] professional time to the duties of [their] office", subject to certain conditions relating to other professional activities [Footnote](#). The duties specified normally include references to research and the advancement of knowledge in the field, to facilitating and managing learning through teaching, and to supervising graduate students, as well as to administration and outreach activities, appropriate to the level of appointment. The information sheet standardly attached to the letter of offer of appointment of *general staff* makes specific reference to the University's policy on IP. Under Australian law, the University is entitled to ownership of any IP developed, acquired, or contributed to by staff members in the performance of their duties and/or using resources and facilities provided by the University, except where otherwise agreed in writing or where the University states in this policy that it will not claim ownership.

Students

- 4.2 The University does not claim ownership of the IP which undergraduate or postgraduate students generate through activities associated with the University, unless they sign an agreement assigning their ownership rights to the University. The circumstances in which the University will seek such an agreement are set out in Section 5. In what follows, references which state or imply that the University might have a claim to IP generated by students are to be understood as referring to IP which the student(s) involved has agreed to assign to, or share ownership with, the University.

Scholarly and Artistic Works and Teaching Materials

- 4.3 Although the University is entitled to claim ownership of IP developed in the circumstances referred to above, *where the objective is open publication of scholarly work*, in keeping with its past practice the University will, in general, refrain from

claiming its ownership of the IP in published scholarly books, journal articles, conference papers and proceedings, textbooks, audiovisuals, computer programs, software, or other academic works authored by staff or students of the University. It will normally, however, claim ownership where such work has been specifically commissioned by the University, or where the net income from any particular scholarly work exceeds the financial threshold determined in Schedule A, as described in clause 10.2 below.

- 4.4 In particular, the University will normally allow copyright in course materials and syllabuses authored by a staff member or a student while employed or enrolled at the University, to rest with that person, subject to clause 10.2 below, provided the University has free, non-exclusive use of such materials, both during the period of that employment or enrolment and after the staff member leaves the employ of the University, or the student's enrolment is completed. The University will, however, claim ownership of specifically commissioned course materials (lecture notes, audio or visual materials, software, and the like) which have been developed to further its teaching function and result in specific considerations to the staff member(s) or student(s) involved. A *specific commission*, in this regard, is to be based on a contract signed by a member of the University Executive, or a Dean or Director, and may include financial benefit, a period of release from teaching, or a lighter teaching load for a period. Should the author of such course materials relocate to another institution, s/he may, at the discretion of the person holding the office which commissioned the work, be granted a non-exclusive licence to use the course materials for teaching purposes, as agreed in writing with the University at the time.
- 4.5 The University will in general refrain from claiming ownership of the IP in artistic, musical, or dramatic works created, composed, performed, or recorded by staff or students, except where these works have been specifically commissioned by the University. The University will allow copyright (including so-called mechanical, synchronisation and performing rights) in this type of work to rest with the originating artist or author, except where the net income from any particular artistic work exceeds the financial threshold determined in Schedule A, as described in clause 10.2 below. In particular cases, and subject to specific agreement, the University might agree to negotiate other arrangements. However, the University reserves the right to use artistic, musical, or dramatic works created, composed, performed, or recorded by staff or students for any not-for-profit purpose, after consultation with the originator(s). Both the originating artist or author and the University will acknowledge each other when making use of the work.
- 4.6 The cost to university libraries of purchasing scholarly works from commercial publishers is escalating even though those works often contain IP generated within the universities themselves. Wherever possible, copyright of scholarly work should be retained within the University, particularly where electronic rights are concerned. Difficulties can arise for staff and students seeking open publication of their scholarly work if the publishers expect the transfer of copyright wholly to themselves. In the light of clause 4.3, authors should take care, when negotiating contracts with commercial organisations to publish their work, to consider the University's best interests when responding to publishers' representations that copyright be assigned to them. Authors are encouraged to seek publishing agreements which acknowledge the University's entitlement to claim copyright and do not purport to transfer that copyright to the publisher. Also, the University strongly prefers that publishing agreements not preclude the University's making the material available in other ways (e.g. on the World Wide Web).

