

29 January 2010

Ms Maria Vamvakinou MP
Chair
House of Representatives Standing Committee on
Industry, Science and Innovation
PO Box 6021
Parliament House
Canberra ACT 2600

Dear Ms Vamvakinou

The Group of Eight (Go8) is pleased to make the attached submission to the House of Representatives Standing Committee on Industry, Science and Innovation's inquiry into Australia's international research collaboration.

The Go8 regards international research collaboration as essential for ensuring that Australia maintains its position and reputation in international research and ultimately its economic competitiveness.

The Go8 considers that there is a strong need for the Government to provide strategic leadership with respect to international research collaboration, especially in relation to access to major international research facilities, participation in major international research projects, collaboration with countries which are rapidly developing their research capability (for example India and China) and collaboration in research areas of strategic importance to Australia.

The Group of Eight would be happy to meet with the Committee and to provide any further information as required.

Kind regards



Michael Gallagher
Executive Director



GROUP OF EIGHT

Go8 submission to the House of Representatives Standing Committee on Industry, Science and Innovation's Inquiry into Australian International Research Collaborations January 2010

1. The nature and extent of existing international research collaborations.

It is difficult to identify the full extent of Australia's existing international research collaboration at all levels for a variety of reasons. The 'bottom up' and informal nature of much research collaboration, the sheer scale of the activity in large institutions, and the wide variety and short-term nature of most funding for research provide challenges for institutions in collecting and maintaining information on international research collaborations. At the national level there is no single agency responsible for the negotiation, oversight, coordination, implementation and review of our formal international research agreements.

Without question, however, the Australian university sector and the Go8 universities in particular are extensively engaged in international research collaborations, and consider international collaboration a core part of their research strategies. More than 30 per cent of the Go8's research publications include an international co-author and those collaborators come from well over 100 countries including the USA, UK, Germany, Peoples Republic of China, France, Canada, New Zealand, Italy, Japan, the Netherlands and Switzerland. In addition, 22 per cent of the Go8's research students are from overseas while over half of all international higher degree by research (HDR) students enrolled in universities in Australia are enrolled at Go8 universities [Australian Government's PRISMS database].

The Go8 universities have in place many mechanisms for encouraging and supporting international research collaboration. For example, the University of Western Australia (UWA) has a dedicated Research Collaboration Award scheme to support staff in building international collaborations while the University of Sydney, through internal schemes, such as its International Development Program Fund, is pursuing strategies to increase international engagement throughout its teaching, research and outreach activities. The University of Sydney particularly encourages its researchers to pursue multilateral partnerships, as well as collaborations that incorporate a research mobility component for postgraduate research students and early career researchers as well as encouraging international research leaders to come to the university by offering around 50 international visiting research fellowships each year for visits of up to 10 weeks. The Australian National University has a proactive approach to international engagement maintaining an 'on the ground' presence in the US and Brussels.

Go8 universities actively participate in international university networks including the International Association of Research Universities (IARU), the Academic Consortium 21 (AC21), the Association of Pacific Rim Universities (APRU), Universitas 21 and the Worldwide Universities Network (WUN) they actively collaborate in international research projects, research publications, and joint PhD supervision. UWA, for example, has over a dozen cotutelle arrangements (where Ph D students have their doctoral studies supervised jointly by an Australian university and a foreign university with the student being awarded a joint doctoral degree by the two institutions) with a number of participating countries in Europe and Asia, and approximately 30 per cent of its higher degree by research students are international. UWA has a robust strategy of engagement with China, India and Japan, including joint research laboratories such as those with China's Zhejiang University in Genomics and Nutriomics, Biomedicine and Biotherapeutics; and in Water Management and Protection. UWA also has made a large investment in scholarships to support international research students.

The University of Sydney is involved in several research programs funded by the United States National Institutes of Health and by the European Union which involve multi-national collaboration, particularly in health and medical research but also in physical sciences.

