



PROFESSOR M M HARDING

PRO VICE-CHANCELLOR  
RESEARCH

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Committee Secretary  
Standing Committee on Industry, Science and Innovation  
House of Representatives  
Parliament House  
Canberra ACT 2600  
Email: isi.reps@aph.gov.au

Dear Standing Committee

The University of New South Wales welcomes the opportunity to provide this submission to the House of Representatives Standing Committee on Industry, Science and Innovations *"Inquiry into Australia's International Research Collaborations"*.

### Summary of Submission

UNSW's research strategy is centred on supporting research excellence in our defined areas of research strength. Within this strategy, a key priority is to maximize opportunities for our researchers to collaborate with the best Universities globally and to build on and enhance our long history of successful engagement with partners in the Asia-Pacific region. The national and international recognition of research excellence that results from collaborations and partnerships with highly ranked Universities is a major driver of our ability to attract and retain the best staff and students in the world to work in areas of research strength, and to resource and support a critical mass of staff and research students in these research areas.

#### ***Key recommendations to improve international research engagement:***

- The Australian Government International Research Funds for building partnerships with India, China should be expanded to other countries in the region;
- A consistent framework and cycle of funding for major Australian Government schemes would greatly assist researchers target these schemes in a more effective manner;
- Access to Government Funding, similar to the (now obsolete) International Science Linkages programme and the Australian Academy of Science short-term exchange programmes, that is inclusive of all disciplines, would enhance opportunities for early career researchers and academic staff to engage with international collaborators through short-term visits;
- Improved opportunities for Australian PhD students to spend part of their candidature overseas via access to travel grants, and the introduction of a research fellowship scheme to allow Australian Universities to sponsor and host outstanding international applicants to participate in projects of strategic importance, would allow more effective engagement with international partners.

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

UNSW's strategic intent, presented in *B2B Blueprint to Beyond*,<sup>1</sup> defines UNSW's aspiration to be a leading research intensive University in the Asia Pacific region, focusing on contemporary and social issues through defined strengths in professional and scientific fields – a peer in good standing with the best globally. Our research strategy is centred on supporting research excellence in our defined areas of research strength<sup>2</sup>. ***Maximizing opportunities for our researchers to collaborate with the best Universities globally and to build on and enhance our long history of engagement with partners in the Asia-Pacific, in these areas of defined research strength, is a major priority.***

UNSW is a member of the Universitas 21<sup>3</sup> network of 21 leading international research-intensive Universities and through this network, benefits from engagement with best international research practice and current international research issues, as well as shared research initiatives. Memorandums of Understanding (MOUs) between UNSW and selected partner Universities are entered into as a formal mechanism to signal a genuine commitment to a mutually beneficial partnership that meets strict criteria with clear benefits to staff and students, and alignment with UNSW research strengths.<sup>4</sup>

Our defined areas of research strength include cross-disciplinary areas that address contemporary, global issues. As a result, a large proportion of UNSW's research programmes involve significant collaboration with the leading researchers in the field, wherever they are located in the world. Appendix 1 provides a snapshot of 10 programmes that illustrate the breadth and diversity of current UNSW international research collaborations. ***International research collaborations are a significant component of the overall research productivity of the University:***

- 38% of 2007 publications were co-authored by at least one international collaborator; of these publications, 14% were co-authored with researchers from the USA, 7% with co-authors from the UK, and 4% each co-authored with researchers from Germany and China.
- 270 MOUs with international Universities are in place to facilitate specific discipline-based research programmes and staff and student exchanges; these MOUs are with partners in Europe (40%), the Americas (20%), Northeast Asia (20%), Southeast Asia (10%) and South Asia (10%).

The geographical location of international research partners is determined by a number of factors. ***The research reputation of collaborating organisations, alignment with UNSW's research strengths, as well as the nature of the specific research including the relevance of the outcomes to the collaborators, impact on the countries involved.*** For example, the National Centre for HIV Epidemiology and Clinical Research (NCHECR),<sup>5</sup> as Australia's only medical institute conducting lab bench-to bedside research on sexually transmitted and blood borne viruses, underpins UNSW's research strength in *Biomedical Sciences* and specifically as a world leader in HIV/AIDS research. The Centre has extensive international research engagement as evidenced by collaborations with 165 institutions in 35 countries (2008 data) engaging with those countries in which there is greater opportunity for impacting on the global HIV epidemic as well as leading research communities positioned to complement and contribute to the key priorities of the Centre. Similarly, the UNSW Climate Change Research Centre<sup>6</sup> which has current collaborations with the UK, France, Germany, US, Canada and the Netherlands and has emerging links with China, India, and Japan is pivotal to UNSW's research strength in *Water, Environment and Sustainability*. The Centre has received wide