- 4.7 Where the University does not claim ownership of any works, it will not necessarily undertake to promote, support or defend any legal action in relation to, or arising from, such works.
- 4.8 Where an author requires documented evidence of his or her entitlements, the University may, on request of the author, and subject to clause 10.2 below, assign its rights under section 35 of the *Copyright Act* to any such work, in return for a non-exclusive, royalty free and irrevocable licence to reproduce, publish, perform, broadcast, disseminate and otherwise use the work for the University's teaching and research purposes only.
- 4.9 Where the University requires documented evidence relevant to its entitlements, the originator will provide the relevant documentation, in return for a clear statement of the originator's rights acknowledged in accordance with this policy.
- 4.10 Where teaching materials, research equipment, multimedia products, computer programs or software are being developed beyond the immediate requirements for teaching or research at the ANU, with a view to commercialisation, and with substantial use of University resources, the University will claim ownership of all IP rights. Staff members and students developing materials in this way can seek advice from ANUTECH on the appropriate protection of the relevant IP.

Externally Funded and Collaborative Research

- 4.11 Wherever possible, the University seeks to preserve its IP rights even when the research or part of the research is externally funded. It does so in order to ensure that the academic activities of the University are not detrimentally affected, i.e. to ensure that the rights of staff to publish research, engage in academic discourse and conduct future research are protected. It also seeks to ensure that if any IP is at any time determined to be worth commercialising the University ownership of that property has been protected and not assigned to an external party at an early stage in the research.
- 4.12 The University recognises that its own interests need to be balanced against the interest of the external funding agency and that under certain circumstances it may be necessary to assign some or all of its IP rights in order to obtain external funding, or in its commercial interest. In doing so, the following principles are indicators of those matters which will guide the University's approach to IP agreements with external parties:
- Where an external funding agency contributes only a minor component of the funding of a project, it should have no entitlement to any of the IP;
 - Where an external funding agency seeks to share IP rights with the University, it should be done on a *pro-rata* basis based on the contributions to the project of the external agency, the University and any other parties. In determining the University's contribution to the project, the full costs including all direct and indirect costs (such as infrastructure/support costs and an amount equivalent to the value of the estimated staff time associated with the project) should be taken into account;
 - Where an external funding agency seeks to have full ownership of the IP, this should only be agreed if the agency has paid for the full cost of the project – that is, all direct costs as well as all indirect costs including infrastructure/support costs – an amount equivalent to the value of the estimated staff time associated with the project and in most cases a profit margin. In negotiating such cases, the rights of University staff or students to make appropriate use of the IP should be

protected and, where applicable, the commercial interest of the staff member or student recognised;

- Wherever possible, the University attempts to ensure that the rights of the staff member or student to publish research from externally funded projects is retained. The University only agrees to accept funding from agencies which restrict the rights of publication if the staff members or students involved are aware of the consequences of the restrictions on their ability to publish and their future research. In such cases, the external funding agencies would be expected to cover the full costs of the project;
 - All IP agreements with external funding agencies or collaborating partners should be project-specific. ‘Background’ IP – that is, pre-existing IP which each party brings to the proposed project but which does not form part of the agreement – should be clearly identified and excluded from project-specific IP ownership. Also, ‘incidental’ IP – that is, IP generated by staff or students of the University in the course of the project but the generation of which was not a clearly identified objective of the project– should normally be excluded from any IP contract relating to project specific funding by an external party, so that ownership is retained by the University. This exclusion should explicitly apply to any ‘incidental’ IP generated later in time than the period during which the project is being funded or supported by an external party;
 - IP ownership agreements should explicitly provide that any patents arising from externally funded projects should be co-authored by all inventors;
 - All agreements should provide that if the scope of a project changes substantially from the originally agreed plan or ‘milestones’ then that agreement should be renegotiated.
- 4.13 With respect to IP generated by research conducted in collaboration with another university, or some other institution, the University’s approach will be to seek equitable shares of the IP, guided by the principles in clause 4.12.
- 4.14 Where staff appointed to the University bring with them IP generated under the auspices of a previous employer and on which that previous employer or that staff member has a reasonable claim, issues concerning the apportionment of ownership arising from further development of that IP will be guided by the principles in clause 4.12.
- 4.15 The University recognises that the commercial development of products resulting from use of the ‘traditional knowledge’ of indigenous peoples should be subject to benefit-sharing negotiations with the providers of such knowledge, consistent with Australia’s National Strategy for the Conservation of Biological Diversity and international commitments.

