

Benefits of Australian membership of the International Science Council and international scientific unions





The Australian delegation votes at the International Mathematical Union's general assembly in Rio de Janeiro, 2018. IMAGE: YA-XIANG YUAN

‘... scientific expertise should be a fundamental part of diplomatic efforts. As single nations can neither solve them alone nor develop solutions to every problem, scientific cooperation becomes an increasing necessity.’

BACKGROUND

There are over 450 Australian scientists actively involved in International Science Council and scientific union committees, task groups and projects.

International science and the Academy

The Australian Academy of Science was established in 1954 by Royal Charter and is Australia's peak independent scientific body. The Academy has an esteemed Fellowship of over 500 eminent Australian scientists, representing disciplines across the physical, biological and mathematical sciences.

A key responsibility of the Academy—and one of its primary historical functions—is to promote international scientific engagement by maintaining relationships between Australian scientists, the international scientific unions, the International Science Council and other international groups.

To meet these responsibilities, the Academy makes use of its 22 discipline-based National Committees for Science to provide guidance and advice on representing Australian science at the International Science Council and its scientific unions.

History of the International Science Council

The International Council of Scientific Unions (ICSU), subsequently re-named as the International Council for Science, was established in 1931. Its aim was to enhance cohesion and cooperation within the international scientific community, especially among the diverse international scientific unions that had been established to foster collaboration within the various specialist disciplines.

In July 2018 ICSU and the International Social Science Council (ISSC) merged to form the International Science Council (ISC). The amalgamated body heralds a new era in international scientific cooperation and will champion a vision of advancing all sciences as a public good through a stronger and united global voice that is better able to adapt to emerging and future global challenges.

For nearly a century, ICSU provided a structural and organisational framework to coordinate scientific efforts and responses to globally pertinent issues, focusing on three key areas:

1. **International research collaboration** through coordination and support of its interdisciplinary research programs

2. **Science for policy** through its membership network to provide advice to peak international bodies, such as the United Nations, and to facilitate scientifically informed policy development

3. **Championing the universality of science** to promote free and responsible conduct of science, by protecting the freedom of movement, association and expression of scientists, ensuring equitable access to data and other resources and supporting capacity development in developing countries.

As the ISC evolves to meet humanity's future challenges, it will continue to drive forward the ideas championed by its predecessor and adapt its approach to encompass both natural and social sciences. As of December 2018, the ISC has over 140 national scientific members. The Australian member is the Australian Academy of Science.

International scientific unions

In addition to national scientific members, the ISC membership also includes 39 scientific unions and associations, each representing specific scientific disciplines. These not-for-profit organisations strive to facilitate international cooperation and collaboration through coordination, promotion and support of the discipline, and build international science capacity.

The ISC also convenes thematic committees and research programs to champion global cooperation and scientific advances in key multidisciplinary areas. These include committees on Data for Science and Technology (CODATA) and Space Research (COSPAR), as well as scientific committees on Antarctic Research (SCAR), Oceanic Research (SCOR), Solar-Terrestrial Physics (SCOSTEP) and the World Climate Research Programme (WCRP).

The scope and activities of these organisations include involvement in global science policy through the provision of high-level advice to United Nations bodies on the Sustainable Development Goals and facilitating global data, observation and scientific modelling programs. In addition to developing and publishing technical reports, many scientific unions are peak bodies for standard setting and nomenclature, including naming of chemical elements and compounds, stars and planets.

The ISC and the scientific unions are small organisations by international standards. Their activities are reliant primarily on the voluntary efforts of scientists from across the world, supported by small secretariats that are often hosted within other organisations, such as research institutes.

The annual subscriptions paid by members such as the Academy are the primary and essential source of funding for these organisations.

Motivation for review

The Academy has represented Australian science as the national member of the ISC, its predecessor and numerous international scientific unions since 1954.

Since its foundation the Academy's activities have been supported by an annual grant-in-aid from the Australian government. Although the Academy's funding has been supplemented by other sources over time, activities associated with the international scientific unions, ISC and National Committees for Science remain funded entirely from a fixed portion of the grant. Since 2013, subscriptions have accounted for around half of these expenses, down from nearly 60 per cent during the 1990s. All other expenses, including secretariat staffing, activities of the National Committees for Science and support for ISC and scientific union activities, have been drawn from the remaining funds.

Since 2003 the grant-in-aid has been provisioned through the *Higher Education Support Act 2003* and, apart from a considerable increase that was implemented in 2007, has been indexed approximately to inflation. At

Between 2000 and 2017 more than 40 international scientific union conferences and meetings were held in Australia. The ensuing benefits directly contributed an estimated A\$118 million to the economy, provided invaluable opportunities for Australian scientists and greatly accelerated delivery of the long-term economic benefits of scientific progress for Australia.

the same time, however, subscription costs have increased at a rate that significantly outpaces inflation. Many subscription levels are fixed by the ISC or the scientific union and reflect gross domestic product or relevant scientific activity. National members, such as Australia, must either pay the required fee or resign from the organisation.

