

**Submission to the National Innovation Review from the Royal Institution of Australia  
(Ri Australia [RiAus])**

*“Bringing science to people and people to science”\**

This submission has been prepared on behalf of the Royal Institution of Australia (RiAus) by Linda Cooper, Project Director, RiAus.

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**Declaration of Interest:** The Ri Australia (including the Australian Science Media Centre) is supported by a Council, Board and Science Advisory Panel whose membership comprise key representatives of business, science, education and media organisations throughout Australia and are listed in Appendix 1 of this submission.

*NB: \* The term ‘science’ in this submission encapsulates science, technology, engineering, mathematics and the social sciences.*

## **Preamble**

Established in Adelaide in October 2007, The RiAus is a national, independent, not-for profit incorporated association, which aims to increase public engagement with and promotion of science and scientific applications for the advancement of the sustainable economic, social and cultural wellbeing of the Australian community.

Baroness Professor Susan Greenfield, former Adelaide Thinker in Residence (2004–2005) proposed the establishment of the RiAus as the first international affiliate of the world-renowned Royal Institution of Great Britain (RiGB), of which she is Director. This London-based Institution has been at the centre of scientific research, science education and the popularisation of science for over 200 years. Past leadership has included Michael Faraday, Humphry Davy and Australians father and son William and Lawrence Bragg (winners of the 1915 Nobel prize for physics).

Leading the way, as the RiGB’s first international satellite, the RiAus will facilitate diverse forums for scientists, engineers, students, educators, media, business, government, industry and the community to learn about and discuss the promises and challenges of science in shaping our future. This participation leads to engagement, thus facilitating cultural change. The RiAus will provide a modern, vibrant program of science-focused activities, many of which were initiated by Baroness Greenfield during her Adelaide residencies, while assuming the status of a prestigious internationally recognised Institution. The State Government of South Australia has committed \$12.7 million to the set-up of this initiative. Further details of RiAus programs are provided in Appendix 2.

The RiAus will mobilise innovative methodologies and state-of-the-art communication technologies to deliver its programs across Australia, recognising the shift from the role of the 'central institution' to distributed networks of global research and development activity. The RiAus aims to democratise science by providing diverse forums for our brightest science researchers and educators to promote and celebrate their work, passions and knowledge within the broader community.

It aims to foster a scientifically literate community that understands the relevance of science, engineering and technology to their everyday lives, thus influencing education and career choices in these areas of opportunity.

## Public Engagement and Innovation

"Innovation is all-pervasive, frequently found in unlikely places and is rarely based on traditional understandings of linear, "pipeline" research and development that leads only to new products, drugs or technology." <sup>1</sup>

It is clear "we need to develop a deeper understanding of innovation based on where it actually happens, and we need to develop our approach to innovation policy based on this understanding." <sup>1</sup>

In this regard, the diffusion (and absorption) of applied knowledge is a vital (but sometimes overlooked) component of the innovation cycle. <sup>2</sup> This "innovation awareness" predominately focuses on raising community awareness. To achieve this, strategies need to be developed that aim to break down the barriers that presently inhibit participation in science, technology and the innovation process itself. In this manner, it can better support the diffusion and uptake of new technologies and of creative processes across industry and the community, which influence attitudinal and cultural change.

The RiAus shares similar objectives to the many national and international policy frameworks that recognise the important role of public engagement within the innovation process:

- Engaging the broader community and increasing people's understanding of the importance of science and the benefits it contributes to economic, environmental and social development.
- Encouraging younger people to study science, mathematics and engineering as well as pursue a career in science and/or engineering.
- Recognising and highlighting the achievements of scientists and their discoveries.