Fractional Appointments

- 4.16 Where the development of IP has been specifically commissioned by the University in accordance with clauses 4.3, 4.4 or 4.5, or its development has involved significant use of resources and facilities provided by the University, the University will not distinguish between full-time and fractional appointments with respect to claims of ownership of IP. Where a staff member holding a fractional appointment develops IP of which the University would otherwise claim full ownership but which the University is satisfied has been developed in full or in part without significant use of its resources and facilities, the University may apportion equitable shares of ownership rights between itself and the staff member, generally on a *pro-*

rata basis based on the fraction of the appointment. Apportionment of rights will be determined by the relevant Dean or Director, and any disagreement will be resolved by the Deputy Vice-Chancellor.

Adjunct Academic Appointees, Visiting Fellows, etc.

- 4.17 Subject to clause 4.18 below, adjunct academic appointees, Visiting Fellows and individuals working at the University and making significant use of the University's resources and facilities shall be treated under this policy as if they were ANU academic staff for the period of their appointment. Nevertheless, where the visitor raises an issue of equitable apportionment of rights in the light of some other appointment that visitor might also have, the matter will be determined in the first instance by the relevant Dean or Director using this policy as a guide – in particular, clause 4.12 – and any disagreement will be resolved by the Deputy Vice-Chancellor. The arrangements to pertain in each case will be agreed in writing with the appointee as part of their terms of appointment.
- 4.18 In the case of adjunct academic appointees and Visiting Fellows who also hold a substantive appointment at another institution, however, the University will seek an agreement whereby the University will not claim ownership of any IP generated by such persons in the course of their employment by the other institution and that other institution will not claim ownership of any IP arising from the adjunct or visiting appointment at the University. The agreement will contain an agreed procedure for resolution of any dispute or disagreement over whether some particular IP was generated in the course of the person's substantive appointment at the other institution or arose from the adjunct or visiting appointment at the University.

Transfer of Ownership

- 4.19 The University reserves its right to transfer the ownership of any IP claimed under the above provisions to third parties, either wholly or on a shared basis, following consultation, where possible, with the originator(s) of the IP.

5. Involvement of Students in Activities likely to lead to the Generation of Intellectual Property

- 5.1 While the University does not, in general, claim ownership of the IP which undergraduate or postgraduate students generate through activities associated with the University, as stated in clause 4.2 above, it will normally ask individual students to sign an agreement assigning their ownership rights where:
- the generation of this IP has required substantial use of University resources and/or services beyond that which is ordinarily provided to students; or
 - the generation of IP has resulted from the use of pre-existing IP owned by, or existing within, the University; or
 - the IP belongs to a body of IP generated by a team including members of staff of which the student is also a member; or
 - the IP results from collaboration, either formal or informal, in a research project with staff; or
 - the IP has been generated as a result of funding provided by or obtained through the University.

- 5.2 The University will take reasonable steps to protect students' rights to include their research in their thesis and to be able to publish papers and theses, whether that research has commercial potential or not, subject to consideration of IP issues canvassed in this policy.
- 5.3 Increasingly students are being invited to work on commercially, politically or culturally sensitive areas of research. Regardless of the nature of their research, students must be able to meet the University's examination requirements. In particular, the University will insist that any conditions attached to the placement of students in another organisation as part of a degree course, or any conditions attached to external funding for research projects in which research students might work as part of a degree course, not impose limitations on the ability of those students to include the results of their research in their thesis. Likewise, in neither of these kinds of arrangements will the University agree to conditions which would permit external organisations to require alterations to a student's thesis before submission for examination, other than to request the maintenance of confidentiality of their own IP. In special circumstances, the University is prepared to agree to confidentiality arrangements, such as confidential appendices, limiting access to theses for a certain period, and confidentiality arrangements with examiners, subject to clause 5.4, although it should be recognised by all parties that such confidentiality agreements might not be sufficient to protect the novelty of patent applications. Any disputes are to be resolved in accordance with section 11.
- 5.4 Where students are involved in activities that could lead to the development of IP over which the University or a third party may claim ownership, rights or control over IP, the following conditions apply:
- The nature of the proposed work, and the potential IP issues, should be made clear to students by their supervisor(s) or Head of Department before they undertake it;
 - Participation in the research should not interfere with the assessment of the student's academic performance. In particular, the protection and commercialisation of IP should not be allowed to delay unduly or otherwise negatively impact on this assessment;
 - Students should receive considerations and returns commensurate with those provided for staff, including recognition of their moral rights in any IP they might have generated; and
 - If the student's future career choices could be adversely affected by their choosing to work in a confidential area of research, the potential disadvantages of such arrangements should be carefully explained to the student before any agreements are signed.
- 5.5 In general, the University requires supervisors electing to supervise a student in an area likely to lead to claimable IP to complete a confidentiality and IP assignment agreement with the student before the work is commenced. In particular, students and their supervisors should not enter into any agreements with outside bodies without first seeking advice from the Research Services Office, in the first instance, and the Dean of the Graduate School, or ANUTECH as appropriate.
- 5.6 Clause 5.1 sets out the conditions where it is appropriate for students to relinquish ownership in IP which they might generate through their involvement in specific research projects. A standard University agreement is available for this purpose.

