

30 May 2008

Committee Secretary
Standing Committee on Industry, Science and Innovation
House of Representatives
Parliament House
CANBERRA ACT 2600

Email to: isi.reps@aph.gov.au

Dear Standing Committee,

UNSW RESPONSE TO 2008 INQUIRY INTO RESEARCH TRAINING AND RESEARCH WORKFORCE ISSUES IN AUSTRALIAN UNIVERSITIES

The University of New South Wales welcomes the opportunity to provide this submission to the House of Representative Standing Committee on Industry, Science and Innovations "Inquiry into research training and research workforce issues in Australian Universities".

This submission seeks to demonstrate that Australia lags behind our international competitors in recognising the contribution and importance of university research training and research careers on setting the foundations to drive the national innovation agenda.

1. INTRODUCTION

As a member of the Group of Eight¹ research-intensive universities, UNSW is a world leader in the areas of biomedical sciences, water, environment & sustainability, next generation materials & technologies, social policy, government & health policy, ICT, informatics & robotics, business, law & economics.

UNSW considers that maintaining a vibrant cohort of higher degree research (HDR) students is essential to the research productivity and reputation of UNSW that is associated with all standard research indicators and metrics (publications, grants, quality of staff, research student enrolments, completions etc).

The profile of UNSW's HDR student cohort is distinctive in the Australian context in that, of the 3285 HDR students enrolled in 2007, the composition is heavily clustered in enrolments in Engineering, Science and Medicine disciplines, and the mix of HDR students contains a high percentage of international students. UNSW is therefore well-positioned to provide comment on key issues related to:

- attracting and retaining international HDR students;
- the challenges facing the Australian workforce in key areas related to Engineering, Science and Medicine; and
- Australia's innovation agenda and global competitiveness in Engineering, Science and Medicine, and the importance of multidisciplinary and collaborative approaches with researchers in the humanities and social sciences to addressing major research questions.

UNSW



PROFESSOR LES FIELD

DEPUTY VICE-CHANCELLOR
(RESEARCH)

¹ See www.go8.edu.au for further information

The recommendations made in this submission are based on the following overarching principles:

- The ranking of six Australian Universities in the top 50 of the Times Higher Education Supplement² is compelling evidence of the quality of the Australian higher education sector, especially when the comparative funding models, and declining research funding are taken into account;³
- If the current trend of declining domestic local commencing PhD students (a decrease of 30% between 1995-2006)⁴ continues, then Australia will face a severe shortage of highly qualified professionals, researchers and academics in core sectors including science and engineering and fields critical to tackling national issues such as health, the environment, sustainability, earth sciences, and banking and finance, that underpin Australia's economy and future; and
- PhD graduates are essential to the workforce that supports emerging industry sectors including nanotechnology, advanced manufacturing, the biomedical and pharmaceutical industry, health and medicine, the IT and communication sector *etc.* Failure to attract and retain PhD students in these areas will impact on Australia's competitiveness, with a concomitant detrimental impact on our international reputation as a leader in science, innovation and research.

2. SUMMARY OF RECOMMENDATIONS

The Contribution that Australian Universities make to Australian research training

- **Australian Universities should remain the sole authorities to award PhD degrees** as they are uniquely positioned to provide the intellectual and research environment coupled with the highly integrated framework necessary to deliver high quality training of HDR students.
- **A new model for RTS and IGS within the block research grant funding is required** in which:
 1. the "fixed-pie" model is replaced by a model in which completions and load are directly funded based on agreed indexed metrics per HDR student load and for each HDR completion;
 2. a factor that reflects the quality of the research training environment, as measured by external competitive research income and infrastructure grants, is included in the formula;
 3. there is an expanded cost model (at least 4 cost bands) that recognises interdisciplinary research and more accurately reflects the costs of research training should replace the simplistic high/low cost differential used to fund completions;
 4. the ratio of the funding returns for load versus completions should be changed from the current model to be more heavily weighted in favour of the load for 4 years FTE (PhD) and 2 years FTE (Masters) to generate a ratio of funding for load : completion of 3:1 *i.e.* 75% of funding is delivered during the course of the candidature and 25% of the funding is delivered on successful completion.
- Alternatively, **consideration should be given to the merits of a completely new funding model** for HDR students that mirrors the funding of undergraduate places and includes:
 1. Universities developing a plan for a specific number of HDR places per year in areas of research where they meet defined criteria for delivery of high quality research training and have the capacity, space and resources to train students;

