2014 Meeting of the Chairs for the National Committees for Science

Tuesday 25 March 2014, 10 am – 4 pm
University of Melbourne, Yasuko Hiraoka Myer Room, Sydney Myer Asia Centre

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Welcome

Professor Suzanne Cory, President, Australian Academy of Science

Professor Cory welcomed all Chairs, Academy staff and executives, commenting that the meeting would be an opportunity to facilitate and improve interaction between the 22 National Committees for Science and the Academy executives. It is intended that this will be an annual event in future.

Implementation of the Review of the Academy's National Committees was the focus of all National Committee activities last year. Professor Cory acknowledged the sterling work of the Review committee, chaired by Professor Bruce McKellar and appointed by the Executive Committee of the Academy. She also thanked the Secretaries for Biological and Physical Sciences, Professor Marilyn Renfree and Professor Chennupati Jagadish, and all the National Committee Chairs for their contributions to implementing the Review's recommendations.

Professor Cory emphasised that the review had helped redefine some of the roles of the National Committees, and specified a clear path for their future activities.

She commented that the financial assistance provided by the Academy to the National Committees was modest, of necessity, but that two new staff members had been appointed in the Projects section to assist all committees to effectively execute their planned activities and initiatives. She emphasised how much the *pro bono* work of the members was valued, including their time and efforts to fundraise to support their programs.

She pointed out that the formation of five new committees, namely,

- Agriculture, Fisheries and Food
- Cellular and Developmental Biology
- Ecology, Evolution and Conservation
- Information and Communication Sciences
- Materials Science and Engineering

had expanded the breadth of science covered by the National Committees, and more closely reflected the modern shape of science, providing a more balanced representation of the physical and biological sciences.

Two major goals of the review have been to encourage and enable the National Committees to interact with each other on issues of common interest, and to engage more closely with the Fellowship and other organisations such as professional scientific societies and other peak national bodies in Australian science. In addition, internationally, the committees have been encouraged to improve linkages with established ICSU unions and with other relevant non-ICSU international organisations. These outreach activities will strengthen Australian science and maximise Australia's contribution to international scientific decisions and projects.

Professor Cory emphasised that with a diverse representation of sectors, the National Committees were perfectly placed to support discipline development, which has recently been highlighted by the Chief Scientist in his Australia 2050: Smart Science series as fundamental to Australia's future.

Session 1: Overview of activities of the 22 National Committees, issues of concern

Professor Marilyn Renfree, Secretary Biological Sciences, chaired this session and invited all the Chairs to give a brief overview of activities of each of their committees which is summarised below:

Agriculture, Fisheries and Food

Professor Roger Leigh

- Welcomed the re-organisation of the previous Plant Sciences committee and subsequent creation of the Agriculture, Fisheries and Food, Cellular and Developmental Biology and the Ecology, Evolution and Conservation committees
- NCAFF coverage underpins a major area of economic activity
- Membership consists of society representatives and members in their own right
- Emphasised that a few societies would be common between the NCEEC and NCCDB and it would be important to coordinate between the Chairs to avoid mixed messages
- Major activity in the coming year will be beginning a decadal plan in agriculture
- Currently working on a white paper on agricultural competitiveness
- Challenges include securing funding and defining the focus / scope of the proposed decadal plan.

Antarctic Research

Professor Dana Bergstrom

- Coverage of NCAR includes a wide range of overlap with other NCs
- Contributed to the review of the 20 Year Australian Antarctic Science Plan both in the capacity of the National Committee of Antarctic Research and ex-officio member of the Antarctic Science Advisory Committee (ASAC) advising the Government on these issues
- Major cultural event planned for 2015 – Pure Antarctic, an outreach event that aims to improve awareness of Australian Antarctic Science
- Key international link is Scientific Committee on Antarctic Research (SCAR)
- Main area of concern is continuing and future funding for the whole Antarctic science sector including ASAC. The number of science projects being supported by the Australian Antarctic Program has dropped from 142 in 1997 to just 62 this year with concurrent decrease in science support staff as well.

Astronomy

Professor Stuart Wyithe

- Main bodies in Australia covering astronomy are the NCA, Astronomical Society of Australia and Astronomy Australia Limited (which resulted out of the need to manage the investment in national astronomical research infrastructure), which was secured as a result of the previous Decadal Plan, 2006-2015
- The committee's decadal plan (*New Horizons: A decadal plan for Australian astronomy 2006-2015*) has been a very important document for Australian astronomy. A mid-term review was undertaken and a new decadal plan is currently being developed by the committee

- The International Astronomical Union, which the NCA links to, is an active union with a mission to promote and safeguard the science of astronomy in all its aspects through international cooperation
- Main challenge is ongoing infrastructure funding and funding to engage in international projects and utilise international resources
- The emphasis was not only on buying time on the international telescopes for instance, but to be involved as partners, which will enable the astronomical community to influence international strategy.