**In responding to the seven questions outlined within the Call for Submission, Review of the National Innovation System, the RiAus wishes the following points to be considered:**

- As the world and the global economy relies ever more on knowledge and innovation it is vital that we rethink science as a central activity, not just for scientists, but for the general public. Science, increasingly, is touching everything that we cherish, be it climate and environment, nutrition or reproduction etc. Yet many within the community still think of scientists as a small minority locked away in the ivory towers of their research laboratories, metaphorically (and often literally) on the outskirts of society. Sometimes scientists are demonised by the public, often based in ignorance or misinformation.
- The practice of science should not mean that debates and arguments surrounding it are undertaken and resolved in private, long before the public is presented with a consensus view. The RiAus could play a vital role in celebrating ideas, scientific inquiry and debate and can provide the space, physical and through the use of media to promote and engage in informed and meaningful debate on matters of science.
- Science needs to be considered as much a part of Australian culture as the arts, humanities and sporting endeavors and be valued accordingly.
- The broader community should be capable to contribute to proposing new and different paths of innovation, introducing detours and discords in the normal processes of thought and action, contributing creatively and serving as a catalyst for cultural change.
- The RiAus, together with the Australian Science Media Centre, will play a role in exposing scientific issues to debate well before they are debated in relation to decisions needing to be taken on regulation or application. The Australian Science Media Centre currently provides Australian journalists with horizon-scanning briefings, and expert comment on scientific issues. This allows for more dispassionate and rational debate regarding contemporary science prior to issues emerging in the light of popular media scrutiny which so often makes complex issues into clear “black and white” / “good or bad” debates. Science as an information genre has characteristics different to politics and business, and therefore requires a different approach when engaging mainstream media and through them the public.
- Science is driving the rapid pace of change and provides the means to understand it. This rapid change is a relatively new phenomenon. The Ri Australia believes the public confidence in understanding these changes will be enhanced by an organisation that is underpinned by leaders in the community (drawn from education, politics, business, the media and science) and independent of a scientific research institution.
- Rather than the process of engagement being restricted to particular questions, posed at particular stages in the cycle of research, development and exploitation or in response to particular events, the RiAus could develop the capacity and reputation to be the place to find clear information on any scientific question or discipline.
- Recruiting, retaining and promoting the interest of women in science, engineering and mathematics (STEM) careers is vital to the economic interests of Australia, our innovation cycle and relevant to the national skills shortage.

- Linking scientific knowledge and understanding to policy development. The production and uses of science are now intertwined and embedded in dense relationships with business and policy. In this new environment of public questioning and engagement there is a vital opportunity for science to connect in a positive way with policy. This could include new approaches to alleviating human disadvantage (social, planning and health policy), educating our children or protecting and enhancing our environment.
- The RiAus has more than the potential to better inform and engage with the wider public, it could also provide a link between research and the practical application of that research in assisting the policy and action of government and business.

#### **Why the RiAus is an organisation well-placed to deliver:**

- Provides flexibility, ability to respond at a much more responsive means than existing educational and beauracrtic structures.
- Can facilitate partnerships with stakeholders, business and science.
- Provides independence from existing science research organisations.
- Provides the role of a catalyst, an independent broker working seamlessly across sectors, heirachies and disciplines within our exisiting institutions.
- Can promote science "heroes" in the mainstream media through the activities of the Australian Science Media Centre.
- It is an organisation whose principal role is to bring scientists and policy makers beyond their research environments to interact directly with community.
- It will translate innovation to facilitate change by engaging community to stimulate participation as agents for change.
- It can pilot new programs/ innovative methodologies that can be distributed nationally, and internationally.

*" I shall argue that only if science is at the heart of the community, driving initiatives in other sectors with which it traditionally has had only a tangential relationship, then, and only then, will we have a sustainable way forward for the 21<sup>st</sup> century and beyond. "*

***Baroness Greenfield, Getting to the Future First (2006)***

## Appendices

### Appendix 1: Composition of Board/Council and Science Advisory Panel etc

#### A) RiAus Council

The RiAus is governed by a Council of distinguished business, science and education representatives. Chaired by Mr Peter Yates, membership to date comprises:

- Emeritus Professor Max Brennan
- Sir Rod Eddington,
- Baroness Professor Susan Greenfield
- Ms Catherine Livingston
- Mr Javier Moll
- Mr Martyn Myer
- Professor John Yovich