² See <http://www.timeshighereducation.co.uk/hybrid.asp?typeCode=144> for further information

³ See UNSW submission to the Review of the National Innovation System available from http://www.innovation.gov.au/innovationreview/Documents/497-University_of_New_South_Wales.pdf

⁴ Go8 Election Statement 4, PhD decline puts Australia's future at risk, 9 November 2007; <http://www.go8.edu.au/news/latest.htm>; Go8 Backgrounder, No. 3. *Researcher Supply and Demand*, Nov 2007 <http://www.go8.edu.au/policy/current.htm>

2. Postgraduate places should be fully costed based on load per year and the full cost of research training in the discipline;
 3. Delivery of up to a maximum of a 20% completion incentive, with the adjustment dependent on completion rates as a quantifiable indicator of quality training. (e.g., 80% completions within 4 years 100% funding; 70% completions with 4 years 80% funding etc).
- UNSW recommends that the Government **consider amending the Department of Immigration and Citizenship's Migration Occupations in Demand List (MODL)** to include University teaching and research in the defined areas of anticipated skill shortage to encourage international students completing Australian PhDs to remain in Australia.
 - The **Commercialisation Training Scheme (CTS) should be abolished** and the limited funds should be allocated to Universities who have demonstrated industry and commercial linkages (including APAs and Linkage grants) to incorporate commercialisation training into the training of research students working with industry.
 - The **generic skill training** required to facilitate the transition from PhD or Research Masters into industry/business/government would be best incorporated into PhD training funded by extension of Government scholarships to 3.5 years with a possible extension to 4 years.

The challenges Australian universities face in training, recruiting and retaining quality research graduates

- **HDR Scholarships must be higher in value** if we are to compete on the international stage for the best candidates and need to take into account the higher costs of living in major capital cities.
- An urgent **review and rationalisation of all international postgraduate scholarship schemes** (Endeavour, AusAID, IPRS) is required to deliver a core set of high quality, internationally competitive scholarships that fully-fund living and training costs.
- **Universities should have flexibility in the management of HDR Scholarships** (APA and IPRS) as a single block grant to award scholarships at the appropriate value to the best students (both local and international) in order to attract and train the next generation of researchers.
- A **long-term strategic plan for essential research infrastructure** needs to be developed. This should be centred on building the critical mass of research excellence – this will directly benefit Australia's ability to attract the best PhD students and retain them in the Australian workforce.
- The level and duration of scholarship support needs to be sufficiently attractive to forgo a full time salary for up to 4 years. **APA stipends need to be increased by at least 30% per annum, tax free and appropriately indexed** and the duration extended to 3.5 years with a 6-month extension possible.
- The **number and types of research fellowship schemes need to be reviewed and simplified** to ensure that there are good career paths for researchers at ALL stages of their careers.
- A **significant increase in the number of research fellowships is required** to create a career path for PhD graduates/academic researchers.
- Elite schemes such as the Federation Fellowship and Australia Fellowship Schemes are critical to underpin research leadership in Australia.
- **A range of well-structured academic career pathways to target expatriate Australians to return home are urgently required** including competitive academic salaries, a suite of research fellowships (early career, mid-career, outstanding established researchers), access to state-of-the art facilities and infrastructure, and access to competitive research funds at levels and success rates consistent with overseas competitors.
- Universities should be allocated a limited number (up to 10% of equivalent RTS places) of **domestic fee places for international research students** in research areas where Australia is

predicted to experience skills shortages in the next decade in order to competitively recruit high quality international PhD students.

- Major Fellowship and Scholarship Schemes for PhD students, and for early and mid-career researchers, should continue to include eligibility criteria that allow the best international researchers to secure these Fellowships in a competitive process.

