

**Submission to the
House of Representatives
Industry, Science and Innovation Committee**

**Inquiry into research training and research
workforce issues in Australian universities**

June 2008

IRU Australia Member Universities





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1 Introduction

About Innovative Research Universities (IRU) Australia

Innovative Research Universities Australia (IRU Australia) is pleased to present this submission to the inquiry into research training and research workforce issues in Australian universities.

IRU Australia is consortium of seven research-intensive universities covering five States. Six of the seven universities are in the top 500 of the 2007 Shanghai Jiao Tong ranking. In 2006, the member universities collectively attracted research funding of \$245 million. In the same year, they had over 7,700 PhD and Masters by Research candidates, representing 16 per cent of all such enrolments in Australia. This included 1,242 international candidates.

The global knowledge economy, human capital development and research training

Universities make a core contribution to the national innovation system through the production of graduates and researchers. The Australian higher education sector produces approximately 240,000 graduates per year, including 5,500 PhD and 1,600 Masters by Research holders.

The progressive shift from a resource-based to a knowledge-based economy in Australia, however, is creating growing and unprecedented demands for research graduates across industry sectors, universities and research organisations. The Australian government has acknowledged that Australia's R&D spending, at 1.8 per cent of GDP in 2004, is not adequate for Australia to maintain its international competitiveness¹. The capacity of Australian governments, industry, business and research organisations to boost Australia's future R&D effort and innovation outcomes will be heavily reliant on the nation's access to a highly skilled research workforce.

The Queensland Chief Scientist, Peter Andrews has estimated a national shortfall of 75,000 scientists, preferably with PhDs in the enabling sciences². This reflects a growing worldwide trend, with the European Union and the US projecting substantial shortfalls in qualified scientists, fuelling the global competition to attract high quality researchers. An innovative knowledge-based economy, however, is not just reliant on a qualified scientific workforce. The important role of the humanities, arts and social sciences in innovation is now well documented. Without appropriate policy responses in Australia, there is a risk that the shortfall in qualified research graduates across all disciplines will impact adversely on the nation's innovative capacity and associated economic, social and environmental outcomes.

¹ Senator the Hon Kim Carr, *Science Serving Society*, Address to National Press Club of Australia, 19 March 2008.

² Andrews, P., *Building Brain-Based Industries? First, find the Brains*, 2004.



2 The key challenges and opportunities

Australia faces five key challenges and opportunities in relation to research training and the academic workforce.

1. *Increasing domestic research higher degree attainment levels across all segments of the Australian community*

There are a number of indicators which suggest that Australia needs to plan very carefully to ensure that it has access to the high level skills required to meet future demands for research services in both the public and private sectors:

- Australia has only eight PhDs per thousand in the workforce, compared with 11 in the US, 20 in Germany and 28 in Switzerland³.
- The number of domestic students commencing higher degrees by research has been declining since 1995 and without abatement in more recent years. Commencing domestic student load (EFTSL) dropped from 6,838 in 2001 to 5,885 in 2006, a decline of 14 per cent in five years⁴.
- The Australian academic workforce is ageing⁵, with projections suggesting that the supply of new graduates will not go close to matching attrition from the system through retirement⁶.
- Despite significant improvements through improved student support frameworks, student attrition from research higher degrees remains high in Australia. The results of one Australian study⁷ which analysed data from seven universities found that attrition rates, five years after commencement, ranged from 14 per cent in Engineering to 61 per cent in Business, with an average of 29 per cent. This reflects international trends. The Council of Graduate Schools in the United States, for example, has launched an ambitious seven-year PhD Completion Project⁸ to address the 'tremendous waste of America's financial resources and human energies' through PhD student attrition.

There are also important challenges to be addressed in terms of the distribution of research higher degree attainment across the Australian community.

³ Senator the Hon Kim Carr, *Address to ANU Luncheon with Victorian Business Leaders*, 26 March 2008.

⁴ DEST, Higher Education Student Statistics, 2001 and 2006.

⁵ Hugo, G. (2008) *Demographics: the need for renewal*, conference paper presented to the Council for the Humanities, Arts and Social Sciences, PhD in the Humanities, Arts and Social Sciences Workshop.

⁶ Group of Eight, *Adding to Australia's Capacity: The Role of Research Universities in Innovation*, A submission from the Group of Eight to the Review of the National Innovation System, April 2008.

⁷ Bourke, S., Holbrook, A., Lovat, T. and Farley, P., *Attrition, Completion and Completion Times of PhD Candidates*. Paper presented at the AARE Annual Conference, Melbourne, 2004.

⁸ Refer <http://www.cgsnet.org/Default.aspx?tabid=157>



In 2006, only 18 Indigenous Australians completed PhDs and a further 15 completed Masters by Research. In the same year, Indigenous students represented less than one per cent of commencing research higher degree enrolments, a figure less than half of Indigenous Australians representation in the Australian population as a whole⁹. The 2006 ABS Census¹⁰ indicates that 6.7 per cent of non-Indigenous Australians with a non-school qualification held a postgraduate degree, compared with only 1.4 per cent of Indigenous Australians.