Go8 universities are members of the renowned European Molecular Biology Laboratory (EMBL), a major research and teaching initiative focused on obesity, diabetes and cardiovascular disease, and will play a leading role in Australia's involvement in the Square Kilometre Array (SKA). The Australian National University (ANU) is leading Australian participation in the international Giant Magellan Telescope (GMT) project, and also engages in training and research collaborations with international industry partners such as IBM, Microsoft Research (in China, the US and UK), Intel, Sun Microsystems, BASF, Chromasun Inc., and Bayer CropScience GmbH among others.

The Go8 has a European Liaison Officer based in the Australian Embassy in Berlin who focuses on increasing the Go8's research collaboration opportunities in Europe as well as helping expand the Embassy's education networks throughout Germany.

The Go8 manages the Group of Eight – Germany Joint Research Co-operation Scheme which supports the exchange of skills, knowledge and research outcomes of mutual benefit to both Australia and Germany. The scheme provides funds to meet the travel and living costs (mobility costs) of researchers who spend time at collaborating institutions in Australia or Germany. Overall the scheme has been a great success. It has facilitated an increased level of collaboration between Australia and Germany in many disciplines and has raised the profile of Go8 member universities in Germany. In the first three years of the scheme's existence, it has provided a total of \$3,052,673 (€ 1.9 million) to fund 89 collaborative research projects. This funding comes from the German Academic Exchange Service (DAAD) on the German side and from each Go8 university in Australia. An indication of the demand for mobility funding and interest in collaboration between the two countries is the large number of applications to this scheme (80 to 100 per year).

2. The benefits to Australia from engaging in international research collaborations.

As a relatively small and geographically isolated nation, responsible for only a fraction of global research and development (R&D) investment and output, it is vital that Australia's research system is embedded within the global system. Participation in international research collaborations:

- enable our researchers to access specialist research facilities that are beyond our capacity, or beyond the capacity of any individual nation to provide on its own,
- increase the impacts of our research by providing broader avenues for the dissemination of research findings and have been found to result in demonstrably higher citation rates in some fields;
- provide our researchers with the linkages and networks that are essential to achieve success in international funding schemes, and
- ensure that our researchers, governments and businesses have early access to the vast majority of advances in new knowledge and technological innovation that occur elsewhere – enabling them to apply this knowledge and understanding in an Australian context.

There is growing evidence that publications with international co-authorship are much more highly cited than those with Australian authors alone. Publications with US and European co-authors have even greater citation rates. In addition, Australian publications in the Science Citation Index with international co-authorship have increased from nearly 21% in 1991 to over 44% in 2005 Matthews et al. 2009. Feast Discussion Paper 1/09. 'A Bibliometric Analysis of Australia's International Research Collaboration in Science and Technology: Analytical Methods and Initial Findings.' <http://www.feast.org/index/document/1>).

In an environment where global competition for the best researchers, educators and research students is intense and looks certain to increase, the personal contacts formed by researchers and students through active participation in international research networks improves our ability to identify and attract top talent to Australia – thus contributing to our long-term national competitiveness. The resulting global trade in knowledge and intellectual property can provide

economic benefits similar to other forms of trade through access to markets, people, facilities and standards. Many nations with a profile similar to Australia (ie Ireland, New Zealand, Israel and the countries of Scandinavia) actively engage with 'knowledge trading' as part of their nation building strategies.

More importantly perhaps, active participation in international research collaborations raises our international standing as an open and engaged advanced research nation, willing to contribute its fair share of resources and expertise to address global challenges. It also serves to foster friendly relations and understanding between individuals, research institutions and nations.

It is also essential to realise that the world research landscape is rapidly changing. Australia has in the past made the most of its research links with the USA, UK, Japan, Canada and the major European research performing countries such as Germany and France. We cannot, however, ignore the rapidly growing presence of China and India. China has become the world's second-largest producer of scientific knowledge, surpassed only by the US. If it continues on its current trajectory, China will overtake the US before 2020 and the historical scientific dominance of North America and Europe will start to decline. Data from the Organisation for Economic Cooperation and Development show that between 1995 and 2006, China's gross expenditure on R&D (GERD) grew at an annual rate of 18 per cent. China now ranks third on GERD, just behind the US and Japan and ahead of any individual European Union state.