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<sup>1</sup> <http://www.unsw.edu.au/about/pad/strategicintent.html>

<sup>2</sup> Full list available at: <http://www.dvcresearch.unsw.edu.au/strengths.html>

<sup>3</sup> <http://www.universitas21.com/index.htm>

<sup>4</sup> See for example: [http://www.unsw.edu.au/news/pad/articles/2009/jan/china\\_mou.html](http://www.unsw.edu.au/news/pad/articles/2009/jan/china_mou.html)

<sup>5</sup> <http://www.nchecr.unsw.edu.au/>

<sup>6</sup> <http://www.ccrcc.unsw.edu.au/>

international recognition with the report “The Copenhagen Diagnosis”<sup>7</sup> that was recently profiled in the Federal House of Representatives and the Senate. These countries represent those that are collectively best placed to influence the global problem of climate change.

Within specific countries, ***collaborations with different institutions result from the matching of researcher expertise and researcher priorities, alignment with UNSW’s research priorities, consideration of the funding required and available to support these priorities (current funds and potential future funding sources), as well as the research environment (including size of research groups, mobility options for staff and students, need for face-to-face involvement etc)***. These factors are all important in ensuring a productive collaboration that delivers research outcomes that are mutually beneficial. A further example is the UNSW Australian Tsunami Research Centre and Natural Hazards Research Laboratory (ATRC-NHRL)<sup>8</sup> which is collaborating extensively with Pacific countries in the early detection and risk mitigation of natural disasters including volcanoes, earthquakes and tsunamis. The work of the ATRC-NHRL is globally relevant as research is being used to inform new emergency risk management policy in Australia, Australasia, NW Europe and the USA. In many other cases, the location and nature of international research collaborations is highly discipline specific, and varies from programmes that engage individual researcher-researcher collaborations, networks of teams of researchers, through to large consortia of researchers and Universities. Many academics forge subject-specific collaborations with other leading researchers during the common process of academic exchange (eg conferences, society meetings, sponsored visits etc) and these are usually driven by a matching of needs and capabilities centred around specific research questions, driven through acquaintance and mutual trust initially at the personal level.

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

There are many benefits to Australia, that impact at the economic and societal levels, from engaging in productive international research collaborations. ***Some tangible direct benefits of these collaborations include:***

- Improved international research reputation of Australian higher education institutions, captured in indicators such as international University Rankings (Shanghai Jiao Tong, Times Higher Education etc);
- Increased numbers and quality of co-authored research publications, books and publications through access to a larger “virtual” critical mass of researchers;
- Access to international expertise and networks of researchers that permit major programs of global (and national) significance to be addressed;
- Access to data-bases and collections of data from overseas, samples for testing or analysis, cutting edge technology, equipment and infrastructure;
- Increased ability and opportunity to translate research outputs into internationally relevant outcomes through international exposure and engagement;
- Increased opportunity for the development of Australian researchers and students, from a cultural and professional perspective;
- Enhanced ability of Australian Universities to attract the best international undergraduate and higher degree research students, postdoctoral and research Fellows, academic staff and visiting staff and students;
- Enhanced opportunities for Australian students to participate in global education programs and mobility options as part of their overall research training experience.

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<sup>7</sup> <http://www.copenhagendiagnosis.org/>

<sup>8</sup> <http://www.nhrl.unsw.edu.au/>

The enhanced reputation of Australia as a country of high intellectual capital, productivity and innovation, in turn, feeds the “virtuous cycle” of research in Australia with some of these tangible outcomes further increasing the magnitude and quality of research. For example, ***international students, postdoctoral fellows and visiting staff who return to their home countries often foster direct links to their institutions that seed highly productive ongoing collaborations that benefit Australia.*** For example, Professor Shi, who completed his PhD at UNSW in 1992 in photovoltaic engineering, and holds 11 international patents on solar cell technology, is the Chief Executive of Suntech Power Holdings in China.<sup>9</sup> Suntech has a long-standing research collaboration with photovoltaics with UNSW to deliver innovative solutions to renewable energy. The benefits to Australia’s researchers in photovoltaics that have contributed to the world-class reputation that UNSW holds in this field, are a partnership with the leading solar industry company in China with links to the latest technology. Joint research between Suntech and UNSW developed the semiconductor finger solar cell technology, a major advance for improving the performance of screen-printed solar cells.

