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27 January 2010

Mr Russell Chafer  
Committee Secretary  
Standing Committee on Industry, Science and Innovation  
PO Box 6021  
Parliament House  
CANBERRA ACT 2600

Dear Mr Chafer

**Re: Submission to the Inquiry into Australia's International Research Collaboration**

On behalf of the University of Adelaide we would like to thank you for the opportunity to provide input into this important issue. Please find attached our submission to the Inquiry.

Yours sincerely

Handwritten signature of Professor Mike Brooks in blue ink.

PROFESSOR MIKE BROOKS  
Deputy Vice-Chancellor and Vice-President (Research)

Handwritten signature of Professor John Taplin in blue ink.

PROFESSOR JOHN TAPLIN  
Pro Vice-Chancellor (International)

## Submission to the Inquiry into Australia's International Research Collaboration The University of Adelaide, January 2010

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### Summary

We are strongly of the view that Australia should be more actively pursuing opportunities for international research collaboration in order to build on our existing strengths, and to create new ones. In particular, we need to do more to develop research ties with major countries in the Asia-Pacific region, to complement the existing collaborative relationships with Europe and North America. The Commonwealth Government could support this activity in a number of ways. For example, by upgrading the International Science Linkages program substantially in order to keep pace with the developments that are taking place in major countries within the Asia-Pacific region; and increasing the number and duration of postgraduate scholarships in order to attract domestic and, increasingly, international students.

### Background on the University of Adelaide

The University of Adelaide is one of Australia's top research-intensive universities. While not a large institution, the quality of our research is such that we continue to attract one of the highest levels of per capita research funding in Australia. With over 21,000 students, including around 6,000 international students from 90 countries, the University of Adelaide has produced over 100 Rhodes Scholars, over 100 Fulbright Scholars, and has five Nobel laureates among its alumni. In an analysis of publication and citation data for the last 10 years, as listed in the *Thomson Essential Science Indicators*, the University of Adelaide is ranked in the top 1% of institutions worldwide in thirteen major research fields. We have many researchers conducting world-class research, often in collaboration with international partners.

The University of Adelaide has over 200 current agreements with overseas institutions, relating to research collaboration, teaching and program development, etc. The agreements may be used to facilitate the exchange of information and the publication of research findings, the promotion of research projects of common interest, establishment of joint laboratories, staff exchanges, etc. There will also be a significant number of less formal individual relationships created by organic collaboration between researchers themselves.

We are relatively strong across the board with engagement with Europe and North America (figures), and have emerging contacts in the Asia-Pacific and Latin America. Our academics actively publish and collaborate with colleagues around the world. Table 1 provides some figures on international collaborative research outcomes over the last few years for our main partner countries in Europe and North America.

Table 1: University of Adelaide joint research grants and publications

	Approx. no. of joint research grants with overseas academics (2001-08)	No. of joint publications with overseas academics (2002-06)
USA	127	716
UK	95	367
Germany	36	280
Canada	25	215

We have been less active involved with universities in other parts of the world, although this is beginning to change as we develop and expand relationships in Asia and Latin America. Some examples of specific collaborative programs in which our researchers are involved include:

- The high international profile of the University's research in areas such as cereal breeding is reflected the location of the International Triticeae Mapping Initiative (ITMI) headquarters in Adelaide. The ITMI is the key international forum for the discussion and coordination of public sector activities in the genetics and genomics of wheat, barley, rye and their wild relatives. Its location here places Adelaide at the centre of cereal genetic and genomics research, and provide a crucial mechanism for the Australian Centre for Plant Functional Genomics to provide input into international wheat and barley improvement programs.
- The University of Adelaide, together with Ohio State University in the United States, is leading a multi-million dollar global research project to survey a major group of tiny parasitic wasps. The multinational team from nine countries has recently been awarded US\$2.6 million from the National Science Foundation in the US under its Planetary Biodiversity Inventory program. The five-year project's main aims are to describe and name all 2,500 species of Platygastroidea wasps, to explore poorly known areas of the world rich in parasitic wasps including forests of Brazil and southeast Asia, the Western regions of India and the arid lands of South Africa, and to map the evolutionary relationships using DNA sequences and morphology.
- The University of Adelaide has an agreement on research collaboration with the University of Tokyo, originally signed in 2001. After several years of development, members of our Discipline of Physics installed (in 2005) a super-stable laser on the Japanese TAMA-300 Gravitational Wave Interferometer, located at the National Astronomical Observatory on the western outskirts of Tokyo. The collaboration with Japan was developed through workshops with the Australian Consortium for Interferometric Gravitational Astronomy.
- The University has been actively involved for some years in a geo-sciences research collaboration with several major institutions in India, including the National Geophysical Research Institute, Hyderabad, the Indian Institute of Technology, Kharagpur, and The Indian Statistical Institute, Calcutta. This research has received funding support from the Australia-India Strategic Research Fund in the latest round.
- Senior researchers from the University's Waite campus have been involved in a significant research collaboration for the past decade with the Chinese Academy of Sciences' Research Center for Eco-Environmental Sciences, which led to the establishment of a joint laboratory in soil science. Our key Chinese collaborator in this work has been Professor Yongguan Zhu, who is now the Assistant Director-General (International Relations) for the Chinese Academy of Sciences. Professor Zhu was presented with the National Natural Science Award by the President of China on 11 January 2010. It is intended that future research address four themes of great significance to both Australia and China: soil, plant and water interactions; contaminant biogeochemistry; water supply and human health; and environmental policy and management.

It is one of the values of the University, as stated in our Strategic Plan<sup>1</sup>, 'to be engaged with the local, national and international communities', which includes building international links and partnerships. We are committed to the expansion of our international research engagement, as far as is possible.

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<sup>1</sup> *The University of Adelaide Strategic Plan for 2008-2012*, <http://www.adelaide.edu.au/VCO/strategicplan/>

## Promoting Research Collaboration

We would like to draw your attention to a recent publication by the OECD<sup>2</sup> on the globalisation of higher education. The Report demonstrates that, over the last two decades, there has been a trend towards increasing research collaboration across borders. Although Australia's share of international collaboration (based on internationally co-authored articles) in national output has risen from 27% in 1996 to 41% in 2005, we are below the OECD mean (p.162). We believe this should be a matter of concern for the Committee. The Report also makes an important point about the 'double nature of internationalisation' (p.164), in which we see more international collaboration and more competition, and that:

“... the growing importance of worldwide or international rankings of higher education institutions, generally according to research criteria, changes the scope of the competition between higher education institutions.” (p.164)

There is no doubt that collaboration remains an important element of our research environment, and it needs to be fostered in as many ways as practicable. To work effectively, collaboration needs to be organic, not forced, and implemented where it makes best sense. Of course, competition is good for innovation, and universities exist in a healthy competitive environment. If we are to succeed in this environment, we not only need to work together where this makes sense, but ensure that the scarce resources available to fund innovative research outcomes are invested in priorities with a focus on quality and excellence.

Within the university system, international collaborations are determined by a combination of individual contacts and institutional initiatives. Often initial individual contacts lead to more formal collaborations between several researchers in each institution. However, a university also makes strategic decisions to target a specific country or institution with the aim of encouraging research collaboration. For example, the University of Adelaide is developing close collaborative relations, in research and teaching, with members of the Consortium of Nine Research Universities of China (C9). As a member of the Australian Go8 universities, we are party to the Memorandum of Understanding signed with the C9 in 2009, committing the two groups to work together on postdoctoral student exchange and joint PhD programs. This is a good start, but greater funding is required to develop the relationship and ensure Australia is in a prime position to benefit from China's growth and evolution.