Universities have experienced similar growth. China's student population has reportedly reached 25 million, up from just 5 million nine years ago. The Thomson Reuters study, *Global Research Report: China*, summarises China's research strengths and patterns of international collaboration and finds that in 1998, China's research output was around 20,000 articles per year. In 2006, it reached 83,000, overtaking the traditional science powerhouses of Japan, Germany and the UK. Last year, it exceeded 120,000 articles, second only to the US's 350,000. The report also notes that China is diversifying its research base, producing 10 per cent of the world's publications in engineering, computer sciences and earth sciences, including minerals, and about 20 per cent of global output in materials sciences, with a leading position in composites, ceramics and polymer science and a strong presence in crystallography and metallurgical engineering. The report concludes that China's emergence as a scientific superpower can no longer be denied, and it is a question of when rather than whether it will become the world's most prolific producer of scientific knowledge.

The growth of research in China and India therefore raises the question of how Australia can access the research produced in the rising research superpowers and ensure that China and India wish to collaborate with us. The UK has recognised the strategic importance of China's and India's rapidly growing research base by establishing UK Research Councils (RCUK) overseas offices in Beijing and New Delhi while maintaining their other overseas offices in Brussels, and Washington DC (RCUK China Newsletter 20 January 2010). The RCUK China office works at the funding-agency level to fill the gap between high-level ministerial ambitions for closer collaboration and the bottom-up drive by individual researchers and institutions to build productive links. It aims to enhance the capacity of research funders in the UK and China to work together, to shape funding opportunities so that collaborations involve the best groups in each country, and to enhance mutual understanding of research systems and national priorities so that collaborative activity can be built around complementary strengths and shared ambitions to tackle global challenges.

Australia must put in place a program to strategically target research collaboration with these countries, while building on our existing long-term links with these countries, if it is not to be left behind and effectively denied access to a large part of the world's future research.

3. The key drivers of international research collaboration at the government, institutional and researcher levels.

The key drivers for international research collaboration for Australia include:

- To increase return on investment of research dollars;
- To maintain an internationally relevant and highly regarded research community and higher education system;
- To achieve diplomatic goals;
- To gain critical mass in areas where Australia lacks capacity (e.g. Mathematics);
- To facilitate top quality research;
- To facilitate exchange of students and postdoctoral fellows;
- To gain access to international research funds;
- To gain access to infrastructure not available in Australia;
- To have access to disciplinary colleagues;
- To have internationally relevant publications.

At the governmental level, the key drivers relate to the political agenda and so, for example, climate change, global public health, global financial security, and global food security are all examples of core aspects of an international research agenda. The drivers of international research collaboration at the government level should align with the practical needs of researchers, research organisations, the key benefits that result from international collaborations such as those outlined above, and agreed national strategic research and innovation priorities. In the absence of such a framework, government decisions appear sometimes to have been driven more by diplomatic and short term domestic policy imperatives of the day, rather than by close consideration of the approaches that are most likely to achieve desired outcomes, or of how well specific proposals under consideration fit with other programs and the research system more broadly. Over time, this has resulted in the establishment of various small schemes, administered by different agencies for different purposes – each with its own processes and selection criteria, which often involve high transaction costs and lengthy delays for applicants. It has led to governments often reacting to opportunities as they arise, rather than being in a position to seek out proactively those intergovernmental opportunities that align best with national and disciplinary priorities. It has also led, on occasion, to some confusion about which Minister, department or agency is responsible for coordinating the Government's consideration of specific opportunities for international research collaborations that can proceed only with the approval and active involvement of the Australian Government.

