



Annual Review 2014-15

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Australian Academy of Technological Sciences and Engineering (ATSE)

The full Audited Accounts of the Australian Academy of Technological Sciences and Engineering (ATSE) for 2014-15 can be viewed on the ATSE website (www.atse.org.au) and printed copies are available from the ATSE office (03) 9864 0900 or by email (lynn.pagoda@atse.org.au).

The full Audited Accounts will be presented to the Annual General Meeting of the Academy on 27 November 2015 at The Windsor Hotel, 111 Spring Street Melbourne.

This Annual Review contains Abridged Audited Accounts of the Australian Academy of Technological Sciences and Engineering (ATSE) for 2014-15.

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Leveraging our skills for Australia

ATSE made a distinguished – and unique – contribution to Australia through its support of new national initiatives in the past year.

Perhaps alone among the Learned Academies, ATSE leveraged the skills, experience and generosity of its Fellows – and the energy and commitment of its staff – to help drive some important national programs that support our objectives and begin to meet some of the massive technological challenges of our time.

In the year under review there were a number of programs where we made a difference – and were able to apply the knowledge of our Fellows for Australia's benefit.

The issue of productivity in Australia remains a key national issue and a vital focus for the Academy. Using an array of Fellows' experience and skills we produced an Industry and Innovation Position statement, which was at the heart of our submission to the Senate Inquiry on Innovation and was consistent with what ATSE has been saying repeatedly for some time now – Australian industry competitiveness depends significantly on the ability to translate investment in science, research and development (R&D) into economic benefits. It's rewarding that this has now become almost a national mantra – one we're glad to embrace.

Another example of the impact of our work has been the general recognition of the importance of research-industry collaboration and having our ERA proposal – to complement the established, but publication-focused, Excellence in Research for Australia (ERA) metric with a more outcome-focused Research Engagement Australia (REA) measure – met with respect at government, industry and academic level.

We're not there yet, but ATSE's proposal has prompted some serious debate about the issue and won some important support in the research and industry areas and recognition by government that there is need for change.

ATSE was also a key player in a public – and private – campaign to preserve the nation's science research funding through NCRIS (the National Collaborative Research Infrastructure Strategy). Only after consistent pleas from the research community – in which ATSE played a strong role – did the Education Minister 'decouple' the funding for research infrastructure, which is used by more than 30,000 scientists, from university reform – providing a temporary relief from the threat to research.

One of the Academy's biggest impacts on government policy emerged when the Miles Review of the CRC Program was released – reflecting many of the key recommendations ATSE had made in its submission. Other groups undoubtedly made similar recommendations, but I think we can make a case that we were influential.

All these initiatives served our key challenges and strategies – as did other initiatives which impacted Australia in different ways.

The Clunies Ross Awards Dinner in Brisbane, where we acknowledged some of Australia's most important innovators and product developers for their work in taking their knowledge to the marketplace, attracted a capacity crowd of more than 500 at the Brisbane City Hall.

Our NSW Division organised a successful one-day Intelligent Grid Symposium which generated a lot of interest in optimising electricity supply, including substantial media coverage.

We announced in October 2014 the election to the Fellowship of a stellar group of 26 key business people, leading academics, prominent commercial innovators and high-ranking public sector figures, including eight women Fellows.

ATSE has been at the forefront of boosting the participation of women in STEM industries and research. Our Gender Equity Policy has had a strong impact on driving the target of one-third of all new Fellows being women – now sustained for three years – and we have appointed a Gender Equity Working Group to focus closely on this important issue. We consciously look to promote women Fellows in our initiatives and on our committees and believe we have taken a leading role in gender equity in Australia.

At another level we've been able to provide a 'home' and encouragement to the concept of establishing a national mentoring scheme for STEM students at the PhD level. The Industry Mentoring Network in STEM (IMNIS) program has won early and warm acclaim in both industry and academia, with the pilot programs launched in Victoria by the Premier and in WA by the Minister for Mines and Petroleum.