Biomedical Sciences

Professor Edna Hardeman

- Committee membership represents seven or eight professional societies with either presidents or immediate past-presidents
- Coverage includes all human medicine disciplines
- The committee welcomes interaction with other related NCs and possible presentation of a joint case to the NHMRC with other relevant Committees regarding the anomalies in funding.
- Main activities include promoting education through CUBEnet – network of tertiary biomedical science educators and advocacy to government agencies on behalf of the discipline
- Currently working on proposal to expand the remit of CUBEnet to bring together all Australian biomedical networks into one organisation, potentially with Academy support.

Brain and Mind

Professor Pat Michie

- Recent name change from the National Committee of Psychology to “Brain and Mind”, which has increased the scope and coverage of the discipline the NC now covers
- Welcomes closer links with related NCs
- Concerned about underrepresentation of Psychology in Academy Fellowship possibly because of no appropriate sectional committee covering Psychology and Cognitive Neuroscience
- No longer a member of the International Union of Psychological Sciences but has links to the International Brain Research Organization (IBRO)
- Future objective is to develop a website that will facilitate information exchange between brain imaging centres in Australasia
- The committee is keen to be a part of the implementation committee of the Inspiring Smarter Brain Research initiative to develop a Bionic Brain, an outcome of the Theo Murphy Think Tank 2013.

Cellular and Developmental Biology

Professor Richard Harvey

- Eight to ten societies represented in membership

- Main concern is visibility of both the NC and the Academy within the community – what they do, how the NC can link researchers to the Academy and to government via the Academy
- The committee has organised a public lecture by Nobel Laureate Sir John Gurdon in the Shine Dome in September, when he will be visiting Canberra to open the 2014 ComBio conference
- Concerned about a regulatory loophole in stem cell research and applications, allowing improper use of stem cell research outcomes, which are not evidence based. Could undertake possible action with relevant NCs, Australasian Society for Stem Cell Research and Stem Cells Australia. Professor Cory suggested writing a position paper on the topic with Academy support or a possible Q&A booklet and try to reach public through science programs or opinion pieces in the media
- Undertaking a decadal plan would not be relevant to this field of science as it is dynamic and fast growing, although this will be considered further.

Chemistry

Professor Paul Mulvaney

- The NCC now has a formal agreement with the Royal Australia Chemical Institute (RACI), including shared subscription payments to the International Union for Pure and Applied Chemistry (IUPAC) and a formal seat for the RACI President on the committee
- The NCC has a strong relationship and representation on its committee from secondary schools, other societies, CSIRO and industry
- The NCC provided input to the ERA 2011 and 2012 reviews carried out by the ARC
- Although an old discipline, no overarching, Australian forward-looking plan has been produced for the field of chemistry. Currently fundraising for the first Australian decadal plan is underway (currently $40k raised), and the skeleton plan has been approved by AAS Council. The first Chemistry Decadal Plan Working Group Meeting will be held in April
- The NCC is active in contributing to the National Curriculum for Chemistry with a focus on raising university entry level standards for chemistry
- The NCC is concerned about the accreditation process for chemistry departments across the country – there is now competition with some universities adopting the UK Royal Chemistry Society international model while others support local accreditation through the RACI
- The NCC will be involved in the RACI National meeting in 2017, which happens to be the centenary of the formation of the RACI. We hope this will be a nationally significant event.

Crystallography

Professor Mitchell Guss

- Small sector but committee is influential
- 2014 is the UNESCO International Year for Crystallography (IYC) and it celebrates approximately 100 years since the seminal discoveries of Max von Laue in Germany and the father and son team of William and Lawrence Bragg in England which gave rise to the modern discipline of X-ray crystallography
- The IYCr was officially opened at the UNESCO headquarters in Paris with a two-day meeting to acknowledge the many official contributions to supporting the activities to be held during

the year and highlight new scientific discoveries and acknowledging the contributions of early career researchers from developing countries in Africa, Asia and Latin America. Australia was well represented at the meeting in Paris by delegates including the present and past Chairs of the National Committee for Crystallography, representatives of ANSTO and of the Society for Crystallographers in Australia and New Zealand (SCANZ)

- The NC is facilitating public photography and art exhibitions and crystal growing competitions, sponsored by SCANZ and RACI respectively, during the year with the culmination of celebration at the 2015 *Science at the Shine Dome* symposium, which will have a focus on crystallography in celebration of the IYCr
- Influential in organising commemorative Australian postage stamps of first five Australian Nobel Laureates.