Signing must be a free act by the student, in full knowledge of the consequences of what s/he is doing, and cannot be a condition for enrolment in the University.

5.7 In all such cases, prior to signing any agreement concerning IP, students are advised to seek independent advice from a person who is removed from the immediate administrative framework of the academic work and who is well informed on IP matters and plagiarism. Because of the possibility of conflict of interest it is not appropriate for the University Legal Officer to provide such advice.

5.8 Where organisations seek to keep material secret, the University and its agents, such as ANUTECH and the Research Services Office, will seek agreements which limit the time for which any material needs to be kept secret.

6. Moral Rights

6.1 The University aims to respect and protect the moral rights of originators of IP. In accordance with Australian law, that means:

- the right to be identified in a clear and reasonably prominent way as the author of a work if it is reproduced in a material form, or published, or performed or exhibited in public, or transmitted, or adapted (the right of attribution of authorship);
- the right not to have authorship falsely attributed
- the right of integrity of authorship of a work and not to have the work subjected to derogatory treatment, i.e., distorted, mutilated, or altered in a way that is prejudicial to the author.

Universities have long-standing codes of good academic practice which include the recognition of these moral rights.

6.2 Accordingly, the University recognises the right of originators to participate in decisions regarding the commercialisation and use of IP generated by them. The originator of the IP would normally be consulted prior to the University entering into any contracts for the sale, commercialisation or use of that IP, including providing the originator reasonable opportunity to view and comment on any such contracts.

6.3 The University will also use its best endeavours to assist its staff in ensuring that the following principles are observed:

- Where the work of another, or part of it, is used, the use shall be appropriately attributed;
- If the work of another is altered or distorted in any way, it shall not be altered in such a way as to harm the academic or personal integrity of the originator.

What may cause that harm shall be assessed according to what is reasonable in the circumstances. The determination of what constitutes reasonableness 'in the circumstances' must take account of both the *Copyright Act* and of the codes of practice – written or unwritten – existing in our academic culture.

7. Identification and Protection of IP

7.1 The identification of and timely protection of promising IP is an essential first step in the commercialisation of IP. It is therefore important that staff and students are vigilant in considering the potential benefits and applications which might flow from their work.

- 7.2 Staff and students are required to take the appropriate steps indicated in this policy to protect the University's IP. Since in relation to applications for patents disclosure prevents the granting of patents, staff and students shall not publish, or otherwise disclose patentable University IP without first ensuring its protection. While patenting may impose minor delays on publication, these can be minimised and, in some cases, avoided through appropriate drafting. Advice in this regard can be obtained from ANUTECH.
- 7.3 Staff and students should be aware of how the University's interests in its future IP may be compromised by 'material transfers agreements' provided to researchers by external organisations and always seek advice before signing any such agreements.
- 7.4 Where a staff member or student develops IP over which the University might have a claim to ownership and which has commercial potential, the University requires this to be notified on a confidential basis to the Dean or Director, who will inform the Deputy Vice-Chancellor or his agent. A disclosure form which may be used for this purpose is available from the Deputy Vice-Chancellor's office or from ANUTECH. In making this disclosure, staff members and students are obliged to disclose the names of any other person who might reasonably have a claim to be acknowledged as an originator or an owner of the IP in question. Commercialisation of the IP will then be managed according to the procedures set out below in section 9.
- 7.5 Cooperative Research Centres (CRCs) operate under contracts signed by the University which cover the ownership, protection and management of IP. Staff involved in CRCs are bound by these contractual undertakings and their supervisors will need to ensure that relevant staff are familiar with them. Students whose seek to work in CRCs will be required to sign specific individual acknowledgements or contracts referring to the IP arrangements under which the CRC operates.