ATSE has also been able to offer support and guidance to the Australian Science and Innovation Forum (ASIF), a group of committed young scientists who are attacking the perceived 'gap in the market' for supporting the translation of Australia's excellent science into world-class innovation.

Another key initiative – over some years now – has been the STELR program, which is now running in nearly 500 schools. This has been a cornerstone of ATSE's endeavour to improve the quality and relevance of science and technology education in Australia. But importantly, and uniquely, it has now been adopted for use in a number of overseas countries.

DR ALAN FINKEL AO FTSE
President



ATSE fellows make significant contributions to evidence-based policy advice and innovation thinking

Ms Kathryn Fagg delivers the 2014 ATSE Oration.



Embracing the need for science and technology innovation is a fundamental challenge for Australia. This is because Australia can no longer rely on an overseas appetite for its resources. Urgent attention is being given to fostering other sources of growth including major improvements in productivity in existing industries and innovation to develop industries of the future.

Our future prosperity and well-being depends critically on high-value innovative products, systems and services based on a wide range of science, technology and engineering skills. Such skills-based knowledge and thinking provide vital ingredients in successful innovation across the breadth of the economy, not just only in technology based industry sectors.

Through its identification of National Technology Challenge (NTC) areas, the Academy has enhanced the value of its advice and research by focusing on identifying practical steps and actions that will define Australia's prosperity and global competitiveness in the seven Challenge industry sectors. All actions identified to date rely on sound STEM knowledge and skills, a focus on industry-led research and innovation and technology deployment to provide high value products and services to a global market.

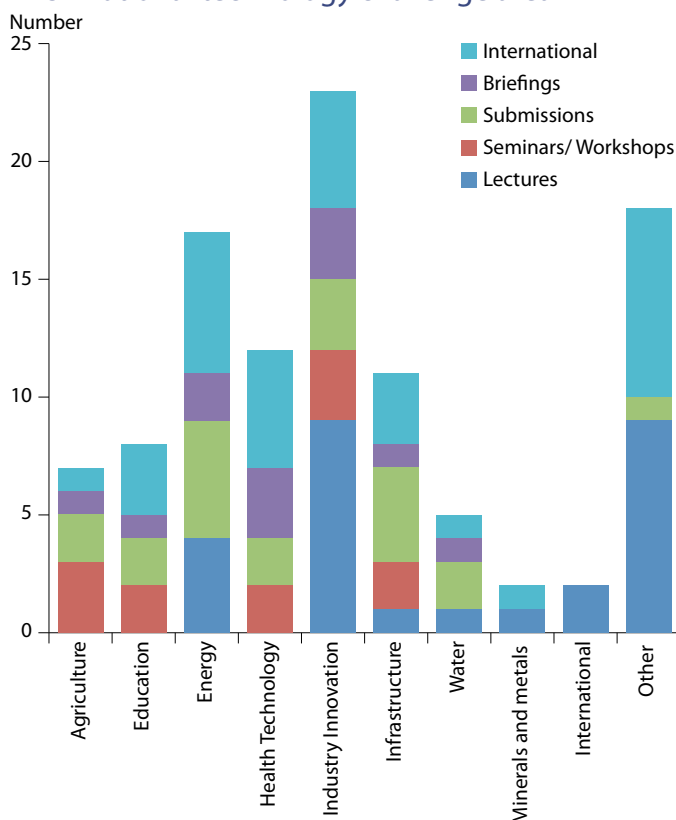
Through the ATSE NTC Forums, ATSE Fellows made significant contribution to evidence-based policy advice and innovation thinking over 2014-15 – identifying priority issues such as enhanced STEM education, a robust and well-resourced research sector, better researcher-industry engagement, new pathways for innovation, and international collaboration.

These activities result from the talents, capabilities and efforts provided pro bono by our Fellows facilitated through a small professional office. Our efforts are largely directed to supporting decision makers and policy formulation in addressing Australia's competitive advantage through science and technology and innovation.