The 2006 Census also demonstrates significant variances in postgraduate degree attainment across different regions of Australia. The Census indicates that 6.0 per cent of Australians aged between 25 and 54 years with non-school qualifications had a postgraduate degree. The equivalent figure for Sydney is 8.7 per cent and Brisbane 6.7 per cent. In contrast, the Hunter Statistical Division in NSW records a figure of only 3.4 per cent and the Northern Statistical Division in Queensland records a figure of only 3.7 per cent. Both these Divisions include major cities (Newcastle and Townsville) and the figures are much lower for Divisions further removed from regional cities and large centres.

2. Capitalising on our success in international education to build Australia's human capital

International education now represents Australia's third largest export industry. International education is important to Australia, not only in economic terms, but also in terms of international trade and diplomacy, links with the global innovation system, access to skilled migrants, and our contribution to developing countries.

The challenge for Australia is to look for opportunities to capitalise on the increasing borderless nature of the global economy and the consequential increased mobility of people. This needs to include strategies for attracting the world's 'best and brightest' to Australia to undertake research training. There would be multiple benefits to be derived from attracting more international research students, including:

- Increased access to a valuable pool of talented researchers and prospective Australian citizens;
- Strengthened potential for future international research collaborations through our international research alumni;
- Diversifying the HDR cohort in Australian universities, thereby building stronger research training communities with access to a broader knowledge, cultural and experiential base.

While Australia leads the OECD in international students as a percentage of all higher education coursework enrolments, it falls substantially behind countries such as the United Kingdom, United States, Switzerland and France in international research student enrolments as a percentage of total research enrolments¹¹. In this regard, the opportunities arising from the success of the university sector in building a strong international student market have not yet been fully realised. Universities have the capacity to increase the numbers of international research

⁹ DEST, Higher Education Student Statistics, 2006.

¹⁰ Australian Bureau of Statistics, *2006 Census of Population and Housing*, Community Profile Series: Indigenous Profile, Table I28.

¹¹ Organisation for Economic Cooperation and Development, *Education at a Glance 2007: OECD Indicators*.



students undertaking research in Australia. Our international reputation for high quality educational provision also positions Australia well to become a country of choice for research students.

Government policy, however, has not fully kept pace with the changing dynamics of the global education market. UNESCO has coined the phrase ‘the new geopolitics’ of higher education which reflects an international shift from student recruitment to bolster cash-strapped universities to higher education as a competitive ‘weapon’ for attracting elite talent¹².

Australia needs a new generation of government policies and funding programs if it is to realise its potential for attracting international research students and accessing the global pool of talent.

3. *Updating research training and support for research students to reflect a changing environment*

The Australian Council of Deans and Directors of Graduate Studies (DDOGs) made the following comment in its submission to the innovation review:

The nature of research training is changing as it responds to national and global needs. Graduate outcomes are diverse as we prepare students for a range of employment opportunities and careers. Innovation is fostered in industry, commerce and academe and PhD programs need to improve the job readiness of our graduates so they have the skills to work in an interdisciplinary and internationally collaborative workforce. The Western et al.¹³ reported that students felt able to work at the frontiers of their disciplines and were able to contribute to scholarship and research but were less convinced that they acquired the team based and other generic skills relevant to their careers.

Universities are needing to significantly reform, supplement and enhance their approaches to research training to ensure that they are producing graduates with the attributes and capabilities required to make valuable contributions in Australian and international industry, business, government and academic settings. In addition, both domestic and international students have growing expectations of a value-added experience which goes substantially beyond traditional models of research training.

This places additional pressure on University resources and also requires complementary changes in government policy and programs.

4. *Safeguarding the quality of research training through full-cost funding*

IRU Australia, in its submission to the Review of the National Innovation System, referred to the ‘vicious cycle’ created by the lack of full-cost funding for Australian Competitive Grant (ACG) research projects. The ‘vicious cycle’ refers to the accumulating impacts of the lack of full-cost funding, including:

- Increased reliance by universities on the cross-subsidisation of research from non-research sources, particularly international student fees.

¹² For example, see <http://www.educationalpolicy.org/pub/commentary/080208.html>,

¹³ Western et al. , (2007) *Survey of Graduate’s Employment Outcomes - 5 to 7 Years Out*. University of Queensland.



- A national research system which is left exposed to significant risks in the event of a downturn in the international student market, leading to a lack of confidence by universities to invest in new research infrastructure and provide research staff with tenure.
- Risks that the quality of course delivery and student services will suffer with a continued transfer of student fee income from learning and teaching budgets to research budgets. International perceptions of the quality of the Australian higher education system will have a major impact on our ability to attract talented international researchers and research students. It is far preferable for surpluses generated from international student revenue to be re-invested in enhancing the quality of student experience.