3. THE CONTRIBUTION THAT AUSTRALIAN UNIVERSITIES MAKE TO AUSTRALIAN RESEARCH TRAINING

Australia's research intensive Universities provide an outstanding research environment to train and produce PhD graduates who are highly qualified and competitive with PhD graduates world wide. There is no question that outstanding research environments are also present in places such as CSIRO and Medical Research Institutes, and that Universities benefit enormously from engagement and collaboration with these organisations. That being said, *Australian Universities should remain the sole authorities to award PhD degrees as they are uniquely positioned to provide the intellectual and research environment coupled with the highly integrated framework necessary to deliver high quality training of higher degree research students.* This framework is not available in any other Government or commercial organisation. In addition to the intellectual and research environment that fosters innovation and facilitates and critically assesses original research and discovery, the Go8 Deans of Graduate Studies⁵ have identified a number of key unique services and facilities that Universities provide research students. These include:

- access to expertise from other disciplines for particular skills or for multi-disciplinary research, as required during the course of the research;
- access to a major library, online resources and a full suite of research infrastructure;
- a well-developed monitoring and compliance framework which instils appropriate values in the conduct of research in terms of occupational health and safety, ethics, animal welfare, appreciation of chemical and radioactive hazards, bio-safety etc;
- discipline-specific training courses, such as data analysis of informatics, microscopy, gene array technologies, foreign language training, new computer applications etc;
- accredited higher degree research supervisors;
- generic-skill training courses such as research methods, research writing, health and safety, intellectual property, research ethics, commercialisation, English language; training and experience in university teaching etc;
- exchange programs and associated services; and
- services and support from student associations that provide students with access to key support services (e.g., subsidised child care, legal services, visa and health insurance) – access to these services can be a major factor in the decision regarding whether or not to pursue tertiary study.

Australian Universities should remain the sole authorities to award PhD degrees as they are uniquely positioned to provide the intellectual and research environment coupled with the highly integrated framework necessary to deliver high quality training of higher degree research students.

Research training within Universities should be restricted to areas of research that meet a defined set of criteria that are commensurate with delivery of high quality research training. These criteria include:

- a critical mass of research activity (staff, students, resources and infrastructure, research output) measured by standard research metrics;

⁵ Go8 Deans and Directors of Graduate Studies: Minutes of Meeting February 2007.

- qualified supervisors, that meet required levels of research activity, and have a track record in the award of research grants and publications, and have experience in quality supervision, as appropriate for the discipline of research; and
- a comprehensive training program embedded within the PhD degree that includes relevant coursework in research practice and methodology and generic skill training.

a. *The contribution of research training programs to Australia's competitiveness in the areas of science, research and innovation*

International Research Reputation of Australian Universities

University rankings (e.g. Times Higher Education, Shanghai Jiao Tong,⁶ Higher Education Evaluation & Accreditation Council of Taiwan⁷) that benchmark performance on the international scale are widely used to underpin the research reputation of Australian Universities. A major component of all of the international University rankings is the research reputation measured by indicators including publications, citations, and the quality of staff.

UNSW's HDR students play a pivotal role in our research productivity and reputation associated with all standard research indicators and metrics (publications, grants, enrolments and completions). For the period 2004 – 2006:

- 27% of journal publications published by UNSW staff were co-authored with a research student; and
- 30% of conference proceedings published by UNSW staff were co-authored with a research student.⁸

Employment of PhD Graduates

The Graduate Destinations Survey⁹ provides clear evidence of the importance of PhD graduates to the academic workforce, as well as to the private and professional sectors in areas that underpin science, innovation and research.

b. *The effectiveness of current Commonwealth research training schemes*

The provision of high quality training of research students is increasingly difficult in Australian Universities with the decline in research support in real terms. The delivery of both research infrastructure to support PhD candidatures and support for the delivery of the research training including coursework and programs that provide generic skills embedded within the PhD degree, is an expensive undertaking. Yet, Government funding support for this endeavour has declined significantly over the last decade. The decline in \$ returns via the RIBG has severely stressed the sector in trying to maintain the level of research infrastructure required to deliver quality research training.

The Research Training Scheme (RTS)

UNSW considers that the introduction of the (RTS) has had a positive effect on the sector in so far as the direct inclusion of HDR load and completions in the funding formula has focused the need for high quality training and resulted in a significant increase in timely completions within 4 years (PhD) or 2 years (Masters). That being said, ***the level of funding to Universities via the RTS and IGS has dropped to a level that is unsustainable and is so low that it is now a real disincentive to recruit more new PhD students.***

⁶ See <http://www.arwu.org/rank/2007/ranking2007.htm> for further information.

⁷ See <http://www.heeact.edu.tw/ranking/index.htm> for further information.

⁸ UNSW's Higher Education Research Data Collection.

⁹ Postgraduate Destinations 2006. The Report of the Graduate Destination Survey. Graduate Careers Australia.