In response to these continued funding pressures, the Academy sought to identify and quantify the benefits derived from membership of the ISC and scientific unions for Australian scientific communities and society. As an outcome of the review, and in response to opportunities identified, the Academy has developed a strategic plan to maximise engagement and the benefits of membership.

BENEFITS FOR AUSTRALIA

As the interface between the scientific community and high-level international policy forums, the International Science Council (ISC) and its scientific unions are important features of the global science and diplomacy landscape. The network of member organisations and their representatives span eminent and influential individuals, including chief scientists of government bodies, directors of leading research organisations and advisors to organisations such as UNESCO.

There are considerable benefits to be gained for Australia by enhancing Australian participation in the International Science Council and scientific unions.

A seat at the table

The ISC and its scientific unions play an important role in the development of international policies and responses to global challenges, including:

- assessing and implementing the United Nations Sustainable Development Goals
- delivering scientific advice through reports and policy briefs, such as providing specialist scientific advice to the Organisation for the Prohibition of Chemical Weapons

- monitoring and responding to human rights breaches, including detentions and violent crimes, as a result of the conduct of science
- developing and reviewing standards and nomenclature
- coordinating, collecting and maintaining data and global observation services that inform a diverse range of applications, such as weather forecasting, agriculture, defence and medicine.

Membership of the ISC and scientific unions affords an official voice within the organisations and leads to opportunities that include:

- providing input into high-level decision-making processes at meetings and in submissions and advisory reports
- participation in a platform for science and soft-power diplomacy
- access to privileged insight through participation in reviews and preparation of advisory documents for peak international bodies
- development of valuable personal, scientific and diplomatic networks.



‘These meetings are of great value in putting Australia on the scientific map and exhibiting our very considerable achievements in various fields of science.’

SIR JOHN ECCLES AC FAA FRS, PRESIDENT OF THE AUSTRALIAN ACADEMY OF SCIENCE (1957–1961), SPEAKING ON THE IMPACT OF INTERNATIONAL UNION MEETINGS AT THE OPENING CEREMONY OF THE ACADEMY HEADQUARTERS (THE SHINE DOME), 6 MAY 1959

These opportunities establish pathways that can be leveraged to protect and progress Australian interests, including:

- providing an avenue for responding to and mitigating changes or decisions that adversely affect Australian interests, both directly through policy and indirectly through alignment of Australian services and products with international standards
- providing opportunities to evaluate policy positions and scientific priorities relative to regional and global trends (for example at topical meetings) as well as the identification of strategic opportunities, such as leadership positions and the establishment of project offices.

Enhancing Australia’s international profile and reputation

Participation in the advisory and technical activities of the ISC and scientific unions increases global awareness and explicitly endorses the world-leading quality of Australian science. This reinforces Australia’s reputation as an active and valuable contributor to the international community. Support of ISC and scientific union activities in capacity building as a form of international aid also projects good global citizenship. Together, these contributions enhance Australia’s authority on the international stage and cultivate relationships that may be leveraged to protect and advance Australian interests.

International scientific union meetings and the Australian economy

Historically, the primary function of many scientific unions has been to convene regular technical meetings of scientists, culminating in bi-, tri- or quadrennial international congresses and general assemblies. Although the advent of electronic communication and competition from large national society meetings has led many organisations to evolve, the hosting and organisation of international meetings remains an important role for many scientific unions.

For Australia, hosting such meetings provides invaluable opportunities for Australian scientists, especially young scientists, to meet and mix with international leaders in their field in ways that greatly accelerate delivery of the long-term economic benefits of scientific progress for Australia.