IRU Australia contends that funding to universities for research students, through the Research Training Scheme (RTS), does not currently cover the full costs of delivery leading to similar issues as those outlined above. This erodes the capacity of universities to provide high quality research training and supervision and is not sustainable over the longer term.

5. Enhancing the attractiveness of academic research careers

Professor Graeme Hugo, who has undertaken extensive research on the Australian academic workforce, draws a following conclusion in a recent paper:

In summary there are four defining elements of the contemporary Australian academic workforce – slow growth, age heaping, a mature age structure and an imbalanced gender ratio. It is growing at a substantially slower rate than other professions. Age heaping can be a problem in any workforce since it produces problems of succession and continuity in a workforce. The academic workforce in Australia has a more pronounced heaping than almost any major group in the national workforce. Clearly too, the academic workforce is older than most other groups and this, in itself, means that it is likely to experience a period of substantial loss of workers through retirement over the next decade. Thirdly, despite improvements in the balance between genders, the Australian academic workforce is still one of the least balanced between males and females.¹⁴

The university system is facing a significant shortfall in research qualified academic staff in the not too distant future and urgent action is required to ensure that Australia has the academic workforce it requires to meet future demand for higher education graduates and research services.

Surveys of HDR graduates undertaken by Graduate Careers Australia indicate that 28 per cent of HDR graduates take up employment in universities, with the remaining 72 per cent taking up employment with scientific organisations and a range of other public and private employers¹⁵. If the government's goal of increasing Australian business R&D is realised, it can be expected that

¹⁴ Hugo, G. (2008) *Demographics: the need for renewal*, conference paper presented to the Council for the Humanities, Arts and Social Sciences, PhD in the Humanities, Arts and Social Sciences Workshop.

¹⁵ Group of Eight, *Adding to Australia's Capacity: The Role of Research Universities in Innovation*, A submission from the Group of Eight to the Review of the National Innovation System, April 2008.



demand for quality research graduates will increase in the future potentially drawing a higher percentage of graduates away from university careers.

With the impending anticipated crisis arising from the retirement of the baby boomer generation of academic staff, it is vital for the university sector to provide an attractive career option and pathway for quality research graduates.



3 Addressing challenges and realising opportunities

With the appropriate national policy settings, the current research training and academic workforce challenges can be successfully addressed and opportunities fully realised to strengthen the national research and innovation system.

Attracting more domestic students to research training

The future supply of qualified researchers in Australia is under threat due the decline in research degree student commencements reported above and the impending retirement of the baby boomer generation of academics and researchers. The Australian government's recent doubling of the number of Australian Postgraduate Awards (APAs) will be of great assistance in achieving a needed boost in the number of research graduates in the Australian workforce. One of the challenges facing Australian universities, however, is the lack of demand for enrolment in research degrees by high quality domestic students.

Quantum of income support

In IRU Australia's view, a key barrier to demand for research degree study is student financial circumstances. Students need to choose, especially in an environment of skill shortages, between entering the workforce and earning attractive graduate salaries or continuing onto a research degree with the prospect of significant income foregone over three to four years and very modest support through a postgraduate award. Figures recently released by the Council of Australian Postgraduate Associations (CAPA)¹⁶ show that for the first time the stipend rate for APAs will slip below the poverty line by the end of 2008.

IRU Australia is strongly of the view that the APA stipend needs to be increased to at least \$30,000 per annum, tax free, if it is to provide any real incentive for talented Australians to choose to undertake research training versus other competing career options. The stipend should also be annually indexed to ensure that it keeps pace with inflation.

Duration of income support

Over recent years, universities have focused on enhancing support services to assist PhD students to achieve a successful completion in an appropriate timeframe and this had a significant impact on the throughput of research degree candidates. The current average completion time for a PhD in Australia is between 4.5 and 5.5 years depending on the discipline¹⁷.

¹⁶ CAPA Media Release, APAs to Break Poverty Line, 30 April 2008.

¹⁷ Group of Eight, *Adding to Australia's Capacity: The Role of Research Universities in Innovation*, A submission from the Group of Eight to the Review of the National Innovation System, April 2008.



This compares favourably with international benchmarks. Data gathered on PhD completion and attrition rates in 30 institutions by the U.S. Council of Graduate Schools (CGS)¹⁸, for example, indicates that:

- Within four years of commencing, 23 per cent of candidates have discontinued their studies, 66 per cent are continuing and only 11 per cent have completed; and
- Within seven years of commencing, 28 per cent of candidates have discontinued their studies, 26 per cent are continuing and 46 per cent have completed.

A recent study in the UK¹⁹ found that, five years after commencing a PhD, 57 per cent of students who began their studies on a full-time basis had completed and 19 per cent of students who began on a part-time basis had completed. After seven years, the completion rates were 71 per cent and 34 per cent for full-time and part-time starters respectively.