#### B) RiAus Program Advisory Group

<b>Emeritus Professor Max Brennan AO</b>	Former Chief Scientist for South Australia/ Ri Council
<b>Professor Marcello Costa, FAA</b>	Professor of Neurophysiology, Dept of Physiology, School of Medicine, Flinders University
<b>Professor Richard Head</b>	Director, CSIRO Preventive Health Flagship Program
<b>Professor Caroline McMillen</b>	Pro Vice Chancellor: Research and Innovation, University of South Australia
<b>Mel Mansell</b>	Editor, <i>The Advertiser</i>
<b>Monsignor David Cappel</b>	Commissioner for Social Inclusion, Government of South Australia
<b>Professor Martin Westwell</b>	Director, Flinders Centre for Science Education in the 21 <sup>st</sup> Century
<b>Professor Tanya Monroe</b>	Director, Centre of Expertise in Photonics, University of Adelaide
<b>The Hon. Jane Lomax-Smith</b>	Minister for Education & Children's Services; <i>Minister for Tourism; Minister for the City of Adelaide Government of South Australia</i>

#### C) Australian Science Media Centre Board Members (2007/2008)

- Mr Peter Yates (Chair AusSMC ); Allco Equity Partners
- The Hon Mike Rann MP; Premier of South Australia
- The Hon Gavin Jennings MLC; Govt. of Victoria
- Mr Russell Caplan; Chairman, Shell Australia Limited
- Ms Marilyn Chalkley; Manager, Media Liaison, CSIRO
- Mr John Croll; CEO, Media Monitors
- Mr Michael Ellies; Head of Group Services, APN News and Media Ltd
- The Hon. Verity Firth; Minister, Govt of NSW
- Professor Tim Flannery; Macquarie University
- Ms Fiona Fox; Director, UK Media Science Centre
- Mr Peter Fray, Editor, Canberra Times, Fairfax Media
- Mr Rob Douglas; Chief Operations Officer, ResMed Limited.
- Mr Graeme Liebelt, Managing Director & CEO, Orica Limited

- Mr Garry Linnell; The Daily Telegraph
- Mr Melvin Mansell; Editor, The Advertiser, News Ltd
- Prof Rob Morrison; Producer/Presenter of TV Science & Environment Segments, Nexus Australia Network (Asia Pacific)
- Ms Kris Neill; Head Corporate Communications Division, Macquarie Bank Limited
- Mr Paul Ramsay; CEO Ramsay Health Care / PRIME TV
- Robyn Williams; Presenter Science Show, ABC
- Professor John Yovich; Chair of The Innovative Research Universities Australia (IRUA) / Vice Chancellor Murdoch University

#### D) Australian Science Media Centre Science Advisory Panel (as at 24/01/08)

The AusSMC has formed a Science Advisory Panel to provide advice when needed.

Membership includes:

<b>Professor Peter Andrews, AO</b>	Queensland Chief Scientist
<b>Professor Ken Baldwin</b>	Professor, Research School of Physical Sciences and Engineering, Australian National University
<b>Professor Robin Batterham</b>	Group Chief Scientist, Rio Tinto Limited President, Australian Academy of Technological Sciences and Engineering (ATSE)
<b>Professor Snow Barlow</b>	Professor of Horticulture and Viticulture, School of Agricultural and Food Systems, University of Melbourne
<b>Professor Lyn Beazley</b>	Professor of Zoology, School of Animal Biology, University of Western Australia
<b>Emeritus Professor Max Brennan AO</b>	Chief Scientist for South Australia/ Ri Council
<b>Professor Adrienne Clarke, AC</b>	Laureate Professor, School of Botany, University of Melbourne
<b>Professor Alan Cooper</b>	School of Earth and Environmental Sciences, University of Adelaide
<b>Professor Marcello Costa, FAA</b>	Professor of Neurophysiology, Dept of Physiology, School of Medicine, Flinders University
<b>Professor Derek Denton</b>	Department of Physiology, University of Melbourne
<b>Professor Peter Doherty, AC,</b>	Laureate Professor, Department of Microbiology and Immunology, University of Melbourne
<b>Emeritus Professor Frank Fenner AC, CMG, MBE</b>	Visiting Fellow at John Curtin School of Medical Research, Australian National University
<b>Dr Bryan Gaensler</b>	Assistant Professor, Department of Astronomy, Harvard University
<b>Baroness Professor Susan A Greenfield, CBE</b>	Director of the Royal Institution of Great Britain
<b>Professor Richard Head</b>	Director, CSIRO Preventive Health Flagship Program
<b>Professor Robert Hill</b>	Head of Science, SA Museum
<b>Professor Marcia Langton</b>	Chair of Australian Indigenous Studies, School of Anthropology, Geography & Environmental Studies, University of Melbourne