During 2014-15, ATSE conducted some seven seminars, five workshops, 28 lectures and other events; provided 18 submissions to government inquires and policy consultations and celebrated innovation entrepreneurs through its Clunies Ross Awards program. ATSE provided advice and assistance on matters of national importance through the publication of eight scientific reports and six editions of our magazine *ATSE Focus*.

The Academy hosted 14 overseas visitors/delegations and operated exchange programs with Korea, Japan and China and successfully evaluated and allocated 62 priming grants between researchers and SMRs in Australia and Europe. Importantly, all these activities have reflected the priority areas of the ATSE National Technology Challenges (see chart).

ATSE national technology challenge area



Some of the key highlight outcomes of the year's activities:

- expansion of our STELR (Science and Technology Education Leveraging Relevance) program into modular units targeted to the Australian Curriculum for physical sciences, chemical sciences, mathematics, and earth and space covering more than 150 guided lessons across years 6 to 10, using hands-on problem solving within a context of sustainability, climate and renewable energy with some 57,500 students undertaking STELR units over the year;
- developing metrics for researcher-to-industry engagement;
- transitioning our international programs to focus on both senior research leader engagement across major trading partners in Asia and new researcher-SME/industry collaboration grants; and
- research on technology and innovation-led opportunities for industry – particularly advanced manufacturing, energy production and distribution, health technologies and food and agribusiness.

The Academy continues to maintain its influential position within the research, science and innovation system in Australia by working in strategically important areas to provide robust, independent and evidence-based advice to government, industry and the community.

DR MARGARET HARTLEY FTSE
Chief Executive Officer



NATIONAL CHALLENGES

Working in Australia and overseas to achieve change and prosperity through innovation

ATSE made a distinguished – and unique – contribution to Australia through its support of new national initiatives in the year. It leveraged the skills, experience and generosity of its Fellows – and the energy and commitment of its staff – to help drive some important national programs that support our objectives and begin to meet some of the massive technological challenges of our time.

*NSW Industry, Resources and Energy Minister
Anthony Roberts addresses the Intelligent Grid
Symposium in Sydney.*



ATSE maintains a strong focus in all its activities on the seven key national technology challenges it has identified.

This review illustrates the breadth and depth of the Academy's activities in these areas.

1. Maximise the contribution of technology to innovation, investment and productivity

The Industry and Innovation Forum was established in August 2014, chaired by Ms Kathryn Fagg FTSE, with deputy chairs Professor Ron Johnston FTSE and Professor Tom Spurling AM FTSE. The first publication of the new Forum was an Industry and Innovation Position Statement, which built on the ACOLA Securing Australia's Future report *The role of science, research and technology in lifting Australia's productivity*, led by Dr John Bell FTSE. The Statement emphasised ATSE's long-standing position that lifting Australia's industrial and business productivity through research, innovation and collaboration must be a key priority for our competitiveness. It noted that Australia needed to rethink the way public money was applied to research and a renewed focus on high-technology high-value industries that drove productivity through technological innovation to produce high quality products and services.

The Position Statement was also a key component of ATSE's submission to the Senate Inquiry into Australia's Innovation System. The submission acknowledged Australia's world-class research and knowledge generation system, but called for greater focus on industry through improving research translation, innovation incentives, better collaboration, and support for technology adoption.

A significant achievement for the Academy was the public release in April 2015 of the *Research Engagement for Australia* (REA) metrics report which detailed the development of a set of metrics to measure and incentivise research collaboration. The REA project was funded by the Department of Education and Training and led by a steering committee of representatives from the Learned Academies, government departments and agencies, and research and higher education sectors. Following widespread discussion and publicity, ATSE commenced a pilot with universities in Queensland and South Australia, in cooperation with State Governments in those states. The pilot has worked with universities to trial and refine the metrics, with a focus on resolving several remaining questions from the original REA report. All three universities in SA and all eight universities in Queensland have participated in the pilot. REA is intended to complement and provide balance to the existing Excellence in Research for Australia (ERA) system.