Data in Science

Professor Jane Hunter

- Membership includes data experts and researchers with data concerns, covering a range of disciplines
- Focus on promoting best practice in data management, with training to all disciplines
- Future plan to develop a policy paper to assist in realising an open data culture in Australian science with a focus on what investments need to be made at the lower levels to enable and implement ARC and NHMRC policies regarding data management. Also some disciplines like Crystallography make their data public but there is a lot of heterogeneity within other disciplines in relation to making their data public
- Present concern is future funding through NCRIS, which is slated to end in June 2015. The pattern of government investment, which is stochastic and not long-term, remains a big issue
- Professor Mulvaney questioned whether technical infrastructure was available to cope with the exponential data growth and Professor Hunter responded that the key to managing such issues was through securing sustainable-long term funding to cope with the dynamic field of data sciences and management, which was also the reason why a decadal plan in this discipline would not be appropriate.

Earth Sciences

Professor Sue O'Reilly

- New committee, merger of previous NC Earth Sciences and NC Quaternary Research
- Membership included many senior earth scientists, two EMCR interns and an industry representative
- Large focus on building collaborations with stakeholders, including local and international research community, industry, state and federal departments through the UNCOVER initiative
- Undertaking a decadal plan in 2014, an update of the 2003 plan
- Current concern with future NCRIS funding.

Earth System Science

Professor Tas van Ommen

- Earth system science underpins ocean, cryosphere and biophysical ecosystems
- Developed 2010 decadal plan - *To live within Earth's limits*, which resulted in biennial specialist outlook conferences (2010, 2012, 2014)
- International links are shifting to the ICSU Future Earth initiative, possible with Australia as a regional 'hub'
- Interested in engaging across all relevant learned academies and developing stronger links with other NCs and societies.

Ecology, Evolution and Conservation

Professor Mark Westoby

- New committee with a lot of overlap with other NCs and professional Australian societies
- Main concern with visibility of committee and finding appropriate and relevant ICSU link, possible link would be the ICSU Future Earth initiative
- Working with the Ecological Society of Australia and Terrestrial Ecosystem Research Network on a new Ecosystem Science Long-Term Plan. A draft of the plan will be available in early May and will be distributed to NCs for comment.

Geographical Sciences

Professor Alaric Maude

- Recent name change from National Committee for Geography to Geographical Sciences to help distance the discipline from people's images of school geography and its classification in school curriculums as a humanity, and to emphasise that it is a scientific discipline spanning the environmental and social sciences
- Will be pursuing joint activities of public interest geography issues with the Academy of Social Sciences in Australia (ASSA)
- Membership includes academics, geographers, teachers and society representatives
- Very interested in development of primary and secondary geography curricula with the Chair active in the National Curriculum development
- Member Ruth Fincher current Vice President of relevant union, the International Union for Geography (IGU)
- Interested in developing a decadal plan in 2014, which will have a focus on education and a geographically literate population.

History and Philosophy of Science

Professor Rachel Ankeny

- History and Philosophy of Science (Medicine, Engineering, and Technology) and Science and Technology Studies (HPS/STS) is a very small community in Australia but traditionally a strong discipline
- The committee is very important in bringing the community together – sometimes researchers are isolated with very small numbers at any one institution
- Very happy to help other NCs and the Academy in areas of members' expertise, including history of Australian science and engagement with the public or public perception and understanding of science.

Information and Communication Sciences

Professor Rod Tucker

- Newly formed committee and as an interdisciplinary committee sees possible links with Mathematical Sciences, Data in Science, Brain and Mind and Mechanical and Engineering Sciences
- Recognises a growing Information and Communication Technology presence in Australia
- Eager to interact with Academy of Technological Sciences and Engineering (ATSE), especially with a focus on education
- Interested in undertaking decadal plan to follow on from the Academy foresighting study Future Science Computer Science in 2013 - http://www.science.org.au/publications/future-science-computer-science , which scoped future capacities and applications of computer science, and identified scientific challenges that are likely to drive the development of computer science during the next 10 to 20 years
- Currently discussing suitable international links.

Materials Science

Professor Jim Williams

- Newly-formed committee
- Membership very representative of relevant societies (about six in Australia), including an EMCR member who also represents international links
- Main focus is on mobilising the community by networking with national societies, other relevant networks, early- and mid-career researchers to promote the discipline nationally
- Possible future decadal plan or discipline review modelled on the national nanotechnology research strategy Academy publication
- Australia is the adhering body of the International Union of Materials Research Societies, with which the Materials Science Committee wants to maintain international links
- Possible name change to National Committee for Materials Science and Engineering (more inclusive).