<b>Emeritus Professor Ian Lowe, AO</b>	Emeritus Professor, School of Science, Griffith University
<b>Emeritus Professor Nancy Millis, AC, MBE</b>	Chancellor, La Trobe University.
<b>Professor Caroline McMillen</b>	Pro-Vice Chancellor – Research & Innovation, University of South Australia
<b>Sir Gustav Nossal, AC, CBE</b>	Emeritus Professor, Department of Pathology, University of Melbourne
<b>Professor Helen Quinn</b>	Director, Stanford Linear Acceleration Centre, Stanford University
<b>Professor Michelle Simmons</b>	Federation Fellow, School of Physics, University of New South Wales
<b>Professor Fiona Stanley, AC</b>	Director, Telethon Institute for Child Health Research
<b>Professor Patricia Vickers-Rich</b>	Faculty of Science, School of Geosciences, Monash University
<b>Professor Malcolm Walter</b>	Director of Astrobiology, Department of Earth and Planetary Sciences, Division of Environmental and Life Services, Macquarie University
<b>Professor Bob Williamson, AO</b>	Senior Principal Research Fellow of the Murdoch Children's Research Institute and Professor of Medical Genetics, University of Melbourne.

## Appendix 2:

Some specific examples of how the Institution intends addressing issues of scientific literacy and engagement of the public include:

### **The Australian Science Media Centre (AusSMC)**

*Chair: Mr Peter Yates, Chair, AusSMC*

The AusSMC is a national, independent, not-for-profit organisation devoted to providing evidence-based science to the public through the mainstream media. It is first and foremost an independent service for news reporters when major science news stories hit the headlines. The overall goal is public debate and awareness on scientific issues that is based on the most up-to-date information available. The AusSMC will be co-located within the RiAus building and will operate in synergy.

Modelled on the Science Media Centre (SMC) established in the UK in 2003, this centre opened in Adelaide in November 2005. The AusSMC was established with a one-off grant from the SA Government as the first of the projects emanating from Baroness Greenfield's residency.

The AusSMC is guided by a National Science Advisory Panel and a Board of senior media, business and academic executives (listed in Appendix1). It is funded by a mix of media, industry and academic organisations, and contributions are capped at 10% of operating costs to ensure the Centre's independence.

In its first two years of operation, the Centre has:

- Developed a database of 1300 Australian experts willing and able to engage with the news media
- Ran 32 national media briefings (from August 2007 all briefings were also streamed live over the internet for interstate reporters)
- Sent out 145 rapid reaction roundups of comment from Australian scientists
- Triggered or contributed to over 4,000 media reports in national and metropolitan outlets, including approx 20% overseas outlets
- Developed "On the Radar", a series of exclusive briefings for senior media and business leaders
- Began a Science Blog site where scientists can express opinions on topical issues
- Fielded over 1,000 unsolicited inquiries from journalists looking for an expert or science background for their story
- Collated "In a nutshell" fact sheets on various topics including bird flu, geosequestration, RU486, and mobile phones and health

The AusSMC Board has supported the proposal for the AusSMC to relocate with the Ri Aus into the new refurbished Stock Exchange building in early 2009. This reflects the arrangements of the SMC being located within the RiGB in the United Kingdom.

The AusSMC have been involved in the planning for the development of the RiAus, in particular, the design of office accommodation, IT capacity within the building and audio-visual equipment requirements.

For the AusSMC to maintain its effectiveness, it is important the two organizations operate independently. However, it is also an opportunity to build on the potential synergies between the two and the opportunities to consolidate administrative functions, shared resources and expertise to maximise the impact of our efforts to build a scientifically literate community. The AusSMC and RiAus are currently working on the development of a Memorandum of Understanding to clarify roles, future collaborations and logistical arrangements that will be represented to both the AusSMC Board and Ri Aus Council for consideration.