ATSE made submissions to a number of reviews addressing the contribution of technology to innovation, investment and productivity, including:

- *Boosting the Commercial Returns from Research issues paper* (December 2014)

- Defence White Paper and First Principles Review (November 2014)
- Cooperative Research Centres Program Review (November 2014)

ATSE provided project management support for the ACOLA Securing Australia's Future report *Translating research for economic and social benefit: country comparisons*, chaired by Dr Bell. The project utilises country comparisons and analyse international best-practice approaches to encourage and facilitate research translation, commercialisation and collaboration, and examine their applicability for Australia, examining Canada, USA, Japan, Brazil, China, South Korea, Chile, Israel, Finland, Denmark, Sweden, Germany, United Kingdom and Singapore.

2. Advance technological solutions for a healthy Australia

Following the establishment of the Health Technology Forum in the previous year, and the publication of several Position and Action Statements, the Forum surveyed its members during the year to determine the key emerging issues in health technology. Responses overwhelmingly identified electronic health records as a key enabling technology that the Forum should focus on.

ATSE was a key contributor to the ACOLA project *Assistive Health Technologies for Independent Living*, part of the program *Making Interdisciplinary Research Work*, funded by Australian Research Council through a Linkage Learned Academies Special Projects (ARC LASP) grant. The project working group was chaired by Fellows Professor Greg Tegart AM FTSE and Dr Erol Harvey FTSE, and was overseen by a program steering committee involving Mr Peter Laver AM FTSE (chair), Forum Chair Professor Karen Reynolds FTSE and Professor Rod Tucker OAM FAA FTSE. The report found that bringing together experts from across the disciplines in a user-centred network was vital to increasing uptake of health technologies to improve health, quality of life and extend independent living. The report was launched in September 2014.

The Health Technology Forum also prepared a number of submissions during the year. The response to the National Disability Insurance Agency Assistive Technology discussion paper drew on the ACOLA *Assistive Health Technologies* report, as well as the ATSE Action Statement on assistive technologies. ATSE provided a submission to the Department of Health's *Expert Review of Medicines and Medical Devices Regulation* in December 2014, highlighting the domestic benefits gained from the operational systems, reputation and independence of the Therapeutic Goods Administration (TGA), areas of the TGA's regulatory framework that should be protected, and recommendations for change that could further strengthen aspects of the TGA.

3. Australia's transition to economic low environmental impact energy supply and use

The ATSE Energy Forum, led by Dr Bruce Godfrey FTSE, was active in policy development, preparing Action Statements on nuclear energy,

future fuels for transport, intelligent energy networks and energy productivity. The Forum was also a driver of ATSE's engagement with the South Australian Royal Commission on the Nuclear Fuel Cycle. ATSE President Dr Alan Finkel AO FTSE and Dr David Klingberg AO FTSE met with the Royal Commissioner, Rear Admiral Kevin Scarce, and a strategy and guidance group of Fellows (Mr Martin Thomas AM FTSE, Dr Ian Duncan FTSE, Dr Graeme Pearman AM FAA FTSE, Dr Godfrey, Mr Barry Murphy FTSE, Dr Klingberg, Dr Erica Smyth FTSE, Professor Helen Garnett PSM FTSE, Mr Henry Muller FTSE, Dr Meera Verma FTSE, Professor Chris Greig FTSE and Dr Susan Pond AM FTSE) prepared a detailed and substantial submission to the Commission.