The Australian Research Training Scheme is currently based on an assumed candidacy period of four years. Somewhat anomalous to this, the duration of an APA is only three years, with a possible extension of up to six months.

There is a widespread view across the higher education sector that this current duration is too short to allow for a reasonable completion time, particularly given the changing demands of research training (discussed further below). A student's scholarship funding is often discontinued at the most demanding time of the PhD candidature, when they are focusing on writing up their thesis, placing unhelpful financial stresses on them. Coupled with an increase in the APA stipend, IRU Australia recommends that the duration of income support be extended to at least 3.5 years.

Given the international comparisons in PhD completion times outlined above, it could be argued that there is a legitimate case for further extending the duration to at least four years. Given potential limits to increased government funding support, however, IRU Australia has the view that the government, in the first instance, should give priority to increasing the stipend to a minimum of \$30,000 and extending the duration to 3.5 years.

Recommendation 1:

- a) Increase the APA stipend to a minimum of \$30,000 per annum tax free.
- b) Introduce annual indexation of the APA stipend to ensure it keeps pace with inflation and the cost of living.
- c) Coupled with the above, increase the length of APA income support to at least 3.5 years.

¹⁸ Sowell, R., Ph.D. *Completion and Attrition: Analysis of Baseline Data*, Council of Graduate Schools, April 3, 2008.

¹⁹ Higher Education Funding Council for England, *PhD research degrees: entry and completion*, 2005.



Remission of HECS-HELP debts

For some prospective research students, their accumulated HECS debt may also be a factor in their decision to choose paid employment over a further substantial period of study attracting no or little income support.

We have noted suggestions made at the 2020 Summit that student HECS-HELP debts be reduced for graduates participating in volunteer community work. Consistent with this, IRU Australia suggests that the Committee give consideration to the merits of a scheme which allows for the total or partial remission of HECS-HELP debts for students successfully completing a PhD or Masters by Research program. Specifically, a completed PhD might result in full remission of the debt, or a research masters, 50 per cent of the debt. The remission would apply at the time a graduate became eligible to make HECS payments through the income tax system. Such a provision would represent a significant offset to income foregone for students undertaking research training programs, and create an incentive to drive higher completion rates. For reasons of fairness, some consideration would need to be given to compensating research graduates who paid their HECS debts fully or partially upfront.

Given that research student load accounts for only five per cent of total domestic student load in any year, we believe that this would be an affordable strategy for government to grow the human capital base needed for the national research and innovation system. Consideration could be given to the feasibility of focusing the remission scheme on areas of national research priority.

Recommendation 2:

Introduce a HECS-HELP debt remission scheme for Australian students completing research higher degrees

Support research training across all segments of the Australian community

Australia's economic, social and environmental development demands access to a highly skilled workforce across all segments of the Australian community. As noted in section 2, however, the distribution of research higher degree attainment is unevenly distributed across the Australian population.

The government's critically important policy goal, of 'closing the gap' for Indigenous Australians, will rely significantly on access to Indigenous research graduates with a strong understanding of Indigenous culture and issues and the skills required to conduct complex research, analysis and evidence-based policy development.

While Australia is one of the most urbanised countries in the world, our future economic, social and environmental development is inextricably linked to the future success of rural and regional communities. Around two thirds of Australia's export earnings come from regional industries such as agriculture, tourism, retail, services and manufacturing²⁰. Many of the Australia's key

²⁰Department of Infrastructure, Transport, Regional Development and Local Government website (<http://www.infrastructure.gov.au/regional/index.aspx>) , accessed on 28 May 2008.



topics of national interest or concern (e.g. climate change, health services delivery, food and agriculture, energy, mining and earth sciences), all of which require concentrated research and policy analysis, are closely associated with the regional and rural areas of the country. It is vitally important that research training in regional Australia be supported by government.

Education and training is also at the heart of the government's social inclusion agenda. Australia not only needs to increase participation in higher education by disadvantaged communities and citizens, but it also needs to ensure that more Australians from disadvantaged backgrounds have an opportunity to undertake research training.

Recommendation 3:

Ensure that government research training programs provide appropriate encouragement to Indigenous Australians, students from rural and regional Australia and disadvantaged Australians to undertake and successfully complete research higher degrees.

Attracting more international students to Australian research training

Attracting high quality international research students to Australia should be viewed as a key strategy for securing Australia's future competitiveness in the global knowledge-based economy. As noted earlier, international education indicators suggest that Australia's great success in building an international education export market has been focused in the area of undergraduate and postgraduate coursework rather than research studies.