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

- i. **Government Level:** Government funding to facilitate collaborations and research programs of global significance and importance to the nation is a key driver of international collaboration. Bilateral and multilateral agreements between Governments, that recognise the expertise and skill base of each partner nation and are aligned with national research and innovation agendas, should drive commitment of Government funds.
- ii. **Institutional Level:** The key driver for UNSW to participate in international research collaboration is the enhanced research productivity and research reputation that these collaborations deliver in our six areas of research strength and three emerging areas of research strength.<sup>10</sup> ***The national and international recognition of research excellence that results from collaborations and partnerships with highly ranked Universities is a major driver of our ability to attract and retain the best staff and students in the world to work in areas of research strength,*** and to resource and support a critical mass of staff and research students in these research areas.
- iii. **Research Level:** Researchers are motivated to collaborate by the intellectual opportunities provided by access to new and complementary expertise, and networks that allow global and large research questions, that are beyond the scope of individual researchers or small teams, to be addressed. Attendance at conferences usually trigger meetings between collaborators and these are often the engine rooms for new ideas, and studies of new questions to be examined. Following on from these contacts, mechanisms and projects are then usually explored that will enable the collaboration to eventuate. These are often facilitated through the exchange of graduate students and postdoctoral fellows, as well as enrolment of Cotutelle PhD students. As these connections are most successful when initiated through personal contact, ***key drivers of this type of research collaboration are those that facilitate and fund attendance at international conferences, staff/student exchanges and fellowships and global education mobility opportunities for students.***

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<sup>9</sup> [http://www.unsw.edu.au/news/pad/articles/2007/jun/Suntech\\_sponsor.html](http://www.unsw.edu.au/news/pad/articles/2007/jun/Suntech_sponsor.html);

[http://www.cbfeature.com/special\\_coverage/news/shi\\_zhengrong\\_and\\_his\\_friends/who\\_will\\_brighten\\_chinas\\_solar\\_energy\\_industry/P2/](http://www.cbfeature.com/special_coverage/news/shi_zhengrong_and_his_friends/who_will_brighten_chinas_solar_energy_industry/P2/)

<sup>10</sup> Full list available at: <http://www.dvcresearch.unsw.edu.au/strengths.html>

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

There are number of bureaucratic impediments to the drivers described in the previous section.

- i. **Visa Requirements:** Visa requirements for Australian and Chinese academics and students for short stays in China and Australia (up to 6 months), respectively, are very onerous and have directly affected the core partnerships associated with the recently established UNSW Confucius Institute<sup>11</sup> in partnership with Shanghai Jiao Tong University in China. For example, a UNSW Australian Endeavour Award Fellowship recipient was unable to obtain a 6 month visa to visit Shanghai Jiaotong University, and needed to obtain two 90 day visas in a lengthy process at significant cost.

***Improvements to the visa process for 6-12 month short stays for international research collaborators, particularly with respect to China, would remove this current impediment.***

- ii. **Funding for short-term staff and student exchange:** The limited pool of funding available to support the exchange of PhD students, postdoctoral fellows and early career researchers as well as academic staff is regarded as an impediment to productive collaborations. The recent changes to the funding rules with the ARC Discovery scheme to fund international collaborations is very welcome. Short-term scientific exchanges offered by the Australian Academy of Science (Korea, Japan, China, Taiwan, UK, France)<sup>12</sup> are excellent programmes, but are open to a limited pool of countries and research areas. The number of allocations is also limited meaning that the competitive process is onerous and has a low probability of success for any given applicant.

***At a practical level, reintroduction of the International Science Linkages programme, that is inclusive of all disciplines, and with an increased budget, would enhance opportunities for early career researchers and academic staff to engage with international collaborators through short-term visits.***

- iii. **Current structure of Australian Government Funding Schemes for International Research:** The lack of consistency in the timing, funding rules, priority areas and availability of funds from the Australian Government international schemes is problematic. International research collaborations require effective planning, including dates and decisions on applications for funding, to be effective. All competitive granting processes require some familiarisation by researchers and those schemes that are consistent in their rules, funding cycles and outcomes are best suited. All too often, one-off complex schemes are called with unrealistic closing dates. In particular, the high level of bureaucracy, and complex application process often associated with different types of funding can be an impediment. For example, funding applications that require 2 separate submissions (one to each country) are unwieldy (eg Australia-India Strategic Research Funds).

***Practical measures to remove these impediments, for future rounds of funding, include:***

- ***forming of a single international panel to assess and fund agreed areas of mutual strategic interest in order to simplify the process and deliver the same outcomes;***
- ***a consistent framework and cycle of funding for major Australian Government schemes which would greatly assist researchers target these schemes in a more effective manner;***
- ***consistency across schemes in relation to progress and financial reporting and removing requirements such as external audit requirements for relatively small amounts of money;***

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<sup>11</sup> <http://languages.arts.unsw.edu.au/confucius-institute/> and <http://www.cspace.unsw.edu.au/>

<sup>12</sup> <http://www.science.org.au/internat/programs.htm>

- ***introduction of online grant application systems for Australian Government Schemes utilising the research offices of Australian universities as a gateway (as per NHMRC, ARC and RIRDC); this process would permit Universities to assist applicants in preparing complete, compliant and strategic applications and assist in effective partnerships with the Commonwealth Government in the application and award process.***

## **5. Principles and strategies for supporting international research engagement**

International research engagement should be pursued based on the principles of:

- Improving educational, societal and economic outcomes for Australia and its region;
- Evidence of a genuine commitment by international partners to deliver mutually beneficial outcomes and an appropriate framework to enable delivery of these outcomes.