**The Hypatia Centre: Women in Science, Technology, Engineering and Mathematics**  
*Champion: Professor Caroline McMillen, Pro Vice Chancellor, Research, University of South Australia*

While enrolments of girls in certain science subjects at school are now higher than for boys, participation by women in maths and physical sciences is traditionally low. Their involvement in all fields of science declines progressively at the tertiary level and in the workforce, particularly at senior leadership levels.

Against a background of an increasing demand for a workforce with STEM skills, the loss of trained women presents a major issue for countries and regions that are striving to build knowledge-based economies.

Named after *Hypatia of Alexandria* – an ancient Greek mathematician and inventor who is among the first women known to have participated in the male-dominated scientific and academic world – the Hypatia Centre will be a national virtual hub that co-ordinates a suite of activities aimed at identifying, addressing and overcoming the issues related to becoming a successful woman in science, technology, engineering and maths (STEM).

It is proposed that the activities and resources of the Hypatia Centre be divided into the following focus areas:

1. 'Employer Engagement Programs' (the delivery end, employer derived and driven)- including industry-focussed days, directly address skills shortage issues, be a national resource for world's best practise intervention programs;
2. a National Brokering Centre, underpinned by a funded researcher program (within University structure) to broker research directions to motivate the national debate and instigate change in policy;
3. 'Education and Awareness Program'- direct links with RiAus programs, focussing on recruitment and retention of women through positive image and role model promotion, communication strategies utilising a national network of 'Hypatia' women; and
4. 'Resource Database'- a 'warehouse' centre that will underpin the Centre.

**Science Outside the Square (SOS)**  
*Champion: Mr Melvin Mansell, Editor, The Advertiser, News Limited*

Now in its fourth successful year, Science Outside the Square (SOS) is a high profile and highly successful program of public events on some of science's hottest topics. It brings the public face-to-face with scientists in non-threatening environments, helping to free science and science from the confines of the lab.

Uniquely characterised by this direct interaction with scientists. Its innovative topics, event formats and venues, and emphasis on interdisciplinarity, SOS has proved to be a popular and exciting way for the public to access science of all sorts.

SOS is a highly collaborative initiative. It involves many leading scientific, education and creative organisations from across government, industry, tertiary and not-for-profit sectors, with partners as varied as AFL teams, the Australian Network for Art and Technology (ANAT) the South Australian Neuroscience Institute (SANI) and the Defence Skills Institute (among others). A typical SOS event lasts about 90 minutes and comprises a combination of presentations/discussion and Q&A sessions those allow the public to interact. Avoiding traditional 'lecture' formats whenever possible, SOS events are usually hosted by a skilled facilitator – often a science broadcaster/journalist – adept at stimulating dialogue between among participants and between them and audience members.

Since its inception in 2005, SOS has delivered approx ten events a year and has reached a total audience of approx 30,000 across both metropolitan and regional areas of SA. The program has developing a high level of brand recognition and has a loyal following of SOS 'friends' who regularly attend events. These 'friends' are kept informed of the program via email bulletins and additional marketing activity, and in the form of free advertising and features in *The Advertiser* newspaper.

Ideally, the RiAus SOS program will thus continue to address the topical (and sometimes controversial) subjects, and to adopt the innovative event formats and venues that have characterised the program so far. It will recognise the importance of taking a proportion of RiAus activities to the public rather than expecting them to come to the RiAus. Key to the success and profile of the program is the delivery of at least one large-scale 'highlight' event annually, often tying in with a major cultural or sporting event. This has proved to be an effective way of reaching out to audiences not necessarily engaged with science previously, thus broadening the program's reach and both increasing the size and demographic of the RiAus audience.

This approach has proved to be an attractive proposition for partner organisations, with a wide variety of stakeholders keen to participate in/contribute to SOS. It has thus played an important role in strengthening relationships both with the broader community and with stakeholders, and has the potential to be a key factor in brokering national and international connections.

### **Links to RiGB**

Central to the RiAus' position as the first international satellite of the RiGB will be its incorporation of specific links with the London Institution. The MOU and affiliation agreement outline that the RiGB and RiAus share IP, which on a practical level will take the general form of sharing knowledge, expertise and a passion for science, plus more specific sharing of event/program ideas/speakers etc and even the delivery of shared events.