Mathematical Sciences

Professor Nalini Joshi

- Membership is representative of many professional bodies
- Currently undertaking a decadal plan, prompted by the decline of the mathematics discipline in Australia and after fundraising ~$140k from various universities and institutes. Previous studies were primarily reviews of the discipline.
- Concerned about a decline in numbers for maths students, lack of representation within Academy Fellowship and disengagement of maths from science
- Interested in increasing strategic communication between mathematical scientists and the Academy
- Looking into the possibility of starting a program for mathematical sciences similar to the Academy's well-established *Science by Doing* program.

Mechanical and Engineering Sciences

Professor Ivan Marusic

- Has seen broadened discipline coverage as a result of the Review.
- Interested in improving dialogue with ATSE and promoting EMCRs
- Have established the John Booker Medal for Engineering Science
- Engages with Australian societies to ensure adequate representation on International Union for Theoretical and Applied Mechanics (IUTAM)
- Interested in pursuing links with other committees and industry and also participating in international collaborations in their discipline.

Medicine and Public Health

Professor Peter Schofield

- Membership is ad hoc - will be restructuring to include younger members and better engagement with societies
- Previously have been involved with assessing AAS grants (e.g., Lindau and HOPE) and contributing to policy submission and statements
- No connected international union, however review recommended linking with the InterAcademy Medical Panel (IAMP)
- The McKeon review (Strategic Review of Health and Medical Research) negated need for NCMPH to undertake strategic plan.

Nutrition

Professor Frank Dunshea

- Committee has a broad range of discipline coverage
- Identifies one or two issues per year to focus on, by undertaking public and scientific awareness programs by co-badging with other organisations, e.g. joint workshop in 2012 with the Nutrition Society of Australia, on vitamin D deficiency in Australia and New Zealand and to highlight the need for the government to urgently consider allowing more vitamin D into the food supply
- The funding for nutrition sciences research falls between the cracks of ARC and NHMRC funding and is a concern
- Links to the International Union of Nutritional Sciences and at the General Assembly of the International Union of Nutritional Sciences (IUNS) in September 2013, the IUNS executive agreed to the formation of the Oceania group lobbied for by the National Committee of Nutrition and their counterparts in New Zealand. It is envisaged that the Oceania group will tackle evidence based nutritional research issues pertinent to the Oceania region including chronic metabolic diseases such as Type II diabetes.

Physics

Professor Hans Bachor

- Works closely with relevant societies, Australian Institute of Physics (AIP) and Australian Optical Society (AOS)

- Membership consists of very active researchers and society representation – large membership to ensure adequate coverage and participation at busy times
- Produced a decadal plan in 2012, currently in implementation stage
- Physics education very important to committee
- Concerned about visibility of committee and societies within community, especially amongst the younger physicists. AIP membership numbers are steadily dropping
- Will be participating in outreach activities for the UNESCO earmarked International Year of Light, which is in 2015, and the Chair encouraged other relevant committees to also participate.

Space and Radio Science

Professor Russell Boyce

- Committee formed of merger of Radio Science and Space Science
- Elucidated that space science is distinct from astronomy
- Membership includes DSTO representation due to overlapping national security issues
- Currently organising (through member) bid for 2017 International Aeronautical Congress
- In 2014 will be undertaking a mid-term review of the *2010-19 Decadal Plan for Australian Space Science*
- Immediate task will be undertaking a census of the community within Australia in preparation for mid-term review.

Session II: Engaging with early- and mid-career researchers

Professor Jagadish, Secretary Physical Sciences, chaired this session and all subsequent sessions. Professor Jagadish congratulated Dr Evans, Chair of the Academy's Early-and Mid-career Researcher Forum (EMCR) on the great work the forum was doing in championing EMCR issues.

Early- Mid-Career Researchers Forum

Dr Krystal Evans, Chair

Dr Evans provided a background to the Australian Early- and Mid-Career Researcher Forum (EMCR Forum). The Forum provides a voice for EMCRs to present critical issues including attrition of women researchers from the research workforce, job security, funding, career structure, education and training to policy makers. The Forum has a network of about 3000 Australian EMCRs and a newsletter, *Early Days*. National Meetings named *Science pathways* are held biennially, with the next in 2015. The EMCR forum has been championing their cause to government, funding bodies and other national scientific entities and as the new voice of Australia's future scientific leaders has been getting a lot of traction. Dr Evans thanked the NCs who have appointed EMCRs as interns on their committees. The EMCR Forum is keen to engage with the NC EMCRs and further support EMCR engagement across all disciplines.

John Booker Award for Engineering Science

Professor Ivan Marusic

The John Booker Medal in Engineering Science is a new award for Early Career Researchers, and an initiative of the National Committee for Mechanical and Engineering Sciences. The John Booker prize recognises EMCRS who have demonstrated outstanding research in the sciences that underpin civil, chemical, electrical, and mechanical or materials engineering and their associated disciplines.