At the institutional level, the rise of international rankings of universities and the need to build critical mass all drive collaboration, and particularly high quality international collaboration. Different institutions have different research agendas and so we would not expect a uniform approach to international collaboration. Collaborations will occur where institutions share a mutual interest in a research topic, further institutional historical advantage, or staff interest, Government policies that encourage international research collaboration will certainly act as a strong incentive to do so, as will any emphasis on research collaboration from the ARC and the NH&MRC.

At the individual level, researchers will engage in international collaboration to enhance the impact and quality of their research, driving international exposure and citations. If international collaboration is encouraged and rewarded through access to resources and time, and through the promotion systems in place in our universities, then it will grow.

4. The impediments faced by Australian researchers when initiating and participating in international research collaborations and practical measures for addressing these.

At the national level, the chief impediments are a lack of strategic focus in Australia's international research collaboration, a lack of coordination of Australia's bilateral research approaches and a lack of funding.

Australia's approach to decision making about participation in major multilateral international research facilities and networks has tended to be ad hoc, reactive to the advances of others, and

considered from a sectional rather than national interest perspective. Certainly, there are some ventures where Australia has shown strategic leadership, such as the Gemini project, Australia's Academic and Research Network (AARNet), and the Square Kilometre Array. In other areas, such as the human genome project, Australia was left behind. This contrasts with the approach of other national governments. The solution is for us to join with, rather than compete against, our northern hemisphere counterparts. We need to explore co-investment in research platforms, shared facilities and networks and fully participation in the creation of cyber-infrastructure and associated data services.

Administrative complexities associated with bilateral agreements could be reduced through the presence of an Australian Government Agency with the power to sign agreements with international partners or a standard template for international agreements. Currently, participation in the European Framework Program is hampered by the EU struggling to engage with multiple Australian institutions.

Another example of the difficulties faced by foreign organisations when dealing with the Australian Government is Australia's involvement with the DAAD. As mentioned above, the Go8 manages a researcher exchange scheme for Go8 and German universities. The DAAD, which offers the scheme to all German universities, would like to see the program enlarged to include all universities and research institutes in Australia, as is usually the case in DAAD partnership programs with other countries. To date, however, no Australian Government funding partner has come forward to meet the DAAD's repeated requests for an expansion of the scheme. With a program budget of €250 million annually and 200 different mobility schemes, the DAAD is one of the world's largest and most respected intermediary organisations of its type. DAAD programs are arranged into five strategic goals which facilitate their long-term orientation:

- To promote young foreign elites as a means of gaining future leaders in education, science, research and culture, in business and industry, in politics and in the media as partners and friends of Germany (€57 million annually)
- To promote young German elites in order to qualify them as open-minded future leading figures in education, science and research, in culture, in business and industry, in politics and in the media in the spirit of international and intercultural experience (€55 million annually)
- To promote the internationality and appeal of Germany's universities to ensure that Germany remains a leading address for young academics and researchers from all around the world (€66 million annually)
- To promote German studies, the German language, literature and area studies at selected universities around the world in order to strengthen German as a major international cultural language and lingua franca and to advance interest in, knowledge of and understanding for Germany (€36 million annually)
- To promote academic and scientific advancement in developing countries and in the transformation countries of Central and Eastern Europe as a means of supporting the economic and democratic reform process there.

Given that Germany is our fourth largest research collaborator, it would make sense for Australia to partner with DAAD on much larger scale than is currently the case. It would also make sense for Australia to examine the possibility of developing a similar set of programs to facilitate research collaboration with other countries.

International research collaboration has relatively low amounts of dedicated funding available. In addition, Australia's distance from the major centres of research means that it must actively take measures to counter that disadvantage. Increasing the availability of seed funding or travel grants would better enable researchers to establish and maintain international collaborations. To facilitate international collaboration and competitiveness, student and postdoctoral travel and exchange programs should be better funded and more accessible. It is worth noting that most research collaborations begin from the bottom-up through contact between individual researchers. The ability of researchers to move internationally and meet face-to-face with peers is critical for fostering these relations. Likewise, domestic funding bodies should recognise international travel

and collaboration as core requirements for research programs and not auxiliary. International collaboration for established research programs is best treated as integral to research funding and the recent changes to ARC programs go some way toward meeting these requirements. However, the international components of domestic funding applications are cut all too often when international engagement should be recognised as a core and indispensable component of grants.