8. The Research Services Office and ANUTECH

- 8.1 Two organisations have been established by the University to deal with outside organisations wishing to interact with the University. These two organisations are the Research Services Office (RSO) and ANUTECH Pty Ltd.
- 8.2 ANUTECH and the RSO consult with each other on all projects where any overlap in their respective activities occur. This consultation enables the University to audit the assignment of any IP and to reduce the risk of inappropriate agreements. Whether the management of the IP arising from such projects is provided by the RSO or ANUTECH is at their mutual discretion.

The Role of the Research Services Office

- 8.3 The RSO manages applications for and the acceptance of funding from external bodies including grants, research contracts and consultancies. It does not, however, deal with funding which is provided for commercial activities or that involving the commercialisation of the University's IP, both of which are dealt with by ANUTECH. In most cases, research funding from commercial companies is managed by ANUTECH.
- 8.4 The RSO manages interactions concerning research project funding with most Government and other public sector organisations as well as from non-profit organisations such as the Heart Foundation. Most sponsored research projects are governed by a specific set of terms and conditions that include provisions dealing with IP. Further, some of this funding (including some funding from the Australian Research Council programs) requires the University to put in place agreements with

industrial partners which make provision, amongst other things, for distribution of outcomes (as measured through IP) and protection of information. In these cases, the RSO consults with ANUTECH on the most appropriate agreement to use.

- 8.5 The RSO negotiates such agreements and contracts with the external funding agency to ensure that they are acceptable to the University in terms of its accounting, student, staff, IP and other policies, and ensures that they do not involve the University in agreeing to unforeseen infrastructure or other costs or impose onerous conditions on staff or students. The RSO is responsible for ensuring that the grant agreements and contracts handled by the Office accord with the University's IP policy. Where necessary, the Office seeks legal advice on these agreements and contracts from the Legal Officer or from ANUTECH. The RSO has the authority (through the Council delegation process) to accept funds from external agencies and, therefore, has the authority to negotiate agreements and contracts that include IP clauses.

The Role of ANUTECH

- 8.6 ANUTECH Pty Ltd is a commercial company fully owned by the University. It acts as the University's preferred organisation to manage the protection and commercialisation of IP over which the University claims ownership and arranges agreements with commercial organisations and companies including licences, sales, research contracts and consultancies. It facilitates technology transfer and provides research project management services and consulting advice to staff and students. ANUTECH's advice on these matters is given free of charge to all staff and students in accordance with the operational agreement between the University and ANUTECH.
- 8.7 ANUTECH normally negotiates appropriate IP agreements on behalf of the University and in consultation with the staff and students originating the IP. These agreements include licences, Research and Development Agreements, Sales, Material Testing Agreements, and Confidentiality Agreements in order to best facilitate commercialisation of the IP.

9. Commercialisation of IP

- 9.1 Once a staff member or student has notified the Deputy Vice-Chancellor or his agent of the development of IP over which the University might have a claim to ownership and which has commercial potential, the Deputy Vice-Chancellor will refer the matter to ANUTECH for evaluation unless the Deputy Vice-Chancellor agrees that the potential commercialisation of the IP may be explored through other channels (see clauses 9.8 and 9.9 below).
- 9.2 Where a notification is referred to ANUTECH for evaluation, both parties – ANUTECH, and the staff member(s) or student(s) and their formal supervisor – will sign a disclosure and confidentiality agreement. ANUTECH will provide advice to staff, students and the University as to the timing and the nature of any protection that is appropriate for the IP. If ANUTECH believes that protection of the IP is warranted, it will make a recommendation to the relevant School, Faculty or other entity. ANUTECH will arrange for the filing of the patent application or take other steps to protect the IP.
- 9.3 ANUTECH will undertake a preliminary assessment of the IP and will normally notify the staff member or student concerned within thirty (30) days as to the company's willingness to manage and commercially develop the IP on behalf of the University. If ANUTECH and the staff member or student agree to work together to