To increase opportunities for EMCRs in the engineering sciences, the National Committee of Mechanical and Engineering Sciences decided to undertake the establishment of an EMCR award in this sphere. Professor Marusic held detailed discussions with the Go8 Deans of Engineering, and with Academy of Technological Sciences and Engineering (ATSE), and raised $300,000 to establish two awards. The first award, The John Booker Medal awarded by the Academy of Science is open for nominations until 17 April 2014. A second award is being established by the Academy of Technological Sciences and Engineering for early career researchers in engineering. In the process of these discussions, the relative roles of the Academy and ATSE with respect to engineering sciences were discussed in detail.

Session III: Engaging public policy in processes

Dr Martin Callinan, Director Science Policy

Dr Callinan's talk encompassed how the National Committees could engage with governments (federal and state) to maximise the chances that the policy outcomes produced by national committees could be used by them. It is important to understand the motivation of governments as direction of public policy is competitive with hundreds of professional lobbyists operating in state and federal governments.

In his talk, Dr Callinan included generalised policy development processes that the National Committees could think about in the scoping phase of the project ,such as thinking about where their idea sits in the current landscape, gathering policy evidence (such as an internet search of HANSARD) and planning effectively to align with government policy and budget timelines. In order to constructively influence government policy, NCs should build a case for action in terms of:

- Existing government policy – what exactly is government policy or position concerning the topic? Market/social failure
- National opportunity – how might the NC project assist the existing national projects/agenda?
- Evidence/emerging trends and opportunities – this will be the basis on which the government will/won't endorse the NC publication
- Political principles – be aware of government election commitments, white papers, policy statements, and developments via speeches and press releases.

Examples:

- *'The ARC is fundamental to the support of both blue sky and applied research, and its peer reviewed competitive funding schemes are the lifeblood of many of the most significant research endeavours in the country'* - Minister for Education, The Hon Christopher Pyne MP, 14 November 2013

- Supporters - try to build support among public service officials, parliamentary secretaries and outer cabinet ministers
- Analyse costs/benefits to government in relation to proposed policy changes.

Dr Callinan also emphasised the role of media in making government aware of the NC's project objectives and mentioned that appropriate media coverage could inform the degree of government interest and awareness of NC projects/publications. The ABC radio's AM, World Today and PM programs reach about 300,000 influential people.

With this background and scene setting, Dr Callinan mentioned that the first step for NCs planning for public policy outcomes would be to firstly determine the core science objectives of their intended project. The NC committee's staff would then help the committees to engage with the appropriate sections of the Academy Secretariat. For the duration of a project, the Secretariat can then help the NCs to develop a strategy to engage with government, the public service and stakeholders before, during and after publication of any NC output.

It emerged from subsequent discussion on this topic that the strategy for each discipline would not be the same and different tactics would be applicable to each NC regarding their proposed plan of engaging and obtaining government endorsement.

Session IV: Decadal plans - implementation strategies

Physics Decadal Plan

Professor Hans Bachor

Professor Bachor gave an overview of the proposed strategy for the implementation of the *Physics Decadal Plan* published in 2012. The message is: 'physics is a foundational and fundamental field that makes a significant contribution to the health of the Australian economy'.

Professor Bachor mentioned that as the activities in physics are diverse, the public perception of physics is not necessarily realistic and focused mainly on fundamental research. To remedy the situation, the decadal plan had a strong education and outreach component with the objective to achieve both a physics-literate work force and community. Other issues highlighted in the plan were facilitation of transfer of knowledge between academia and industry; simplification of the grant system; alternatives to the scheme for international collaboration which has been discontinued; making physics based professional activities more attractive to women and providing a roadmap to government for investment in physics.

Taking a leaf out of the Institute of Physics UK, who had commissioned Deloitte to produce a publication demonstrating the importance of physics to economic growth, the National Committee has recently endorsed a proposal for undertaking a similar publication relevant to the Australian setting. The cost for the publication is expected to be $60,000+ and the committee will soon start fundraising efforts towards the cause.

Implementation of the 2006-2015 Astronomy Decadal Plan

Professor Stuart Wyithe

Professor Wyithe provided a background to the formation of the not-for-profit company, Astronomy Australia Limited (AAL), which was formed as a direct recommendation of the *2006-2015 Decadal Plan*. The specific recommendation called for 'a peak body to coordinate Australia's astronomical activities and to represent it in international partnerships' resulting in the formation of AAL to implement the recommendations of the decadal plan. AAL includes members from universities and national facilities and elects an AAL board with the skills to govern AAL and expertise in key government areas. $100 million has been invested in astronomy through AAL during the life of the plan.