One of the current problems in taking up international opportunities lies with the lack of a national mechanism to co-fund international research partnerships, particularly with China. For example, there have been opportunities to have world-wide collaboration in certain aspects of drug research, organised by the World Health Organisation, where each country provides some funding. As Australia has no such mechanism, our researchers have been excluded from this important human research.

It is worth noting that there are also a number of research areas which are vital to Australia, but in which we are not that strong, e.g. health research in pharmacology, and particularly the translation of outcomes from the laboratory to clinical practice. This requires large population studies, hence the need for large international collaborations. With an ageing population, health issues generally remain a central concern for Australia.

Another example of a program in which Australia could more fruitfully engage is the 'Seventh Framework Programme'. This is the chief instrument of the European Union for funding scientific

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<sup>2</sup> *Higher Education to 2030, vol.2:Globalisation*, Centre for Educational Research and Innovation, OECD, 2009.

research and technological development to 2013. An interesting report published in July last year and entitled 'Mapping the Science, Research and Innovation System of the European Union'<sup>3</sup>, highlights the opportunities which exist for non-EU countries to participate in European research programs, utilising both bilateral and multilateral activities, particularly in addressing global challenges such as food security and climate change. One of the fundamental points within the Report is the importance of developing and delivering research excellence if we are to participate in these research programs.

This is an important point as we need to consolidate our relationships with Europe. One positive initiative from the sector is the *Go8 Australia Germany Joint Research Cooperation Scheme*. The Go8 and the DAAD have agreed to provide around A\$2 million over 3 years to meet the travel and living costs of researchers who spend time at collaborating institutions in Australia or Germany.

As mentioned earlier, we have been able to develop a good base for collaboration with North America and Europe (as shown in Table 1 above). However, it is essential that we broaden this to include a similar expansion of activity to parts of Asia. As noted by Professor Simon Marginson:

"In recent years China, Taiwan, Singapore and Korea have invested heavily in higher education and research. The growth of research in China has been astounding and China is already number two investor in R&D in the world. In the next generation these nations will shoot up the global tables. Along with Japan they will turn East Asia into the world's third great zone of research and innovation, alongside North America, and Western Europe."<sup>4</sup>

In this context we feel that the International Science Linkages program needs to be upgraded substantially in order to keep pace with the developments that are taking place in major countries within the Asia-Pacific region, most especially in China and Indonesia where the lack of Australian Government support for bilateral research collaboration is a very serious impediment. The Prime Minister's announcement of a significant increase in the Australia-India Strategic Research Fund is certainly a step in the right direction, but the extreme disparity with the paucity of funding for research with China requires urgent attention: a bilateral research fund with China of equivalent or greater magnitude must be established as soon as possible. Possibly a similar scheme could also be implemented for the ASEAN countries.

Furthermore, in considering the successor to the International Science Linkages program after 2010-2011, it would be worthwhile giving some priority, not just to countries, but for areas of research, e.g. water, renewable energy technologies, food security, etc., these being areas of global importance having wide application, and scope for future developments.

In considering better ways to enable access to international funding programs, we need to include non-governmental sources such as the Bill and Melinda Gates Foundation, etc. Austrade and others do provide some useful access points, but they might be better co-ordinated and improved. Furthermore, the Commonwealth Government could consider more direct engagement in joint funding programs around areas of key national and international priorities.

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<sup>3</sup> This report was commissioned by the International Science and EIF Branch of the Department of Innovation, Industry, Science and Research in conjunction with the Canadian and New Zealand Missions to the EU based in Brussels.

<sup>4</sup> Simon Marginson, 'Globalization, Knowledge and Competition in Higher Education', paper presented at Kumamoto University, 13 October 2009, p.5. ([http://www.cshe.unimelb.edu.au/people/staff\\_pages/Marginson/Marginson.html](http://www.cshe.unimelb.edu.au/people/staff_pages/Marginson/Marginson.html))

It is also important that we find ways for research institutions to improve access to international capital markets to assist in the commercial development of elements of our research. This is an area where Australia is at a distinct disadvantage to other countries, such as the United States where the availability of venture capital is more widespread. It might be useful for the Commonwealth Government could consider more direct engagement in joint funding programs around areas of key national and international priorities.