The unsustainable level of funding via the RTS/IGS is exacerbated by a number of factors including:

1. ***the negative impact of the “fixed-pie” funding model, in an environment of dramatic improvement in research performance across the sector.*** Without taking into account the cost adjustment factor, for HDR load and completions¹⁰ over the 5 year period 2004-2008:
 - UNSW’s return per HDR completion has declined by more than 30% for both high-cost and low-cost PhD completions. This dramatic reduction translates to the following dollar amounts:
 - High-cost: 2004 ~\$95,000 versus 2007 ~\$59,000
 - Low-cost: 2004 ~\$40,000 versus 2007 ~\$25,000
 - UNSW’s return per HDR enrolment has declined by 3% for both high-cost and low-cost HDR students.
2. ***The declining RTS returns have had the effect of driving international recruitment in the sector, to both increase funding received in the RTS (via increased HDR completions) and to raise income via full fee tuition costs from international students.*** As a result, the distribution of RTS income no longer correlates with total research income,¹¹ arguably the most important indicator of the research environment for delivery of high quality research training.
3. ***The simple two level high-cost/ low-cost funding model for completions is now outdated in a climate fostering innovation through highly cross-disciplinary research programs*** that span the Humanities, Arts and Social Sciences (HASS), Science, Technology, Engineering and Mathematics (STEM) and Health Sciences. The bandings should be reviewed and a four-step cost band model should be introduced. This should more appropriately reflect the costs of research in collaborative disciplines. For example, Community Health is currently in a “low-cost” band, but frequently involves “high-cost” preventative interventions. Computer Science which is currently a “low-cost” band, frequently involves high-cost specialised equipment and facilities, while Communications Technology is classified as “High-cost”. While many research areas in the Humanities and Social Sciences are classified as “low-cost” this classification does not recognise the significant costs associated with extensive fieldwork as an essential component of research in some areas. UNSW recommends expanding the current 2 step cost model which is weighted 2:4.7, to a new four step model weighted 2:3:4:5.
4. ***The current model for HDR training funds completions more heavily than enrolments. While funding should be tied to completions as evidence of the successful delivery of research training, there are significant ongoing costs that are not being met throughout the candidature.*** In the current model, this is made even more difficult as, for example, completion funds for a student who commenced a PhD in 2006 will not appear in the RTS funding received by the University until 2011-2012. Furthermore, the current model provides no direct incentives to drive ***high quality research training***; the heavy emphasis on only completions has improved the number of completions, but a greater emphasis on ensuring Australian Universities deliver high quality research training is now required.

A new model for RTS and IGS within the block research grant funding is required in which:

1. the “fixed-pie” model is replaced by a model in which completions and load are directly funded based on agreed indexed metrics per HDR student load and for each HDR completion;
2. a factor that reflects the quality of the research training environment, as measured by external competitive research income and infrastructure grants, is included in the formula;

¹⁰ See UNSW Submission to the Review of the National Innovation System for further information

¹¹ Go8 Backgrounder, No. 3. *Researcher Supply and Demand*, Nov 2007 <http://www.go8.edu.au/policy/current.htm>

3. there is an expanded cost model (at least 4 cost bands) that recognises interdisciplinary research and more accurately reflects the costs of research training should replace the simplistic high/low cost differential used to fund completions;
4. the ratio of the funding returns for load versus completions is changed from the current model to be more heavily weighted in favour of the load for 4 years FTE (PhD) and 2 years FTE (Masters) to generate a ratio of funding for load : completion of 3:1 i.e. 75% of funding is delivered during the course of the candidature and 25% of the funding is delivered on successful completion.

Alternatively, consideration should be given to the merits of a completely new funding model for higher degree research students that mirrors the funding of undergraduate places and includes:

1. Universities developing a plan for a specific number of HDR places per year in areas of research where they meet defined criteria for delivery of high quality research training and have the capacity, space and resources to train students;
2. Postgraduate places should be fully costed based on load per year and the full cost of research training in the discipline; and
3. Delivery of up to a maximum of 20% completion incentive, with the adjustment dependent on completion rates as a quantifiable indicator of quality training. (e.g., 80% completions within 4 years 100% funding; 70% completions with 4 years 80% funding etc).

c. The adequacy of current research training schemes to support Australia's anticipated future requirements for tertiary-qualified professionals in a wide range of disciplines

While Australia is producing high quality PhDs for a wide-range of disciplines,¹² the current schemes are not delivering sufficient domestic students to satisfy demand and Australia's future workforce needs.