AAL is explicitly guided by the decadal plan, and is better positioned to carry out implementation of the plan than the NCA or any individual astronomy group or observatory as it has the resources and cumulative expertise to respond quickly to government enquiries and provide advice to government relating to investment priorities. Professor Wyithe gave specific examples about how the AAL has managed the investment in optical telescope research infrastructure. For instance, AAL allocated NCRIS & EIF funding to support the construction of the HERMES high-resolution spectrograph which is now in operation. Similarly, the AAL has funded access to the overseas Magellan and Gemini 8-m class telescopes. AAL has also managed Australia's interests in the Gemini partnership.

Implementation of the Earth Systems Science Plan

Dr Tas van Ommen

The National Committee for Earth System Science (ESS) published *To live within Earth's limits: An Australian plan to develop a science of the whole Earth system* in late 2010. The recommendations of the plan centred on advancing the science needed for Australia and the world to address the burgeoning globalisation of the impacts of human activities on the environment.

Implementation is three years in. One of the main aims of the ESS plan was to build a community in Australia which resulted in the establishment of the *Earth System Outlook* conference series. The conferences focus on discussing views on emerging problems and issues in relation to Earth System Sciences and brings together natural environmental scientists with participants in the human sciences, science communication, industry, finance, and sustainability advocacy.

Plans also include preparation of a tertiary-level textbook, which will give a well-integrated account of the state and functioning of the Earth systems. The textbook is envisaged to link to a well-managed interactive web presence for keeping the information up-to-date and relevant to users.

Humans are agents of social change and Dr van Ommen said the committee would initiate discussions between the Australian Learned Academies on collaboration and coordination of activities in Earth system science.

Dr van Ommen stressed that the implementation of the plan needed to be adaptable and flexible to adapt to the changing modalities. An example of this is the recent emergence of *Future Earth*, which

has significant implications and opportunities for the Australian ESS plan. The Committee would be looking into the possibility of establishing a node of the *Future Earth* office in Australia.

In conclusion, Dr Tas van Ommen mentioned that the decadal plan would be used as a tool to increase visibility of Earth system science and engage the diverse spectrum of stakeholders to build a strong community of Earth system science.

Discussion

Implementation strategies for education objectives was raised by Professor Joshi. It was suggested that this can be achieved through input into the national curriculum, engagement with teachers and initiating a dialogue with state and federal agencies in charge of education.

Possible outreach activities to involve the community and enhance the public profile of the discipline was also raised.

Session IV: Raising profile of disciplines and science in general in Australia

Kylie Walker, Director of Communications and Outreach

Ms Walker outlined the role of the Academy Communications team. Communications activities include publications, media liaison, social media, digital tools such as apps, *NOVA: Science in the news, Interviews with Australian Scientists*, newsletters and the Academy website.

Ms Walker also referred to the Academy's strong education programs, *Science by Doing* and *Primary Connections.*

She suggested that Chairs and National Committee members could raise the profile of their national committees by mentioning the committee when being interviewed by journalists, writing articles, or when appearing on radio or TV.

By involving the media team in the early planning stages of projects, the team can advise on and support strategies to promote events and publications of the National Committees. The publications team should be involved in the early stages to guide the structure, look and feel of publications so that there is maximum impact and most traction in public, and so that they adhere to the Academy style guide. The Philanthropy Manager is available to advice on sponsorships and fundraising.

The Communications team can also assist with facilitating relationships with other organisations such as the Australian Science Media Centre, RiAus, Cooperative Research Centres (CRCs) and Science and Technology Australia (STA).

Kylie stressed that National Committees should consider their publications, submissions, events, and current scientific issues of public contention (such as Fluoride in water) as media opportunities and encouraged Chairs to speak to the media. The communications team has briefing notes on commonly discussed issues of public contention.

Kylie mentioned that the Academy newsletter, website and *Annual Reports* should be considered by NCs to be promotional tools. She advised Chairs to focus on outcomes in writing such items.

Discussion

Chairs enquired as to whether there were specific guidelines for communication with print or digital media. Suggestions were that each topic could be assessed on a case-by-case basis and the Chair and the members had the liberty to present their individual opinions. When time is not a limiting factor, Ms Walker encouraged Chairs to run requests for communications by the communications team to assist with consistency of messages. Professor Suzanne Cory, Academy President, said this was particularly important for contentious issues such as climate change.

Session V: Linkages with Scientific societies and with International Scientific Organisations and maximising the benefits of those linkages

Linkages with Scientific societies

Professor Nalini Joshi

Professor Joshi gave a brief presentation about how the National Committee for Mathematical Sciences has risen to the challenge of linking with a range of diverse societies and international organisations relevant to Mathematical Sciences.