A major work program in the energy area was preparation for ATSE's Conference and International Academies Workshop on unconventional gas. Preparations for the events, held in September 2015, began in December 2014, with a conference committee led by Professor Peter Cook CBE FTSE and Dr Vaughan Beck FTSE and including representatives from industry, government, academia and NGOs. The Conference and Workshop built on the earlier work of Professor Cook and Dr Beck on the ACOLA Securing Australia's Future report *Engineering Energy: Unconventional Gas Production*. This report was also the basis for ATSE's submissions to inquiries into unconventional gas in Tasmania and Victoria, including an appearance by Professor Cook before a Victorian parliamentary committee.

ATSE made a submission to the Federal Government's Energy Green Paper which supported the goals and proposals outlined in the Green Paper but criticised it for its near-term focus, failure to address the risks associated with climate change, and including a number of institutional and fiscal barriers to implementation. ATSE also recommended that the Energy White Paper include a greater focus on energy security and reliability, electricity prices, building gas supply, and energy productivity. The submission was developed by a drafting group led by Professor Greig and including Dr David Brockway FTSE, Ms Chloe Munro FTSE, Dr Mike Sargent AM FTSE, Mrs Else Shepherd AM FTSE, and Dr John Sligar FTSE, with input from the Energy Forum Leadership Group and Energy Forum members.



Dr John Bell speaks at the National Press Club about lifting Australia's productivity through science, research and technology.

ATSE also made a submission to the Department of Prime Minister and Cabinet taskforce developing Australia's national commitment for emissions reduction targets to be taken to the Paris Conference of the Parties (COP 21) of the UNFCCC in December 2015. Although ATSE did not recommend a specific target, the submission focused on the critical role for investment in developing and deploying new energy technologies to reduce emissions and included an outline of a potential tax incentive program that could be used to encourage investment. Additional submissions were made to the Australian Renewable Energy Agency (ARENA) process for identifying its future research and development priorities, and to the Senate Inquiry into Australia's Transport Energy Resilience and Sustainability.

4. Efficient and sustainable resource management

Following on from the 2013 ATSE report *Drinking Water through Recycling*, ATSE was commissioned by the Australian Water Recycling Centre of Excellence to undertake a study of the investment potential of resource recovery from wastewater. The study, *Wastewater – An Untapped Resource?*, was authored by a working group led by Dr John Burgess FTSE and produced a seminal report that will serve as a valuable resource for the Australian water industry and policymakers. The *Drinking Water through Recycling* report was profiled in an article by Water Forum chair Mr Ken Matthews in the Journal of the America Water Works Association in June 2015.

The Water Forum developed a Position Statement in November 2014 about the need for ongoing national water reform in Australia, *National Water Management: New Reform Challenges*. The statement was circulated to all State and Federal ministers and department heads with responsibility for water. It calls on the governments of Australia to develop and commit to a new decadal strategy for national water management, following the past two decades of internationally recognised reform progress.

The Water Forum made a submission to the Senate Environment and Communications References Committee's inquiry into Australia's stormwater resource. The submission drafting was led by Water Forum deputy chair Professor Ana Deletic FTSE, who appeared with Dr Matt Wenham, Executive Manager, Policy and Projects, at a Committee hearing for the inquiry in May 2015.

5. Improved agricultural productivity, quality and sustainability

The ATSE Agriculture Forum commenced activities in August 2014, chaired by Professor Timothy Reeves FTSE, with deputy chairs Dr Mary Ann Augustin FTSE and Professor Snow Barlow FTSE.

Through the Forum, ATSE made a submission to the Government's Agricultural Competitiveness Green Paper in December 2014. The submission emphasised that the competitiveness of Australia's agriculture and food sectors continued to rely on strong and stable support for science, research and development, effectively translated to economic impact. ATSE called for the development of a long-term strategic vision for this sector addressing the following



*Improving
agricultural
productivity.*

key issues: increased agricultural and food industry productivity – particularly the rate of productivity improvement pre-farm gate; responsible natural resource and ecosystem management; targeting high-value, high-quality products and value-add opportunities for emerging international markets; and maintaining Australia's strong biosecurity system. The submission also referred to the findings and recommendations arising from the previously published *Food and Fibre: Australia's Opportunities* report.