The 30% decline in domestic commencing students in the last decade is a major concern with projected shortfalls in Earth Sciences, Environmental Studies, Mining Engineering, Banking and Finance. Significant shortages in Engineering & Science graduates have been forecast from a number of sources.¹³ The Queensland Chief Scientist has predicted a short fall of 75,000 PhDs in the enabling sciences by 2010¹⁴, and shortfalls of 19,000 scientists and a significant number of engineers have been projected for 2013.¹⁵

While domestic PhDs have been declining, international PhD enrolments have been steadily increasing. ***There needs to be more appropriate funding and pathway immigration schemes to encourage and allow retention of these high quality, trained professionals in the Australian workforce. The investment in training of these international students is a lost opportunity unless we can retain the knowledge generation to meet the anticipated skills shortfall of the Australian economy.***¹⁶

UNSW recommends that the Government consider amending the Department of Immigration and Citizenship's Migration Occupations in Demand List (MODL) to include University teaching and research in the defined areas of anticipated skill shortage to encourage international students completing Australian PhDs to remain in Australia.

¹²Postgraduate Destinations 2006 The Report of the Graduate Destination Survey. Graduate Careers Australia.

¹³ Go8 Backgrounder, No. 3. *Researcher Supply and Demand*, Nov 2007 <http://www.go8.edu.au/policy/current.htm>.

¹⁴ Qld Chief Scientist, Prof Peter Andrews: <http://www.smh.com.au/articles/2004/08/10/1092102454146.html>.

¹⁵ Address to the National Press Club by Minister Carr, 19 March 2008.

¹⁶ See <http://www.theaustralian.news.com.au/story/0,25197,23768547-25192,00.html> for further information.

Industry-Ready PhD Graduates

There has been a greater emphasis in Australian doctoral education on incorporating generic skills and training into doctoral education to ensure PhD graduates are “*industry-ready*” and equipped with a broad range of skills for careers in all professions.¹⁷

The recent introduction of the Commercialisation Training Scheme (CTS) block grant to provide commercialisation training to HDR students was aimed at providing industry-ready graduates. ***However, the CTS Scheme is poorly targeted for a relatively small pool of funds, distributed to 36 of the 38 Universities with very high administrative, compliance and human resource issues that Universities have had to absorb to deliver the program.*** While UNSW has a critical mass of HDR students, and has successfully implemented a new program to train 37 research students in commercialisation as part of their research training, most Universities have struggled to fill places. Providing funding to Universities to train < 30-40 students in a stand-alone Program is an inefficient use of resources. ***UNSW considers that the CTS Pilot Program is under-resourced and poorly targeted to deliver its goals by expecting 36 Universities to deliver CTS training.***

The incorporation of generic skills and coursework into doctoral programs is supported by a central framework developed by the Australian Council of Deans and Directors of Graduate Studies (DDOGS).¹⁸ This framework recognises the necessary impact on the length of candidature of embedding this generic training into the PhD and presents immediate challenges in the current environment where stipends are 3.0 years with a possible extension to a maximum of 3.5 years. ***Extending the duration of Australian Postgraduate Awards (APAs) to 3.5 years with a possible extension to 4 years would allow Universities to formalise this additional training within the PhD degree.***

The Commercialisation Training Scheme (CTS) should be abolished and the limited funds should be allocated to Universities who have demonstrated industry and commercial linkages (including APAs and Linkage grants) to incorporate commercialisation training into the training of research students working with industry.

The generic skill training required to facilitate the transition from PhD or Research Masters into industry/business/government would be best incorporated into PhD training funded by extension of Government scholarships to 3.5 years with a possible extension to 4 years.

4. THE CHALLENGES AUSTRALIAN UNIVERSITIES FACE IN TRAINING, RECRUITING AND RETAINING QUALITY RESEARCH GRADUATES

a. Adequacy of training and support (including income support) available to research graduate students in Australia

Australian Universities deliver high quality, comprehensive training reflected in the appointment of Australian PhD graduates in international and national laboratories, industry, professional and commercial sectors and in higher education. The Graduate Destinations Survey attests to the high levels of employment of PhD and Masters graduates. However ***the support available to students, particularly income support, is at a level that will make it increasingly difficult to attract new PhD students to address the current shortage.***

Scholarships

Recognition of Australia as a country committed to investment in the next generation of researchers requires a PhD scheme to match offerings such as the new funding offered by Canada – approximately 500 PhD scholarships of \$50,000 each year for up to three years – open to both Canadian and international students.¹⁸

¹⁷ DDOGS Generic Capabilities for Research Students Framework and DDOGS Generic Capabilities for Research Students Guidelines; See <http://www.ddogs.edu.au/>.