- pursue commercialisation of the IP, an appropriate agreement will be completed between the staff member or student and ANUTECH. ANUTECH will thereafter manage the commercialisation of the IP, in collaboration with the staff member or student.
- 9.4 Staff or students who have generated IP being commercialised by ANUTECH shall provide the company with all reasonable assistance in the commercialisation of that IP, including providing information promptly, attending meetings and executing documents without delay.
- 9.5 Whether the commercialisation of IP is to be managed by ANUTECH or by some other approved agency, before contracts are signed the originator(s) must also obtain the approval of the relevant Dean or Director. The cost of obtaining protection for IP, and the benefits, will be shared between the School and/or Faculty in which the IP was developed, the University as a whole, and by ANUTECH when the company is briefed to manage the commercialisation of the IP.
- 9.6 If ANUTECH and the staff member or student do not agree that ANUTECH should manage the commercialisation of the IP, the staff member or student may apply in writing to the Deputy Vice-Chancellor for permission to conduct the commercialisation of the IP through other channels, in accordance with the procedures in clauses 9.8 and 9.9 below.
- 9.7 Where ANUTECH and/or the University determines to incur no further expense in relation to the protection or further development of particular IP, the staff member or student involved in the origin of that IP may apply for or continue such protection or further development, at his/her own expense or the expense of another contracted party. In these circumstances, the University may assign or licence its rights in the IP to the relevant staff/students on fair terms, taking into account costs incurred by the University and ANUTECH up to that date.
- 9.8 Where a staff member or student wishes the commercialisation of the IP to be explored through channels other than ANUTECH, s/he must apply in writing to the Deputy Vice-Chancellor, through the relevant Dean or Director, for permission. Such an application should provide sufficient information to allow for an exploration of the feasibility of proceeding in this manner, of the qualities of the proposed partner, and a draft form of agreement on initial exchange of information with the proposed partner.
- 9.9 If the Deputy Vice-Chancellor gives permission for this feasibility investigation to proceed, negotiations with the proposed partner may commence. These should lead to the preparation of a contract to be signed by the Deputy Vice-Chancellor on behalf of the University and by the proposed partner, which will normally be accompanied by a business plan for the commercialisation of the IP. In these circumstances, the University will also require an agreement with the staff member or student to the effect that the income from the commercialisation of the IP will be distributed in accordance with this policy. Oversight of the administration of such commercialisation activities shall be the responsibility of the Research Services Office, unless other contractual arrangements have been made; for example, as in the case of CRCs.
- 9.10 The above procedures will not apply to commissioned works for which the provisions of the *Copyright Act* would normally apply. For such cases, the University will normally enter into an agreement regarding the sharing of revenue with the authors at the time that the works are commissioned.