The area of research training is another essential part of a knowledge economy and an important element in any research strategy. We need highly-qualified research graduates to undertake new collaborative projects, and we need the ability to attract students from across the globe to our research programs. If Australian PhD programs are to be competitive on the world stage, we as a country must acknowledge the international forces at work especially in Europe and the USA. PhDs will need to be recognised as either 3 years after a Masters degree or 4 years after an Honours degree. There is an urgent need to recognise this in the duration of scholarships, which should be extended to match the Research Training Scheme load of 4 years. Too many students are lost when they seek employment at the end of their scholarship, but still have a year to run in terms of candidature, and this is a great national waste. We also feel that the time is overdue for a significant upward revision of the current value of the Australian Postgraduate Award scholarships and Endeavour International Postgraduate Research Scholarships, particularly at a time of high employment when it is increasingly difficult to recruit PhD students.

This is particularly important for us as South Australia has a small population base and under normal circumstances a research intensive university, such as the University of Adelaide, depends on a mix of national and international PhD students to help drive its research agenda. We are in a globally competitive market 'buying brains' and our future economic development depends on our ability to compete.

Admittedly, such an initiative will not of itself address the extent of the disparity between Australia's PhD exports compared to other countries. In order to attract the best global talent to Australia, we need to relax the rules on overseas PhD students studying in Australia, and sort out the Endeavour International Postgraduate Research Scholarships Scheme to provide a start on getting more scholarships for overseas students. This would assist Australia in competing with the rest of the developed world in recruiting intellectual talent. If we are to compete globally, we need to follow further the early steps taken to embrace more overseas PhD students into Australia.

It is also worth noting that one of the recommendations contained in the Review of Australian Higher Education Report<sup>5</sup>, released in December 2008, was that the Australian Government should 'provide up to 1,000 tuition subsidy scholarships per year for international students in higher degree by research programs targeted to areas of skills shortage.' This is seen as assisting our ability to compete internationally, but a decision on its implementation has yet to be reached.

By encouraging the growth in enrolments by higher degree by research students from the Asia-Pacific region in Australian universities, and the development of our linkages with leading research universities in this region, Australian universities, especially the Go8, will be well placed to engage in joint research projects in many areas of mutual interest.

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<sup>5</sup> *Review of Australian Higher Education Final Report*, December 2008, p.101, <http://www.deewr.gov.au/highereducation/review/pages/reviewofaustralianhighereducationreport.aspx>

As with previous international research engagement activities, this will be a significant long-term benefit to the Australian community, as we benefit from the shared knowledge attained through global endeavours.

### **Summary of key recommendations**

1. That the International Science Linkages program or its successor be upgraded substantially in order to keep pace with the developments that are taking place in major countries within the Asia-Pacific region.
2. That the Commonwealth Government establish a bilateral research fund with China of equivalent or greater magnitude to that of the Australia-India Strategic Research Fund. Consideration should also be given to a similar scheme for the ASEAN countries.
3. That in the successor to the International Science Linkages program some priority be given to critical areas of research, e.g. water, renewable energy technologies, food security, etc.
4. That the Commonwealth Government consider more direct engagement in joint funding programs around areas of key national and international priorities.
5. That the duration of postgraduate research scholarships be extended to match the Research Training Scheme load of 4 years.
6. That there be a significant upward revision of the current value of the Australian Postgraduate Award scholarships and Endeavour International Postgraduate Research Scholarships.
7. That the Commonwealth Government consider relaxing the rules on overseas PhD students studying in Australia, and improve the Endeavour International Postgraduate Research Scholarships Scheme to provide a start on getting more scholarships for overseas students.