¹⁸ See <http://oncampus.macleans.ca/education/2008/02/26/budget-2008-new-grad-scholarships-aim-to-attract-international-talent/> for further information.

(i) Australian Postgraduate Awards

- The value of APA scholarships must significantly increase to at least \$26K and be indexed to attract sufficient new local students to PhD degrees; and
- Universities in major capital cities (such as Sydney, Melbourne and Perth) require the flexibility to offer scholarships at the appropriate level to offset the higher cost of living; a fixed \$ value for the stipend, regardless of the location of the student is inequitable.

HDR Scholarships must be higher in value if we are to compete on the international stage for the best candidates and need to take into account the higher costs of living in major capital cities.

(ii) International Postgraduate Research Scholarship (IPRS) Schemes

- The suite of international postgraduate scholarships offered under the Endeavour Program is complex, poorly targeted, and has a high level of administration at the Government and University level including an external third-party provider;
- Similar issues exist with the AusAID suite of scholarships with regulations that include, for example, the possibility of only minimal extensions of candidature/scholarship and a requirement for students to leave Australia within 2 weeks of submission of their thesis – these factors act as a disincentive to attracting international higher degree research students to Australia; and
- The funding model for the award of IPRS scholarships (awarded as a grant since 2008) has greatly penalised Universities that are dominated by high-cost disciplines in Science, Medicine and Engineering. As a result, and due to the inflexibility of the funding scheme, UNSW and other Universities that consistently attract high quality international PhD applicants are only able to offer IPRS Scholarships to about 5% of applicants with the IPRS grant covering only 65% of tuition fee costs, while other Universities are unable to fill their places and report surplus funds.¹⁹

An urgent review and rationalisation of all international postgraduate scholarship schemes (Endeavour, AusAID, IPRS) is required to deliver a core set of high quality, internationally competitive scholarships that fully-fund living and training costs.

(iii) Block Grant Funding of Scholarships

UNSW welcomes the election promise of additional APA Scholarships for local students, and the relaxation of the citizenship requirement for the award of APAI Scholarships. Further changes are required, however, if Universities are to attract both high quality local and international students, and to be competitive on the international stage.

The current APA and IPRS block grants need to be less regulated with increased flexibility in the use of these funds outside the conditions specified in the current guidelines.

UNSW is currently rejecting high quality international students in key areas such as engineering because of the lack of sufficient scholarship support for international students even though there is strong demand for places because local student numbers have dropped due to the employment boom and high commencing salaries in this area.

- 109 International students have applied to UNSW for a scholarship to enrol in a PhD in Engineering in Semester 2, 2008, for only 20 available scholarships (fees plus stipend);
- UNSW utilises the award of selected “tuition-fee-remission” scholarships, in accordance with DEST provisions Sect. 39.1, AIP, 2006²⁰ to offset costs for some international students where demand exceeds supply; and

¹⁹ Letters sent to Vice-Chancellors dated 10 September 2007 and 18 December 2007 from Fiona Buffinton, Group Manager, International Education, DEEWR, regarding EIPRS.

²⁰ DEST: Administrative Information for Providers: Student Support; Funding and Student Support Branch, Higher Education Group April 2006: <http://www.dest.gov.au/NR/rdonlyres/95FCFC22-138C-4EFE-8DB6-C5018E1B185D/10099/AIP.pdf>.

- The cost of a fully funded UNSW scholarship for an Engineering PhD student (\$20K stipend + \$25K tuition fees for 3.5 years = \$158 K) greatly exceeds the returns via RTS (\$69K for completion in 2007).

Universities should have flexibility in the management of Higher Degree Research Scholarships (APA and IPRS) as a single block grant to award scholarships at the appropriate value to the best students (both local and international) in order to attract and train the next generation of researchers.

Infrastructure

Cutting-edge research relies on complex infrastructure and the management of critical research infrastructure requires long-term strategic planning at all levels of Government, industry, and research organisations.

The necessity for long-term planning permits the government to better position and coordinate activity. It is absolutely clear that major research initiatives must align strongly with national priorities. Such programs as Higher Education Investment Fund (HEIF), ARC and National Centres of Excellence Programs (including NICTA), all enhance research capacity, employment, and follow-on industry development in Australia.