10. Distribution of Benefits from IP

- 10.1 The University seeks to encourage innovation and the commercialisation of IP generated under its auspices and wishes to establish an equitable distribution of any income derived from that commercialisation, as an incentive for the generator(s) of the IP and the University community as a whole. Relevant IP income may arise from royalties, licence fees or net return on sales but shall expressly exclude any monies paid to the University for research or for a development program aimed at ultimate commercialisation. Such IP income shall be distributed in accordance with the policy set out below.
- 10.2 In those cases where the University refrains from claiming ownership (in accordance with clauses 4.3-5 above) and where the commercialisation of the IP in such products has not been carried out by any agency of the ANU (i.e. by some part of the University nor by a company wholly or partly owned by it), the University will also waive any claim upon the income received by the originator – such as royalties, licence fees and return on sales – up to the financial threshold approved by the Vice-Chancellor as part of Schedule A (attached). When the net income (before tax) from any particular scholarly or artistic product exceeds the approved financial threshold, the University claims ownership and requires the staff member or student to declare the income received to the relevant Dean or Director, who will inform the Deputy Vice-Chancellor, and to enter into an agreement for the distribution of such income in accordance with Schedule A, or as otherwise agreed with the Deputy Vice-Chancellor.
- 10.3 The financial benefits from the commercialisation of all other IP generated under the auspices of the University, including patented inventions and any product whose commercial development has been carried out by some agency of the University or has involved substantial use of the ANU's resources, will be directed, in the first instance, as follows:
- to the payment in full of the costs, both legal and administrative, incurred in protecting the IP; including those incurred by the School or Faculty; then
 - to the payment in full of the costs of commercialisation (as distinct from the costs of generation) of the IP; and then
 - to the payment of 1% of gross income to the IP Fund for litigation related to IP protection.
- 10.4 All additional income received, net of the disbursements in clause 10.3 above, subject to the overriding discretion of the Vice-Chancellor, will be distributed as set out in the attached Schedule B. The distribution of net earnings is subject to four levels of priority:
- PRIORITY 1: the generator(s) or originator(s) of the IP. Where more than one person has been involved in generating the IP, the benefits flowing to the originator will be divided into agreed shares, taking into account their relative contributions. (Staff might find it advantageous to the research effort of their department or group to direct their share of financial benefits into a University restricted account (a Q account) rather than receive it as personal income);
- PRIORITY 2: ANUTECH if responsible for marketing the IP (if ANUTECH is not responsible, then the return under this priority is to be divided between Priorities 3 and 4);
- PRIORITY 3: the Research School, Faculty, Centre or Division;

PRIORITY 4: the general revenue fund of the University, a first call upon which would be recovery of patent expenses not otherwise recouped (e.g. the cost to the University's general revenue fund of patenting inventions which have not proved commercially successful).

- 10.5 In cases where ANUTECH, or a subsidiary or an entity in partnership with ANUTECH, undertakes manufacturing and sales of instruments or other product derived from and protected as University IP, then negotiation on a case-by-case basis is necessary. The distribution pattern set out in the attached Schedule B is to be used as a guide for such negotiation on the distribution of income.
- 10.6 Where more than one staff member or student is involved in developing the IP, the University will deal with them collectively. Similarly, where the IP has been generated by more than one person the financial thresholds determined in Schedules A and B will apply to them collectively. It is the responsibility of those staff members and students to establish the relative contributions to the IP and the consequent sharing of the originators' portions of the income. In cases of dispute, the Deputy Vice-Chancellor will adjudicate.
- 10.7 Where the financial benefit from commercialisation of IP is in the form of shares the University can realise the value of the shares and distribute the income in accordance with the attached Schedule B; and/or the originator may hold shares in his or her own name. Distribution of benefits relating to shares will be negotiated on a case by case basis between the originator(s) of the IP and the Deputy Vice-Chancellor.
- 10.8 Where earnings are, in the first instance, in foreign currency, the financial thresholds in Schedules A and B will apply to their equivalents in Australian dollars, calculated in accordance with the taxation convention which uses the mean conversion rate for the month in which payment was made to the earner of the income.
- 10.9 Changes to these Schedules require the approval of the Vice-Chancellor, who will first seek advice from Deans and Directors, and the Finance Committee.

11. Dispute Resolution

- 11.1 In the first instance, the Deputy Vice-Chancellor will be the arbiter over whether the University has a legitimate claim over IP developed by staff or students. Where staff or students believe that they have grounds to contest the University's claims, they should bring this to the attention of the Deputy Vice-Chancellor in a timely manner. Should they disagree with the ruling of the Deputy Vice-Chancellor, they may address their case to an independent arbiter agreed to by the Deputy Vice-Chancellor and by the parties in dispute. Failing agreement on an independent arbiter, the Vice-Chancellor will nominate an independent person to arbitrate the issues. Subject to any decision by a court or legal tribunal, the decision of the arbiter will be regarded by the University as final and binding on all parties. The process of determining the ownership of IP should be completed expeditiously and, except in unusual circumstances, within one month.
- 11.2 Where staff members or students are unable to reach a mutually satisfactory agreement with ANUTECH over the commercialisation of IP, they may refer the matter to the Deputy Vice-Chancellor, who will attempt to have the matter resolved by mediation within a period of one month. In the event that this is not successful, the matter will be determined by an independent arbiter appointed by the Deputy Vice-Chancellor and agreed to by the parties. Failing agreement on an independent

arbitrator, the Vice-Chancellor will nominate an independent person to arbitrate the issues. Subject to any decision by a court or legal tribunal, the decisions of this arbitrator will be regarded by the University as final and binding on all parties.