At the institutional level, the overriding impediment to international research collaboration is access to funds to support such activities for both researchers and research students. The longstanding shortfall in the capacity of competitive and block grant funds combined to meet the direct and indirect costs of core research activities has made it difficult for universities to provide the resources required to support international collaborations at optimum levels. The introduction from 2010 of measures such as the Sustainable Research Excellence (SRE) initiative to meet more of the indirect costs of research, improved indexation of block grants and the prospect of performance funding through the proposed compact arrangements will have a positive impact on overall institutional capacity, but this will take time.

Immigration and visa requirements for incoming researchers sometimes also serve to impede collaboration. For example, the Department of Immigration and Citizenship's recently introduced rules on sponsorship for visits of more than 90 days are quite burdensome, time consuming and require host institutions to pay a fee. The more barriers of this sort that exist, the more difficult it becomes to build and maintain strong research networks and collaborations with international partners. A review of the impacts of visa setting on research collaboration and international research access to Australia is needed.

5. Principles and strategies for supporting international research engagement.

The Go8 supports the recent changes to the guidelines of key ARC schemes designed to encourage and support international collaboration including the introduction of International Collaboration Awards (ICAs) as part of ARC Discovery grants. Given that research collaborations generally occur at the individual/research group level, decisions about which collaborations to fund are best done at the individual project level i.e. as an integral part of Discovery/Linkage or other project funding. The inclusion of support for international collaboration as an integral part of mainstream funding also serves to emphasise the importance of international research collaboration and should be extended to all research funding programs.

The Go8 would also support moves to open all Australian Research Council Fellowship schemes) and the Linkage Australian Postgraduate Award (Industry) (APA(I)) scholarships to international candidates who apply through eligible Australian institutions as well as moves to open Australian Postgraduate Awards (APAs) to recipients of International Postgraduate Research Scholarships (IPRS). In order for Australia to remain competitive it is important for Australia to compete internationally for the best research students and early career researchers. These measures will also assist with international collaboration.

From a research perspective it makes more sense for a country (and a university) to collaborate with countries engaged in cutting edge research i. e. generally to collaborate with the traditional research partners of Australia – the USA, UK, Western Europe (Germany, Scandinavia, The Netherlands etc).

The Go8 does, however, consider that there remains a need for the strategic funding of international research collaboration especially in relation to:

- Major research facilities
- Major international research projects
- The strategic funding of collaboration with countries which are rapidly developing their research capability (for example India and China), and
- The strategic funding of collaboration with countries for other reasons, for example, for aid purposes or collaboration in research areas of strategic importance to Australia

In the past, the International Science Linkages Program (ISL) administered by DIISR has served this role. However, the program has suffered from underfunding and a lack of a cohesive Government approach to international research collaboration. The competitive grants scheme of the ISL has now been terminated and there is not a commitment of funding for the program in the outyears.

The Government must put in place a coherent international research collaboration strategy if Australia is to maintain its research competitiveness and prosper economically. Such a strategy requires that the Government actively explore government-to-government agreements relating to participation in major international research facilities, develop a national strategic assessment capacity for future international research collaboration, and assess the appropriateness, against international benchmarks, of mechanisms in place to enable Australian researchers to actively participate in global knowledge networks.