A long-term strategic plan for essential research infrastructure needs to be developed. This should be centred on building the critical mass of research excellence – this will directly benefit Australia’s ability to attract the best PhD students and retain them in the Australian workforce.

b. Factors for graduates that determine pursuit of a career in research

The choice to pursue a career in research commences with the decision to undertake a PhD rather than join the workforce as a graduate. ***The level and duration of scholarship support needs to be sufficiently attractive to forgo a full time salary for up to 4 years and the certainty of a full-time, permanent job that will offset the time and financial cost associated with the period of study.***

UNSW supports the Australian DDOGS and CAPA’s positions regarding the duration, amount and conditions of APA scholarships and refers to the submissions to the Innovation review. Specifically:

- ***APA stipends need to be increased by at least 30% per annum, tax free and appropriately indexed;***
- ***APA scholarships should be available for 3.5 years with a six month extension possible; and***
- ***The significant number of mature age students, and those with family responsibilities undertaking research part-time should be permitted to hold part-time APA scholarships tax-free. Part-time scholarships would allow these equity groups to undertake higher degree research programs.***

The level and duration of scholarship support needs to be sufficiently attractive to forgo a full time salary for up to 4 years. APA stipends need to be increased by at least 30% per annum, tax free and appropriately indexed and the duration extended to 3.5 years with a 6-month extension possible.

c. Opportunities for career advancement for research graduates and staff

Career paths for Australian researchers are vitally important to the national innovation system. There are at least 7 different Fellowship Schemes within the ARC and 26 Fellowship Schemes within the NHMRC. These need to be reviewed and simplified to ensure that there are good career paths for researchers at ALL stages of their careers – *i.e.* at (and between) Level A, Level B, Level C, Level D, Level E, Level E +.

The Federation Fellowship Scheme has been an excellent Scheme to attract and retain research leaders to Australian Universities. Excellent research leadership is arguably the most important critical element in the development of a strong research culture and UNSW fully supports continuation of elite schemes such as the Federation Fellowship and Australia Fellowship Schemes.

The number and types of research fellowship schemes need to be reviewed and simplified to ensure that there are good career paths for researchers at ALL stages of their careers.

A significant increase in the number of research fellowships is required to create a career path for PhD graduates/academic researchers.

Elite schemes such as the Federation Fellowship and Australia Fellowship Schemes are critical to underpin research leadership in Australia.

d. Factors determining pursuit of research opportunities overseas

Retaining high quality researchers in Australia, attracting expatriate Australians to return to Australia after postdoctoral positions held overseas, and attracting the best international researchers to pursue careers in Australia are all critical to Australia's future workforce.

Every PhD graduate who chooses to permanently pursue a research career overseas, or remain overseas rather than return to Australia to pursue that career, represents a significant loss of the investment (financial, human resources) in the training of these graduates in the higher education sector.

Research by Professor Graeme Hugo, Director of the National Centre for Social Applications of Geographic Information Systems at the University of South Australia²¹ has confirmed that employment-related reasons dominate the reasons provided by Australian expatriates living in foreign countries, including academics, for moving elsewhere. Non-competitive salaries, teaching conditions, paucity of research funding, job security and opportunities for career advancement are all cited as contributory factors.

Expatriate Australian Researchers

A range of well-structured academic career pathways to target expatriate Australians to return home are urgently required. Our best local PhD students are encouraged to seek postdoctoral experience overseas – indeed this is almost mandatory to be competitive in seeking academic positions in Australia in many Science and Technology fields. However, many choose not to return to Australia. Competitive salaries to those offered in the UK and USA in particular, such as those offered through the Federation Fellowships and Australian Fellowships are required to attract the best researchers to contribute to Australia. Access to state-of-the art facilities and infrastructure, and competitive research funds at realistic success rates via the major granting agencies are also important factors in academic careers. A major factor in the decisions by researchers considering academic positions at UNSW is the high cost of living in Sydney versus the comparatively low salaries.

A range of well-structured academic career pathways to target expatriate Australians to return home are urgently required including competitive academic salaries, a suite of research fellowships (early career, mid-career, outstanding established researchers), access to state-of-the art facilities and infrastructure, and access to competitive research funds at levels and success rates consistent with overseas competitors.