12. Signing on Behalf of the University

12.1 In order for agreements described in sections 5 and 9, including Confidentiality Agreements and Materials Testing Agreements, to bind the University, they shall be signed only by one of the following entities:

- (a) ANUTECH;
- (b) The Research Services Office;
- (c) The Vice-Chancellor; and/or the Deputy Vice-Chancellor, or a person authorised by either of them to sign on the University's behalf.

13. Staff or Students Leaving the University

13.1 Staff members or students who have participated in the generation of IP for which the University claims ownership and who wish to leave the University may negotiate for the assignment in whole or in part of the IP, either to another institution or to themselves personally. Such negotiations would be conducted in the case of externally funded research grants by the Research Services Office or as appropriate by ANUTECH. These negotiations would be on a case-by-case basis, taking into account the contribution from the ANU and the cost of that contribution over the period since the beginning of the research.

SCHEDULES FOR DISTRIBUTION OF NET INCOME

Schedule A

This schedule deals with income derived from the commercialisation of any scholarly or artistic products where the commercialisation *has not* been carried out by any agency of the ANU. In these cases (for example, the publication of a scholarly book by a commercial publishing house) the return to the author is usually a small proportion of the sale price.

As provided in clause 10.2, when the cumulative income (before tax) from the commercialisation of any particular scholarly or artistic product exceeds the financial threshold of \$25,000, the University claims ownership and requires the staff member or student to declare the income received to the Deputy Vice-Chancellor and to enter into an agreement for the distribution of such income in accordance with the table below, or as otherwise agreed with the Deputy Vice-Chancellor.

	Originator(s)	School/Faculty/Centre	University
First \$25,000	100%	-	-
Next \$15,000	70%	20%	10%
Next \$100,000	60%	25%	15%
Further amounts	50%	30%	20%

Schedule B

This schedule deals with income derived from the commercialisation of any scholarly or artistic products whose commercialisation *has* been carried out by some agency of the ANU, which agency therefore ought to share in the distribution of income, with a consequent reduction in the other shares from those in Schedule A.

As provided in clause 10.4, in respect of each commercially developed product or patented invention, and subject to the overriding discretion of the Vice-Chancellor, the income received, net of the disbursements in 10.3 above, will normally be distributed as set out in the table below.

This table assumes that ANUTECH has had management of the commercialisation of the product or invention. If some other agency of the University has undertaken the developmental costs of commercialisation, that agency will be entitled to the share in the second column. In particular cases, variations in the shares may be approved by the Deputy Vice-Chancellor. For example, if the University, or ANUTECH itself, has contributed research and development support in the commercialisation process, then the share to ANUTECH will be determined by negotiation, and approved by the Deputy Vice-Chancellor.

	Originator(s)	ANUTECH	School/Faculty/Centre	University
First \$40,000	50%	20%	20%	10%
Next \$100,000	40%	20%	25%	15%
Further amounts	35%	15%	30%	20%

Where the income net of the disbursements mentioned in clause 10.3 is derived from sales, including sales of items for more than \$100,000, then the distribution is calculated on a cumulative definition of income.

Footnote from 4.1:

The quoted words are from the Conditions of Appointment signed by academic staff since 1986. Professional time has not been officially defined, but it could be taken to encompass all work undertaken which utilises the knowledge and professional or other skills required for the performance of the duties for which the University employs that staff member and for which s/he receives remuneration. Conditions of Appointment signed by academic staff prior to 1986 express the same point in terms of “devote full time and attention”. The post-1986 agreements also provide that an academic “will only practice a profession, accept a commission, act as a director or secretary of a corporation (other than a family company managing personal and family affairs), be a member of a partnership or conduct any business, occupation or outside work which does not affect the performance of these duties. Permission of [their] supervisor must be obtained for these activities and the University may attach conditions to such approval.”