***Strategies to better support international research engagement include:***

- The Australian Government International Research Funds for building partnerships with India, China should be expanded to other countries in the region (including South Korea, Japan, Malaysia) in recognition of the strong research opportunities and synergies with Australian research priorities;
- Access to Government Funding, similar to the (now obsolete) International Science Linkages scheme and the Australian Academy of Science short-term exchange programme, that is inclusive of all disciplines, would enhance opportunities for early career researchers and academic staff to engage with international collaborators through short-term visits;
- Improved opportunities for Australian PhD students to spend part of their candidature overseas (6 months) as part of their research training by provision of targeted travel grants; a successful model for this programme is the Cotutelle Travelling Grants<sup>13</sup> available from the French Embassy, which are an essential part of supporting Cotutelle PhD programmes between Australia and France;
- Introduction of a research fellowship scheme to allow Australian Universities to sponsor and host outstanding international applicants to participate in projects of strategic importance.

Yours sincerely



Margaret M. Harding  
Pro Vice-Chancellor (Research)  
Email: [harding@unsw.edu.au](mailto:harding@unsw.edu.au)  
Phone: (02) 9385 5638

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<sup>13</sup> [http://www.ambafrance-au.org/france\\_australie/spip.php?article3621](http://www.ambafrance-au.org/france_australie/spip.php?article3621)

**Appendix 1:** Representative examples of current UNSW international research collaborations.

<b>COUNTRIES</b>	<b>COLLABORATING INSTITUTIONS</b>	<b>PROJECT NAME</b>	<b>RESEARCH AREA</b>
Germany, UK, Japan, Belgium, Croatia, Italy, Denmark, USA, Australia,	Max Plank Inst for Biogeochemistry, Uni of Exeter, Uni of Newcastle, Uni of Hiroshima, Vrije Universiteit Brussels, Universite Catholique de Louvain, Uni of Split, Uni of Padua, Uni of Copenhagen, NASA, ANU, UTas	The maximum entropy production principle in the earth climate system	Climate change, Geology, Biology, Chemistry, Materials, Ecology
UK, USA, Japan	ARC Discovery Project with research collaborators at University of York, Syracuse University, National Institute of Population and Social Security Research	Comparing the Living Standards of Children and Older People Within and Between Nations	Social Policy
India	Indian Institute of Science, Bangalore	Hot Carrier Solar Cells (3 <sup>rd</sup> Generation Photovoltaics)	Photovoltaics, Engineering
Cambodia, Laos, Vietnam and Malaysia	Western Pacific Regional Office, World Health Organisation, Manilla	Development of Guidelines: Drug detoxification and drug treatment in areas of high HIV prevalence or risk and prisons on HIV incidence among IDUs in Northern Shan states	Prisoner health, Developing countries, Drugs and HIV
India	TERI (The Energy and Resources Institute)	Energy efficient membrane processes for treating and processing water recycling	Chemical engineering, biotechnology
Indonesia	University of Airlangga, Surabaya	Capacity building for the Islamic Microfinance Providers for the development of small and medium enterprises in Indonesia	Political economy, Governance, Entrepreneurship, Anthropology
European Union (Netherlands)	Academic Medical Centre, Amsterdam	Gene – environment interactions in heart development	Heart development and congenital heart disease
China	UNEP-Tongji Institute of Environment for Sustainable Development, Tongji University, Shanghai. Funder: Bayer/Ministry of Science and Technology Beijing	Climate change adaptation and buildings in China	Climate Change/Environment
China	China Japan Union Hospital and The Third Clinical College of Jilin university	A collaborative study in sarcoma – biological markers of tumour progression, diagnostic methods of patient identification, targets of tumour therapy	Genetics, Cancer Research, Soft tissue sarcomas
Malaysia Singapore	University of Malaya Medical Centre, Hospital Kuala Lumpur, Hospital Kuala Terengganu, Hospital Tengku Ampuan Afzan, Hospital Sungai Buloh, Hospital Selayang, KK Hospital for Women and Children	Targeted oxygenation in the resuscitation of premature infant and their developmental outcomes	Neonatology