²¹ <http://www.arts.adelaide.edu.au/socialsciences/people/ges/ghugo.html>

e. Australia's ability to compete internationally for high quality researchers

High Quality International PhD students

UNSW consistently attracts applications from high quality international students for PhDs. The high tuition fee costs and living costs, particularly in major capital cities places Australia at a competitive disadvantage in converting applications to enrolments.

In our own region, New Zealand has recently introduced a new policy to charge domestic fees for international research students supervised by leading researchers in New Zealand Universities, including the accompanying legislative changes that allow domestic status for children of PhD candidates studying in New Zealand Schools.^{22,23} Clear support for PhD students and their dependants coupled with immigration pathways post graduation has had a positive impact on recruitment of HDR students to New Zealand and in turn impacted on the competitiveness of Australia as a destination of choice for the best quality international PhD candidates. The New Zealand model provides important lessons for Australia to consider in providing flexibility in attracting international HDR students.

Universities should be allocated a limited number (up to 10% of equivalent RTS places) of domestic fee places for international research students in research areas where Australia is predicted to experience skills shortages in the next decade in order to competitively recruit high quality international PhD students.

UNSW welcomed the introduction of the Skilled Graduate (Temporary) visa in 2007²⁴ that allows international graduates to remain in Australia for 18 months post graduation. That being said, we believe that further changes to immigration rules particularly changes to the Migration Occupations in Demand List (MODL) will make Australia a more attractive destination for PhD enrolment for many international students, particularly those from South-East Asia.

High Quality Researchers

The announcement of the Future Fellows program is a welcome first step as an initiative to provide an attractive entry back to Australia. While the guidelines are in consultation phase only, UNSW considers that the Fellowships will encourage high quality international (and expatriate) applicants and supply an important bridging scheme to complement the normal APD/QEII/NH&MRC and AFP/FF schemes for the recruitment of both Australian and International researchers to the academic workforce. Changes to the APAI conditions are also welcome as they will also have a positive impact on international researchers considering Australia for a career.

Major Fellowship and Scholarship Schemes for PhD students, and for early and mid-career researchers, should continue to include eligibility criteria that allow the best international researchers to secure these Fellowships in a competitive process.

f. Whether Australia's academic workforce is ageing, and its impact on research capacity

Professor Graeme Hugo, Director of the National Centre for Social Applications of Geographic Information Systems at the University of South Australia²⁵ has published extensively on Australia's workforce issues and analysed the academic workforce²⁶ in the context of PhD training. Hugo's data suggests that Australian Universities will lose between a fifth and a third of their staff between 2001-2010, and the lack of opportunities in Australian Universities over

²²Policy Statement on Domestic Status for New International PhD Students:
<http://www.minedu.govt.nz/index.cfm?layout=document&documentid=10874>.

²³ See fee structure at University of Auckland:

http://www.auckland.ac.nz/uoaf/prospective/welcomes/internationalstudents/costs/tuition/intltuition_pg.cfm for further information.

²⁴ See DIAC General Skilled Migration Reforms: <http://www.immi.gov.au/legislation/amendments/2007/070901/lc01092007-01.htm> for further information.

²⁵ See <http://www.arts.adelaide.edu.au/socialsciences/people/ges/ghugo.html> for further information.

²⁶ See http://www.atn.edu.au/docs/Demography_Australias_Academic_Workforce.pdf for further information.

the last two decades and/or a decrease in the attractiveness of academic jobs has resulted in those aged in their 40s and 50s outnumbering those in their 20s and 30s by 31%. Furthermore, highly skilled Australians are now able to easily move to positions in foreign countries, particularly OECD countries. This is consistent with UNSW's experience and its own staffing profile.

The impact of this trend on research is obvious – the shortage of qualified academics in disciplines will result in lower numbers of graduates and postgraduates from Australian Universities. These numbers will affect the supply of qualified researchers across all fields of employment with a decline in research.

5. SUMMARY

In summary, we will not be able to recruit, and more importantly, retain high quality researchers and higher degree research students unless and until:

1. Salary remunerations reflect the real cost of living (particularly for those with families);
2. Research support fully funds the cost of doing research; and
3. Initial research support for attracting expatriates back to the country needs to be not only high enough in monetary value but also for a reasonable length of time, to allow the researchers to settle in and establish their research group before having to vie for national competitive funding.

The University of New South Wales would welcome the opportunity to contribute further to the Inquiry into Research Training and Research Workforce Issues in Australia.

Yours Sincerely,



Professor Les Field
Deputy Vice-Chancellor (Research)