Universities recognise that Australia has a great opportunity to attract larger numbers of international HDR students and demand is currently strong. As a nation, however, Australia is competing against other countries that offer international students substantially more attractive support, for example:

- Evidence from the U.S. *Study of Earned Doctorates Report 2006*, which presents data on the 45,596 recipients of research doctorates awarded by 417 U.S. universities, reveals that almost two-thirds of foreign PhD students are financed by scholarships or work in universities. By contrast, less than 25 per cent of international research students in Australia receive any support from Australian sources²¹.
- Canada has recently introduced a new PhD scholarship program, the Georges Vanier Scholarships, which will support 500 students from Canada and abroad for up to three years at CAD\$50,000 per year.
- The New Zealand government has recently introduced a new policy whereby international PhD students enrolling from 1 January 2006 for the first time will pay domestic fees only for the duration of their studies.

²¹ Group of Eight, Research supply and demand, *Go8 Backgrounder* No. 3 November 2007.



The government needs to take deliberate action to enhance the attractiveness of Australia as a destination for international research students. IRU Australia proposes that the Australian government take the following action:

- Substantially increase government investment, by a factor of five, in the International Postgraduate Research Scholarships (IPRS) program (or equivalent). While the number of commencements in research degrees by international students has increased by 36 per cent from 1,858 in 2001 to 2,533 in 2006²², the number of Endeavour International Postgraduate Research Scholarships (EIPRS) available to assist outstanding international candidates has declined in real terms. An analysis by the Group of Eight universities suggests that the current EIPRS allocation to universities covers only approximately 228 new scholarships annually.

While the scholarships cover international student fees, they do not cover living allowances. As a co-investment strategy, many universities divert funds from other sources to offer students supplementary living allowance scholarships. To match the diversity of student circumstances, it would be desirable for the government to introduce greater flexibility into the international scholarship program by providing for different categories of scholarship (e.g. partial fee payment; full fee payment; full fee payment with living allowance).

- Review, rationalise and simplify the current suite of international postgraduate scholarships. IRU Australia agrees with the observations made in the Australian Council of Deans and Directors of Graduate Studies (DDOGs) submission to the Review of the National Innovation System:

... the suite of international postgraduate scholarships offered under the Endeavour program is complex and poorly targeted. The scheme needs to be reviewed, rationalised and simplified to provide a core set of high quality, internationally competitive scholarships that fully-fund living and training costs. Similar concerns are held about the AUSAID suite of scholarships.

- Introduce greater responsiveness and flexibility to international student visa policies and practices. Once again, we quote the DDOGS:

Other barriers to growing Australia's intake of high quality international students include visa accessibility and timelines for both entry and candidature/scholarship extension. Valuable internationally funded scholarships can be placed in jeopardy by delays in the issuing of visas or the extension of these when students change or extend their programs. The DDOGS recognise the support provided by the Department of Immigration and Citizenship but seek further understanding and flexibility in the cases of sponsored students. Similarly more autonomy for universities to decide on English requirements for HDR students (as has been shown in this regard to Iraqi government funded students) would enhance the opportunities to attract students.

²² DEST, Higher Education Student Statistics, 2001 and 2006.

**Recommendation 4:**

- a) Government investment in the International Postgraduate Research Scholarships (IPRS) program, or equivalent, to be increased by a factor of five.
- b) The flexibility of the IPRS, or equivalent, to be enhanced through the provision of different categories of scholarship (e.g. partial fee payment; full fee payment; full fee payment plus living allowance).
- c) Review and simplify the suite of Endeavour Scholarship Programs.
- d) Introduce greater responsiveness and flexibility to international student visa policies and practices as they relate to research higher degree students.

In addition, there is action that can be taken by State governments to make study in Australia more attractive for international research students. The Victorian government introduced a policy in 2006 which provides the dependents of international postgraduate research students with full exemption from tuition fees in government primary and secondary schools. The exemption applies to dependents of postgraduate research students holding Subclass 574 visas and enrolled at Victorian tertiary institutions in doctoral or masters by research degree courses. This type of provision has not been universally adopted by other State governments. In many cases, school fee exemptions only apply to dependents of research students on government-approved scholarships (e.g. AusAID). The adoption of an exemptions policy on a uniform national basis would introduce a significant incentive for quality research candidates to make Australia their choice as a research training destination.

Recommendation 5:

State governments to introduce policies to provide full exemption from tuition fees in government primary and secondary schools for dependents of international research students.

Enhancing the quality of research training

Australian universities, with the support of government programs such as the Commercialisation Training Scheme (CTS), have introduced a range of initiatives over recent years to respond to the changing demands of research training and to enhance support to students undertaking research higher degrees.

There are three key areas, however, where IRU Australia believes that more needs to be done to reduce student attrition, increase completion rates and help prepare research students for their future roles in the innovation system.



The structure and nature of contemporary research training

As noted earlier, contemporary research training needs to respond to a far more complex set of requirements and expectations than was historically the case. Research higher degree candidates need to do more than engage solely with their supervisors and restrict their training to a singular focus on their thesis topic. They need to acquire a range of generic professional skills (e.g. inter-disciplinary teamwork, project management, communication) and build their knowledge base in areas of relevance to their future research careers (e.g. intellectual property, commercialisation of research, ethics).