The National Committee for Mathematical Sciences has international links with the International Mathematical Union, which has subsidiary bodies, the Commission for Developing Countries, the International Commission on Mathematical Instruction and the International Council on Industrial and Applied Mathematics.

There are many organisations relevant to the mathematical sciences at the national level. These include professional societies, employee organisations, umbrella organisations and outreach organisations. Australian Mathematics Trust (AMT) is an outreach organisation which administers the Australian Mathematics Competition. It has become the largest single event on the Australian Education Calendar, allowing students to attempt the same tasks, on the same day in about 40 countries, making it a truly international event. Australian Mathematical Sciences Institute (AMSI) is a joint venture organisation with member institutions from many Australian universities, which aims to strengthen the disciplines of mathematics and statistics in Australia.

The previous restriction on number of members of the NC of Mathematical Sciences made it difficult to have equitable representation of the range of professional activity in Australia. However, the recommendations of the review have lifted this restriction.

Professor Joshi has made successful efforts to ensure that linkages are reciprocal, e.g. Professor Joshi is on the steering committee of the Australian Mathematical Society, is an observer on the board of the Australian Mathematical Sciences Institute, both in her capacity as Chair of the National Committee. She also writes a regular column in the *Australian Mathematical Society Gazette*.

Linking with International Scientific Organisations and maximising the benefits of those linkages

Professor Bruce McKellar, Chair Committee to Review National Committees 2012-13

The Chair of the session, Professor Jagadish congratulated Professor McKellar on his recent award of the Companion in the General Division of the Order of Australia, until today the Nation's highest honour.

Professor McKellar emphasised the collaborative nature of science today, often on large scales, which makes Science truly international. The involvement of the National Committees in International Scientific Organizations (ISO's) gives opportunities to shape and influence the international development of the discipline.

National Committees can negotiate with the Academy about the appropriate ISOs to link with, as long as the ISO accommodates national members. Most of these already have Australia as a member. When that member is not the Academy the National committee can link to the ISO through that the Australian member.

National Committees can build effective interactions with international science organisations by nominating committed people to the executive and committees, commissions and associations of the ISO, as many now do.

Some ISOs particularly the international unions predate the Academy and the International Council for Science (ICSU). Many are not good at adapting to the changes in science and particularly in embracing interdisciplinary science. An involved National Committee can help with this.

National committees can take a lead to create a new international union if they feel there is a gap. This was the case with IUMRS, the International Union of Materials Research Societies.

Many ISOs have the promotion of science in the developing world as an important activity. This is one activity that Australia could usefully be engaged in, especially in Southeast Asia, South Asia and in the Pacific.

The ICSU *Future Earth* program is arguably the key part of ICSU activities, and it is vital that Australia be involved in this program.

Returning briefly to the National Committees generally, Professor McKellar emphasised that effective communication in all directions was vitally important. Industrial links of the National Committees are also important, as was mentioned by several Chairs today, and should have been emphasised by the Review Panel.

Brief on ICSU Review

Professor Andrew Holmes, Member ICSU External Review Panel

Prior to the current review, ICSU was last reviewed in 1996. Australia's submission to the 2013 ICSU Review has been informed by the recent NCs review in 2012. Currently Australia has three presidents/president designate of international scientific unions, with a total of 24 Australians serving on the Executives of the unions. Around 370 Australians serve on committees and commissions of international unions at any one time. This creates awareness of Australians excelling in their fields of science and gives Australia an international profile. Professor David Black is the secretary-general on the ICSU board.

The unions value scientific advice provided by Australia e.g. through the Academy's Advisory Committee on International Matters (formally National Committee for ICSU). The report to the ICSU review was also a collective decision making opportunity to inform ICSU of Australia's opinion.

International Polar Year and the International Geophysical Year are both models of mobilising the national community. The upcoming Future Earth initiative is another ICSU, interdisciplinary initiative which can have profound effects on Australian science. Academy Foreign Secretary Professor Andrew Holmes will report on the ICSU review in September to the ICSU General Assembly in Auckland.

Summary by Chairs

Professor Marilyn Renfree and Professor Jagadish

Professor Jagadish thanked all the National Committee Chairs for their efforts and participation in the meeting. The McKellar review had recommended the Chairs Meeting to be an annual event. The Chair's Meeting would provide a platform to Chairs to enable them to identify issues on common interest with other Chairs and facilitate discussions on their collective vision for their discipline, championing for their discipline in terms of infrastructure, educational objectives, outreach and public engagement, fostering and encouraging early career researchers in their discipline. Professor Jagadish remarked that science can't be done in isolation in this day and working together was the best outcome for all disciplines.