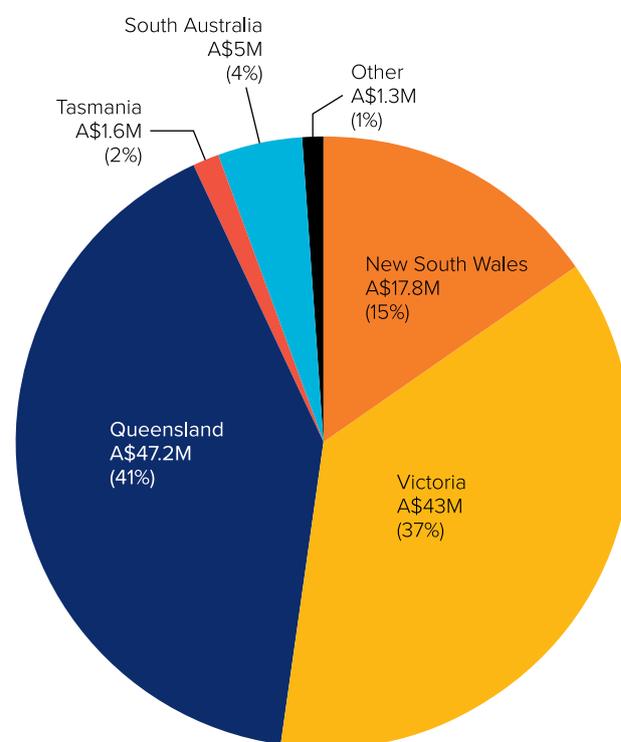
Bidding to host scientific union meetings is open only to representatives from paying member countries and the hosting of such meetings provides by far the largest and most readily quantifiable direct economic benefit of membership. The meetings range from small, specialist gatherings to discipline-wide congresses that can attract several thousand delegates from all corners of the world.

In accordance with their mandate of international representation, scientific union congresses typically rotate around the world, which is particularly beneficial for relatively geographically isolated regions such as Australia. Bidding to host such events therefore requires long-term engagement, coordination and investment.

In some cases, scientific unions will provide some seed funding to successful bids. On the other hand, since scientific union meetings can be determined up to eight or more years in advance, securing sufficient financial backing can be a considerable challenge. However, if managed properly, the benefits far outweigh the risk. A successful, well-run congress should make money. In some cases, a modest fraction of the revenue may be returned to the scientific union and used to support initiatives such as mobility and capacity-building programs. In general, the profit belongs to local organisers and stakeholders and in Australia is reinvested into programs that support Australian students and researchers.

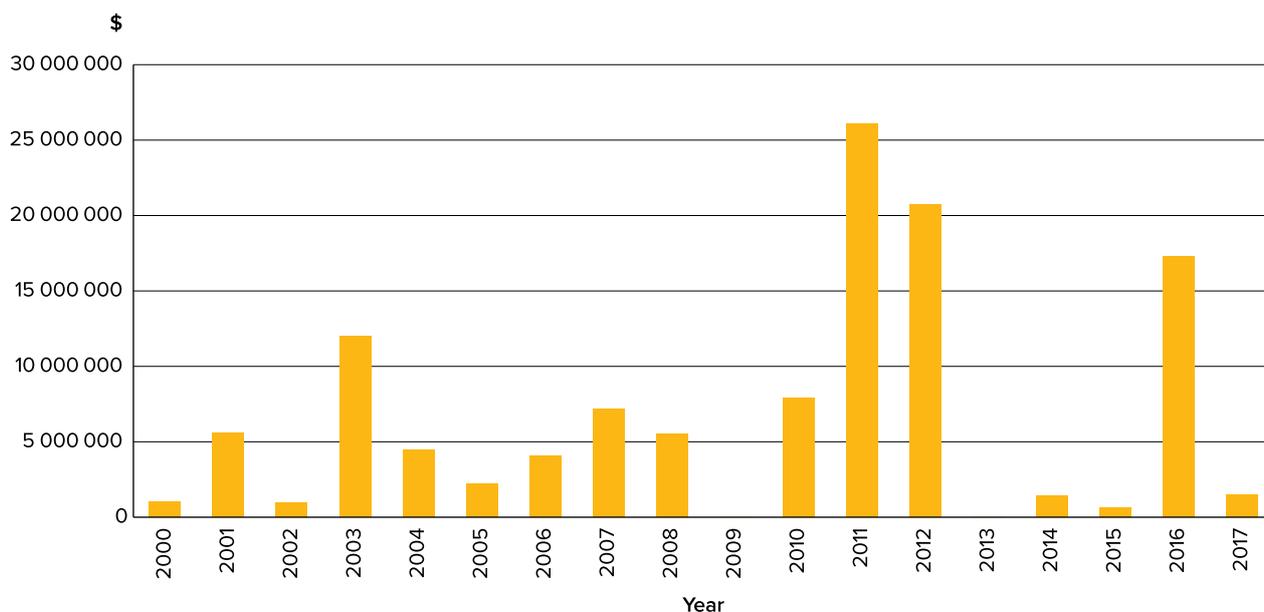
Like other large business events, the process of organising and hosting a scientific union meeting generates direct benefits across all levels of the Australian economy, and these are amplified by the

Direct economic value of scientific union meetings by state (held between 2000 and 2017)



Breakdown of the direct economic value by state and territory to Australia of scientific union meetings held in Australia, 2000–2017. Based on average reported daily expenditure by meeting organisers and delegates, including pre- and post-meeting tourism activities and excluding airfares (Ernst & Young, 2015). The total is estimated at A\$118M over a total of 195 business days, equivalent to A\$608K per day.