There is also a strong recognition by universities that it is important to put a range of structures and support services in place to reduce attrition rates, improve completion rates and reduce completion times. The seven IRU Australia member universities, for example, have collaborated in the design and delivery of a PhD Masterclass Series, *Defeating Self-Sabotage: getting your thesis finished*. The program, led by Flinders University, has been extremely successful and is being extended in 2008 to include a series of workshops designed for larger numbers of research students.

Many universities have sought to enhance the quality of research training by introducing a range of associated systems, structures and support mechanisms, including:

- Central and Faculty-based induction programs;
- Compulsory coursework programs, often including generic skills training;
- Short courses/workshops on topics such as commercialisation, intellectual property; research ethics, overcoming writer's block;
- Student tracking and milestone reporting systems;
- Research student support networks; and
- International travel scholarships.

Programs such as these, however, are far from universal and there is considerable scope across most of the sector for these aspects of research training to be further expanded and improved.

There is no doubt that these additions to research higher degree programs have significantly enhanced the quality of research training in Australian universities. What hasn't been fully recognized by government, however, is that they have also increased the resource-intensiveness of research training and hence the associated costs. This issue is taken up in a later section of this submission. In addition, they add to research student workloads and consequently the time taken to complete. This is one key factor contributing to the need for an increase in the duration of income support for research students.

Student mobility

The mobility of students between universities, both nationally and internationally, is a key factor in building a research workforce that can operate across a variety of organisational and cultural environments. It is also a necessity in many cases, with students needing to undertake specialised fieldwork and access facilities and research environments not available in their home institution.



Australia could do more to encourage and support student mobility. A key inhibitor to mobility in the Australian context is the inability under the current system to share the funding for PhD supervision between two institutions. Universities do enter into joint supervision arrangements, but in the absence of national guidelines, this is often cumbersome and time-intensive. It is proposed that the government introduce policies to enable students to enrol simultaneously at two universities, with the student load and completion similarly split between the two institutions.

With respect to international mobility, many universities have introduced travel scholarship schemes to support PhD students, on a merit basis, to travel overseas as during their candidature. By necessity, however, the amount of funding made available for these schemes does not match legitimate demand. It is proposed that the government provide targeted funding support for this purpose.

Recommendation 6:

- a) Introduce revised policy enabling co-supervised PhD students to enrol simultaneously at two universities, with the student load and completion similarly split between the two institutions.
- b) Introduce policy mechanisms to encourage the international mobility of domestic PhD students, including targeted funding support to universities.

Linkages with the broader innovation system

Career pathways for research graduates are very diverse, with graduates just as likely to be working in industry, business, community organisations and government departments as they are to be working in universities or research organisations.

Research training programs need to acknowledge this and provide opportunities for research students to engage meaningfully with those sectors and workplaces that are likely to be most relevant to their research careers. There are of course mutual benefits to be derived from such linkages, with research students bringing valuable high level skills to those sectors and workplaces. These linkages can also support greater collaboration between universities and other key agents in the innovation system.

A number of existing programs support linkages of this nature, including the Australian Postgraduate Awards (Industry) and the Cooperative Research Centres (CRCs). It has been the observation of the IRU Australia member universities, however, that as the CRCs have moved away from a focus on public good outcomes to commercialisation outcomes, the number of PhDs being supported through the Centres has diminished.

IRU Australia believes, however, that a more comprehensive and systematic approach to enabling and supporting substantive engagement between research students and relevant sectors and workplaces would greatly strengthen the Australian innovation system.



In our submission to the Review of the National Innovation System, we recommended the establishment of long-term industry²³ innovation councils, or similar, to lead innovation strategy in their industry or sector. A targeted range of industry innovation councils could play a key role in mapping the needs of their industry or sector, and translating these into innovation and research goals and priorities, with associated scoping of skills requirements in collaboration with Industry Skills Councils. The Industry Innovation Councils could play a key role in defining future research workforce needs within each industry and working with government and universities to design appropriate programs to support enhanced linkages between research training and the broader innovation system.

Examples of strategies and models that could be adopted to strengthen these linkages include:

- The *Growing the Smart State PhD Funding Program*²⁴ which is designed to support doctoral research at Queensland universities that can inform evidence-based public policy development.
- The UK Knowledge Transfer Partnerships (KTP) program in which one or more KTP ‘associates’ (high calibre PhD graduates) are recruited to work in a particular business on a project that is central to its strategic development. A project may last from 12 to 36 months. The University partner provides the expertise and jointly supervises the project together with a representative from the company. The costs a part funded by government with the balance being borne by the participating business. The KTP program has been judged as very successful in the UK, with the recent *Innovation Nation* white paper recommending the doubling of the number of KTPs available.
- The adoption of more deliberate and targeted policies to integrate capacity building into a wider range of innovation programs. The Commonwealth Environmental Research Facilities program, for example, does not make provision for the training of PhDs within its guidelines. There are numerous other research and innovation programs that focus on: the appointment of outstanding established researchers; the establishment of major research infrastructure and facilities; and, the conduct of research. Many of these do not place a parallel emphasis on capacity building and training the next generation of researchers. This applies both to programs directed principally towards universities and those directed to industry and business.
- The introduction of tax incentives to encourage industry and business to establish programs to support research training (e.g. research scholarships, internship programs).