### ***SpiRit of Science***

The SpiRit of Science Maurice de Rohan Scholarships have for the past three years enabled ten South Australian teenagers to head to London each year for an action-packed stay centred on the Christmas Lectures.

Named in honour of the late Mr Maurice de Rohan, South Australia's former Agent General in London, SpiRit of Science arose from Susan Greenfield's conviction that "It is particularly important to provide first-hand opportunities for young people from low socio-economic communities to experience the wonders of science, to connect them with eminent thinkers and inspire them to see science as a possible pathway for their learning and careers." It gives a talented group of young people a chance to develop their passion for science in a unique learning environment. It shows them what they can achieve if they choose a career in science and enables them to share their experiences with their peers and neighbourhood schools on their return to Australia.

The young people are chosen on the basis of their passion for science and their communication, social and leadership skills. Each group comprises a mix of girls and boys aged 15–16 from regional and metropolitan areas, with a priority on the participation of Aboriginal students, girls and young people under the Guardianship of the Minister.

#### *'Dusk to Dawn'*

It is intended that – through the use of state of the art technology (video-conferencing and live webcasts) – the RiAus link directly to the RiGB for shared/joint events. In this way, audiences in the UK can hear direct from Australian scientists and/or interact with audiences in Australia (and, of course, vice versa).

#### *Christmas Lectures*

The RiGB Christmas Lectures are the flagship activity of the London Institution and have been annually since 1825 when they were introduced by Michael Faraday, a former Director of the RiGB.

Each performed for a live audience of over 500 schoolchildren, the five (approximately hour-long) lectures serve as a forum for presenting complex scientific issues to young people in an informative and entertaining manner, and have been televised nationally since 1966. In recent years, the Lectures have filled peak-time evening slots between Christmas and New Year, with each was viewed by over 1.000,000 people. In addition, the lectures tour Japan (and until recently South Korea; supported in both instances by the British Council), where they are performed live and televised to huge audiences.

While the subject matter varies from year to year, central to each Christmas Lecture is the exciting mix of children, science and demonstrations that audience around the world love. Many world-famous scientists have given the lectures, including Baroness Susan Greenfield David Attenborough and geneticist Richard Dawkins.

#### *Christmas Lectures at the RiAus*

The RiAus has a unique opportunity to bring the world-famous Christmas Lectures to Australia. The manner in which this is realised could take various forms, and would need to consider obvious cultural/seasonal differences between the north and southern hemisphere, but might include:

- Live link to the lectures in the UK.
- Bringing a previous set of lectures/lecturer to Australia (in the same way as they are currently presented in Japan, through the co-operation of the British Council).
- Development and delivery of uniquely Australian lectures – ideally supported by a major sponsor and with a media/broadcast partner to enable televising of the lectures nationwide.

### ***Masterclasses***

The RiGB serves as an umbrella organisation, for the delivery of maths (and more recently, science) 'Masterclasses' across the UK, offering guidance, resources (on organisational and mathematical aspects) and limited grants to support the launch of new series.

Organised regionally by local volunteers and based at universities, schools or local authorities, Masterclasses inspire and engage young people who have shown an interest in/aptitude for maths and science by introducing them to aspects of the subjects not usually covered in the curriculum. They bring maths and science alive for students and support teachers.

Targetting both primary and secondary levels, each Masterclasses comprises a mix of lecture/demonstration (class), individual and group work, which might include games, puzzles, problem solving, investigations and cross-curricular projects. Students work with a different presenter (from industry or education) and a different topic each week, with presenters chosen for their ability to share their enthusiasm and knowledge.

### **Maserclasses at the RiAus**

The RiAus has the potential to set up a similar network of Masterclasses in Australia, using the RiGB as a model on which to base the program but tailoring the program according to Australian needs. Alternatively, the RiAus might consider adopt the 'Masterclasses' branding only and developing a unique series of activities specifically aimed at enrichment activities (as opposed to the more general education-focused initiatives).

### **References**

1. *Innovation Gap Report*. National Endowment for Science Technology and Art (NESTA). UK, 2006.
2. Terry Cutler. *Review of the National Innovation System*, 2007.