With respect to International linkages, Professor Jagadish mentioned that Australia produces only 3% of the world's knowledge. To gain access to the other 97%, we must ensure our scientists are well-connected internationally. Australia does pull above its weight in ISOs with a number of Australians serving as executives in the Unions and this trend has to be maintained, if Australia has to maintain an international science profile. Professor Jagadish said it was critical to engage with the funding agencies, industry, ministers and national science entities to champion for their disciplines. The Government has to be made aware that funding for research and development is important for the future of the country.

With the decrease in government funding, it becomes imperative to use the existing resources effectively. For instance, leveraging on societies who pay subscription to unions which the National Committee may feel relevant to their discipline and in case of unions where the Academy pays the subscription, seeking input from societies to provide to the unions. The National Committees could also co-badge activities with the relevant societies. For e.g. the NC for Nutrition recently coordinated a workshop with the Nutrition Society of Australia.

In conclusion, Professor Jagadish stressed that the National Committees should pro-actively look for opportunities to communicate the issues faced by their discipline to authorities in government, funding agencies and other national organisations.

Professor Renfree encouraged all Chairs to build on communications with the Academy and especially the secretaries for Physical and Biological Sciences, saying that communication lines were always open.

Closing remarks

Dr Sue Meek, Chief Executive Officer

Dr Meek remarked that the meeting had been valuable for Chairs to gain a broad understanding of the activities and priorities of the National Committees for Science in the context of the recent review and restructure. She noted their presentations had clearly shown that while there is some overlap between objectives and commonalities of approach, some issues are unique to the discipline. In addition, she commented that the presentations by the Academy's Director of Science Policy, Dr Martin Callinan, and Director of Communications and Outreach, Ms Kylie Walker, had been helpful in providing a wider perspective on the role and capabilities of the Secretariat.

Dr Meek emphasised the Academy's appreciation of the significant part played by the National Committees in helping the Academy to enhance national discipline linkages and maintain relevant international connections, noting the importance of coordination when more than one committee may be linked to a specific scientific union.

In conclusion, Dr Meek said that the meeting had been a wonderful opportunity for Chairs to interact with each other and the Academy. She commented that the high level of conversation between the formal parts of the program augured well for effective future communication and thanked everyone for their enthusiastic participation.

Appendix 1

Meeting attendees

Name	Role
Academy	
Professor Suzanne Cory, FAA	President
Professor Andrew Holmes, FAA	Foreign Secretary
Professor Marilyn Renfree, FAA	Secretary Biological Sciences, CHAIR (10.00 – 12.35 pm)
Professor Chennupati Jagadish, FAA	Secretary Physical Sciences, CHAIR (1.15 – 3.30 pm)
Professor Bruce Mckellar, FAA	Chair of National Committees Review Committee
Dr Sue Meek	Chief Executive Officer
Dr Martin Callinan	Director Science Policy
Kylie Walker	Director, Communications and Outreach
Dr Krystal Evans	Academy EMCR Forum Chair
Dr Poulomi Agrawal	Project Coordinator, National Committees
Jeanette Mill	National Committee Officer
Meaghan O'Brien	National Committee Officer
National Committees	
Professor Roger Leigh	Chair, NC Agriculture, Fisheries and Food
Dr Dana Bergstrom	Chair, NC Antarctic Research
Professor Stuart Wyithe	Chair, NC Astronomy
Professor Edna Hardeman	Chair, NC Biomedical Sciences
Professor Pat Michie	Chair, NC Brain and Mind
Professor Richard Harvey, FAA	Chair, NC Cellular & Developmental Biology
Professor Paul Mulvaney, FAA	Chair, NC Chemistry
Professor Mitchell Guss	Chair, NC Crystallography
Professor Jane Hunter	Chair, NC Data in Science
Professor Sue O'Reilly, FAA	Chair, NC Earth Sciences
Dr Tas van Ommen	Chair, NC Earth System Science
Professor Mark Westoby, FAA	Chair, NC Ecology, Evolution & Conservation
Professor Alaric Maude	Chair, NC Geographical Sciences
Professor Rachel Ankeny	Chair, NC History & Philosophy of Science
Professor Rod Tucker, FAA	Chair, NC Information & Communication Sciences
Professor Jim Williams, FAA	Chair, NC Materials Science
Professor Nalini Joshi, FAA	Chair, NC Mathematical Sciences
Professor Ivan Marusic, FAA	Chair, NC Mechanical & Engineering Sciences
Professor Peter Schofield	Deputy Chair, NC Medicine & Public Health
Professor Frank Dunshea	Chair, NC Nutrition
Professor Hans Bachor, FAA	Chair, NC Physics
Professor Russell Boyce	Chair, NC Space & Radio Science