²³ We emphasise that ‘industry’ should be interpreted here in the broadest sense as applying to the many sectors of our society, including health-care, education, security, and environment.

²⁴ Refer <http://www.premiers.qld.gov.au/policy/research/phdfund/>.

Recommendation 7:

- a) Encourage and support Industry Innovation Councils (or alternatively industry peak bodies) to define their future research graduate workforce needs and develop training and recruitment strategies to ensure the ongoing international competitiveness of Australian industry.
- b) Review and scale up the current suite of government funded programs which provide support for research student and recent graduate linkages with the broader innovation system.
- c) Adopt more deliberate and targeted policies to integrate capacity building into a wider range of innovation programs, including those directed to industry and business.

Funding the full cost of research training

There are two major reasons for the current lack of full-cost funding for research training.

First, since 1999, the number of HECS-exempt research training places funded under the RTS has not kept pace with the increase in enrolments and completions across Australia. Universities currently 'carry' large numbers of unfunded domestic PhD students, largely through cross-subsidisation from undergraduate and postgraduate coursework programs. This places considerable pressure on the capacity of universities to guarantee quality student supervision and the overall quality of graduate outcomes. It also inhibits the capacity of institutions to introduce innovative enrichment programs for research students.

Second, there is growing evidence that the quantum of RTS funding does not reflect the full cost per student of completing a HDR program. A study in the UK, which examined the net cost to institutions of HDR training in 2003-04, found that annual costs ranged from £17,461 to £29,106. These costs are significantly higher, in equivalent terms, to the annual RTS funding provided per student. The Group of Eight, in its submission to the Review of the National Innovation System, also presented the results of recent studies undertaken at Monash University which suggested annual funding shortfalls of over \$20,000 for some fields of study.

This shortfall in funding can be attributed to a number of factors including: the accumulated impact of the lack of adequate annual indexation of funding; the rising costs of research infrastructure and resources (e.g. library acquisitions); and, the changing nature and expectations of research training as discussed earlier.

IRU Australia shares the views of other bodies, including the Council of Humanities, Arts and Social Sciences and the Council of Australian Postgraduate Associations that the current high cost/low cost categorisations by discipline which determine the quantum of funding received for each RTS place are quite arbitrary. They need to be reviewed on the basis of evidence of the contemporary cost structures associated with research training in different fields of study.

Recommendation 8:

- a) Undertake a study to determine the full costs of research training across different fields of study. This should include an evaluation, based on robust evidence, of the validity of the current high cost/low cost categorisations.
- b) Increase the quantum of RTS funding available to Australian universities to reflect (i) the actual number of domestic students enrolled in research higher degrees; and (ii) the true costs of delivery.

Attracting research graduates to Australian university academic careers

Increasing global competition for the ‘best and brightest’, an aging academic staff profile and a significant gender imbalance within the academic workforce collectively create a major challenge for Australian universities in meeting their future workforce needs.

In addressing this challenge, it will be critical to create more secure, flexible and rewarding academic career pathways for research graduates in Australia. To achieve this, there are many issues to be considered. One key issue raised by IRU Australia in its submission to the Review of the National Innovation System, which is outside the Terms of Reference of this Inquiry, concerns the need to ensure adequate levels of university research funding and the quality of research infrastructure if Australia is to be internationally competitive in attracting quality researchers. With regard to the Inquiry’s terms of reference, we briefly outline a few key issues below.

Attracting research graduates into postdoctoral research

A UK report which examined the supply of people with science, technology, engineering and mathematics skills (the Roberts’ Review)²⁵, noted the following:

Postdoctoral research is a crucial phase in researchers’ careers, for it is here that researchers can make a name for themselves through ground-breaking innovative research. It is also an important phase in which they can develop the skills to lead research projects, which in turn is vital in making the transition to becoming a permanent member of academic staff (or to leading research work elsewhere).

However, entering the environment of postdoctoral research work is an uncertain and, for many, unattractive prospect. Postdoctoral researchers receive pay that compares unfavourably with that which comparably qualified people could expect to earn outside academe; receive few opportunities to undertake training and development; and are faced with uncertain futures since employment beyond the current project contract – commonly around two years – is not guaranteed. Furthermore, there is little structure to their career, and little advice as to how to make the jump to becoming a permanent member of academic

²⁵ SET for Success: The supply of people with science, technology, engineering and mathematics skills, the report of Sir Gareth Roberts’ Review, 2002.



staff. Although a large proportion remain intent on pursuing academic research careers, it is estimated that fewer than 20 per cent reach a permanent academic job.