Direct economic value of scientific union meetings in Australia (in AUD by year)



Based on average reported daily expenditure by meeting organisers and delegates, including pre- and post-meeting tourism activities and excluding airfares (Ernst & Young, 2015).

34th International Geological Congress Fund

In August 2012 the 34th International Geological Congress of the International Union of Geological Sciences was held in Brisbane. The event was a resounding success. It was attended by 6012 delegates from 123 countries, with overseas visitors making up 62 per cent of the delegates. Seed contributions (including interest) and profit shares were distributed to all stakeholders, resulting in the

establishment of the 34th International Geological Congress Travel Grant Scheme for Early-Career Australian and New Zealand Geoscientists. This scheme, which is administered by the Australian Geoscience Council in conjunction with the Academy, provides annual grants of up to A\$5000 to support international travel for early-career geoscientists to attend conferences and conduct fieldwork.

Dr Paul Ashwell, a 2015 awardee of the 34th IGC Travel Grant Scheme, undertakes field work in Chile with colleagues. From left to right: Dr Lauren Schaefer, Dr Ian Schipper, Emma Rhodes, Dr Ben Kennedy, Rebecca Fitzgerald, Dr Paul Ashwell. IMAGE: PAUL ASHWELL



Between 2007 and 2017 the international scientific unions awarded 66 young scientist awards, travel grants and mobility fellowships to young Australian scientists and research visitors to Australia.

significantly higher proportion of international visitors, compared to other domestic events¹.

For local and state economies, scientific union meetings generate short- and medium-term employment opportunities in hospitality, event management and associated industries. The influx of international visitors injects millions of dollars directly into the economy through expenditure on accommodation, food, shopping and tourism-related activities. For the federal government, the economic benefits manifest as increased tax revenue from goods and services, as well as income from associated job creation.

Between 2000 and 2017, the total cost of subscriptions paid by the Academy on behalf of Australia was A\$6.22 million. By contrast, during this seven-year period, the direct value of international scientific union conferences to the Australian economy was estimated to be at least A\$118.6 million over a total of 195 business days—equivalent to A\$608 000 per day, a return of about 19 times the cost of the subscriptions (using delegate and conference organiser expenditure rates from a 2015 E&Y survey of business events in Australia, indexed to 2016/17).

Australian science on the international stage

The ISC and scientific unions facilitate international cooperation in science through grassroots programs and support of individuals. This includes:

- conference travel grants to help overcome barriers to participation by scientists in developing countries, as well as those in distant regions such as Australia
- prizes and awards across all career levels that provide recognition, exposure and prestige
- fellowships that enable international researcher mobility by supporting travel and other costs associated with conducting research overseas

- establishment and endorsement of short-term multinational collaborative research projects and long-term global scientific undertakings, which provide opportunities to leverage additional support from external sources
- coordination and championing of global outreach initiatives such as the United Nations-endorsed International Years of the Periodic Table (2019), Light (2015), Crystallography (2014), Chemistry (2011), Astronomy (2009), Planet Earth (2008) and Physics (2005).

Mobility and opportunities for international exposure are particularly important for fostering budding scientific careers and are critical to enhancing the visibility of Australian science on the global stage. International scientific meetings are key opportunities to showcase research to a global audience, discuss ideas, develop professional networks and form new collaborations and partnerships. A unique challenge for Australian scientists—at least compared to North American and European colleagues—is the distance and associated costs of attending an overseas conference. Improving opportunities for international exposure, engagement and networking by successfully hosting scientific union meetings in Australia will contribute to retaining local expertise and attracting the best overseas talent.

Maximising opportunities

In an accompanying document (found at www.science.org.au/isc-benefits), the Academy outlines a strategy developed in response to this report's findings. This strategy aims to more effectively leverage strategic opportunities and maximise Australian engagement with the ISC and scientific unions for the benefit of Australian science, the economy and society.

In Australia, only three per cent of delegates to business events in 2013 and 2014 (meetings and conventions) were international delegates. By contrast, international delegates made up at least 60 per cent of participants at scientific union meetings held in Australia between 2000 and 2017.

Cover image: Professor Andrew Holmes AC FAA FRGS FTSE takes part in the Q&A session at the 31st ICSU General Assembly in Auckland, 2014.

IMAGE: BRENDON O'HAGAN/INTERNATIONAL SCIENCE COUNCIL

¹ Ernst & Young. 2015. The Value of Business Events to Australia: www.businesseventscouncil.org.au/files/View_Report.pdf