The Go8 recommends that the Government:

1. Continue to progressively open up all Commonwealth schemes for research fellowships and higher degree by research scholarships to international candidates. In addition, consideration should be given to allowing Commonwealth funding and research partner contributions to meet the tuition costs of international postgraduate research students in receipt of Australian scholarships such as the APA(I)s. The current prohibition on meeting student fees from such sources has diluted their effectiveness and reduced the impact of opening up the APA(I) scheme to the best international candidates.
2. Ensure that all Commonwealth competitive schemes designed to support research projects have internationalisation objectives and include funding to cover the reasonable costs associated with supporting international collaboration.
3. Ensure our immigration and visa requirements for both short and longer-term visits by international researchers promote rather than impede researcher mobility. This may include the active pursuit of agreements with other countries to facilitate the movement of researchers and research students.
4. Make a single Minister responsible for all decisions about Australia's involvement in intergovernmental research agreements and for the oversight and coordination of all Commonwealth programs and activities in support of the internationalisation of Australia's research effort. Under the current administrative arrangements the Minister for Innovation, Industry, Science and Research would appear to be the most appropriate minister to assume this role.
5. Establish within an appropriate Government department an 'International Research Strategy & Coordination Unit', to advise and support the responsible Minister in all matters relating to international research collaboration, and to act as the central source of expertise and advice to all other Government departments, agencies and research organisations about Australia's international research strategies, priorities, agreements, programs, and processes. The key aims of this unit would be to:
 - assist the responsible Minister to implement the Government's overall strategy for international research collaboration once determined
 - coordinate a whole of Government approach to Australia's engagement in international research collaborations
 - ensure coherence in policies and programs applied across different Government departments and agencies in support of international research collaboration
 - liaise with disciplinary and industry communities to stay up to date with priorities for national engagement

- proactively seek out opportunities for international research collaborations that align with national research and innovation priorities and which are only possible through intergovernmental agreements
- develop consistent criteria and processes for evaluating available intergovernmental research collaborations and ensure that these are applied to all opportunities under consideration
- routinely review the success of the Government's overall strategic approach, all intergovernmental agreements and programs in support of internationalisation
- provide a single source of information about all Australian inter-governmental research agreements and programs in support of international research collaborations.

The proposed unit would coordinate input on international research matters from the Prime Minister's Science, Engineering and Innovation Council, the Chief Scientist, the Coordinating Committee for Science and Technology and peak representative bodies. It would work closely with all government departments (including Immigration) the research funding councils, universities and other research organisations, industry groups and our embassies to make high quality information available about relevant visa rules, inter-governmental agreements, programs, intellectual property opportunities, and the location of research expertise within Australia.

6. At a Government level we should gain a better understanding of Australian and international research strengths and weaknesses. This would help facilitate research partnerships in areas where Australia needs to import knowledge and expertise and improve diplomatic ties where we can export knowledge and expertise. There will also be areas of mutual benefit where we can partner with countries with similar needs, increasing the total research effort. It may be prudent for DIISR to commission research on international research engagement, our strengths and weaknesses, and develop a national strategy.
7. Enhance research student mobility. Many Australian postgraduate research students are currently disadvantaged in their ability to build international research connections because of difficulties they face in having an international experience as part of their studies. This is often due to the tight timeframes and funding constraints Australian research students face compared to their colleagues in many leading international research universities. In addition to progressively opening up Australia's postgraduate research scholarship scheme to high quality international research students, consideration could be given to providing additional funding to cover travel and other reasonable costs associated with such collaboration.
8. Explore options for technology enabled collaboration. Australia's distance from the research hubs of North America and Europe has always made collaboration difficult and expensive, and the same barriers exist for collaboration with India and China. In a low carbon future and as fossil fuels are depleted, it is likely that air travel will become increasingly expensive. Many innovative technological options already exist for facilitating international collaboration and it would be sensible for Australia to start thinking now about future technological options for supporting international research engagement in an environmentally sustainable way.
9. Use mission-based compacts to drive international research collaboration. The Australian Government's proposed compact approach to the funding and performance monitoring of Australian universities should be used to reward those universities that improve their levels and quality of substantive engagement in international research collaborations.
10. Establish a program to provide funding for strategic international collaboration including funding for Australian use of major international research facilities, Australia's involvement in major international research projects, strategic research collaboration initiatives with major research performers (such as North America, Western Europe and Japan) and strategic research collaboration initiatives with the leading research performers of the future such as China and India.