This description could equally apply to Australia in 2008. Postdoctoral research fellowships provide a key incentive for research graduates to remain in the academic environment. IRU Australia believes that the postdoctoral research fellowship pathway could be made more attractive to research graduates by: increasing the number of fellowships available; increasing their duration; and, raising salary levels (recognising that many research graduates enter full-time research employment for the first time in their late twenties). There also needs to be a greater emphasis, on the part of universities, on career guidance and training and development matched to each postdoctoral researcher's career plans.

Career pathways

Many universities are seeking to introduce greater flexibility into their academic staff employment arrangements to match the diversity of staff work preferences and skills. This extends to examining the types of employment contracts available to academic staff, including research only contracts. This is prompting considerable focus on the issue of academic career pathways.

The government's new Future Fellowships scheme is a very welcomed initiative aimed at enhancing career pathways through the provision of opportunities for mid-career researchers. One concern we have in response to the Australian Research Council's recently released discussion paper on the implementation of the Future Fellowships, however, is the duration of the Fellowships and the continuity of the program. It is proposed that the Future Fellowships run for four years, on a non-renewable basis.

We highlight that other countries, in the push to attract high quality researchers, are offering more generous schemes. In 2000, the Government of Canada created a new permanent program to establish 2000 research professorships—Canada Research Chairs—in universities across the country by 2008. Tier 1 Chairs, tenable for seven years and renewable, are for outstanding researchers acknowledged by their peers as world leaders in their fields. For each Tier 1 Chair, the university receives CA\$200,000 annually for seven years. Tier 2 Chairs, tenable for five years and renewable once, are for exceptional emerging researchers, acknowledged by their peers as having the potential to lead in their field. For each Tier 2 Chair, the university receives CA\$100,000 annually for five years. The South African Research Chairs program provides for five year renewable Chairs, to a maximum of 15 years.

Job security

On a full-time equivalent basis, 57 per cent of the Australian university workforce is employed on a tenured basis, with the remaining 43 per cent employed on fixed-term contracts or on a casual basis²⁶. While the exact figures are not readily available in the public domain, it can be assumed that the percentage of academic staff employed on a tenured basis is somewhat lower than for all (i.e. academic and non-academic) staff. This will be particularly the case for 'junior' academic staff employed in Level A and B positions.

²⁶ Department of Education, Employment and Workplace Relations, *Selected Higher Education Statistics – Staff 2007*.



Within this broader context, contract research staff form a significant part of the university workforce in Australia, as they do in other countries. While there are benefits to the national innovation system, such as increased mobility of researchers and greater flexibility within the system to meet changing research needs, the lack of secure employment can act as a disincentive for research graduates choosing academic careers.

Many universities have human resource policies in place to ensure that staff members are offered a tenured position once they have completed a nominated number of years' employment in contract positions or postdoctoral fellowships. There is a lot more that can be done, however, to give greater recognition to research contract staff and to make research positions more attractive through the adoption of appropriate human resource management strategies and policies (e.g. training and development, career management support).

A possible way forward: the UK Research Careers Initiative

In 1996, Universities UK, the Research Councils, the British Academy and the Royal Society recognised that action needed to be taken to address the employment and career issues associated with contract research staff. These bodies agreed a Concordat on Contract Research Staff Career Management: a framework for the career management of contract research staff. A Research Careers Initiative (RCI) was established in the following year to monitor the implementation of the Concordat and to identify, encourage and disseminate best practice²⁷.

A major achievement of the RCI has been its key role in raising awareness of all those involved in the need to change the culture surrounding research staff employment in universities. It has initiated aligned action on the part of government, research funding agencies, higher education funding councils and higher education institutions to:

- Change the culture in which contract research staff worked so that they were seen as central to the pursuit of good research;
- Provide contract research staff with a viable career structure; and,
- Secure adjustment to national funding systems so that change could be enabled.

The RCI monitoring process has encouraged the higher education institutions to develop and promulgate employment policies, codes of conduct, and good practice models relating to contract research staff, particularly in provision of staff appraisal, training and career guidance. It has also encouraged government and funding agencies to implement a range of policy changes and initiatives to promote the intended outcomes of the RCI.

IRU Australia believes that a coordinated national approach of this nature would greatly assist in addressing the challenges currently faced by Australian universities in attracting high quality research graduates to academic careers.

²⁷ Refer to <http://www.universitiesuk.ac.uk/activities/rci.asp>.



Recommendation 9:

Establish a national taskforce, with representation from key stakeholders including universities, government and research councils, to oversee the development and implementation of a national research career initiative aimed at making academic careers more attractive to quality research graduates.



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