In August 2014, ATSE provided a submission responding to questions from the Department of the Prime Minister and Cabinet's Green Paper on Developing Northern Australia. The submission emphasised the requirement for further systematic research into fundamental issues relating to the potential resources available for development, and how science and technology can enable environmentally sustainable development in northern Australia. It also highlighted the need for a strategic vision and business plan to guide this development, and the importance of protecting the region's unique ecosystems while delivering benefits for local populations and indigenous communities, as well as the nation as a whole.

ATSE was a key contributor to the ACOLA Securing *Australia's Future project Australia's Agricultural Future*, providing project management support and through the involvement of ATSE Fellows Dr Joanne Daly PSM FTSE (chair) and Professor Bronwyn Harch FTSE in the expert working group. The report examined the drivers of demand; returns, resources and risks; and social and political contexts of Australian agriculture and was launched by the Chief Scientist in July 2015.

In June, the ATSE Board decided agribusiness in the digital age would be the topic for the first ATSE National Technology Challenges Dialogue, to be held in June 2016.

6. Infrastructure to meet Australia's future economic and social needs

The Infrastructure Forum held a half-day focus session in April 2015 to discuss the key issues and challenges relating to two themes: *committing to long-term robust planning and ensuring effective infrastructure development and delivery*. The session involved constructive discussion on what ATSE could focus on and who to strengthen linkages with to ensure the Academy has significant impact in the area of infrastructure. The discussions were led by the Chair of the Forum, Mr David Singleton FTSE, and deputy chairs Dr Max Lay AM FTSE (previously Forum chair) and Professor Cynthia Mitchell FTSE, and included a number of Fellows and external experts from industry, government and academia.

The Forum also held a seminar in November 2014 where Mr Peter Watson FTSE, Board Member of Infrastructure Australia, spoke on 'Australia's priority infrastructure for the future – the new role of Infrastructure Australia'. This presentation focused on characteristics of the successful Regional Rail Link project in Melbourne, as well as Infrastructure Australia's new mandate and progress on new initiatives including a national infrastructure audit and 15-year infrastructure pipeline. The presentation was followed by a panel discussion session with Mr Watson, Dr Lay and Dr Beck.

The Forum pursued active engagement with the new leadership and management of Infrastructure Australia, building on the 2013 ATSE-IA workshop on infrastructure planning. The Forum leaders met with The Hon Mark Birrell and Mr John Fitzgerald from IA in August 2014, and provided subsequent input into the development of the IA Infrastructure Audit.

Submissions were also prepared for the *Overview of Project Appraisal* draft paper released by the Bureau of Infrastructure, Transport and Regional Economics, and the House of Representatives Standing Committee on Infrastructure and Communications inquiry into infrastructure planning and procurement. These submissions drew on the ATSE Infrastructure Position Statement, published in November 2014, along with the ATSE-IA workshop report.



Working for home-based health services.

7. Improve quality and reach of science, technology, engineering and mathematics (STEM) education at all levels

The Education Forum held a seminar in November 2014 on *Challenging Education Paradigms in Engineering and Technology*. Professor Robin King FTSE, Chair of the Education Forum, set the scene before invited speaker Professor Sam Bucolo (Professor Design and Innovation, University of Technology Sydney) spoke about *Industry Drivers for Education Transformation*. He noted that for the higher education sector to remain relevant to enable a resilient and competitive nation, significant change within the sector would be required. The presentation took an oblique perspective on this debate; grounding the discussion on a future education paradigm that takes a trans-disciplinary approach to higher education, integrating a range of industry experiences, real-world projects and self-initiated proposals to equip students to address wicked problems and complex challenges. Professor Ian Cameron FTSE, one of the Forum's deputy chairs, spoke of the importance of learning spaces and constructing creative environments to encourage entrepreneurship and innovation. The Forum's other deputy chair, Professor Judy Raper FTSE, talked about the need for 'T-shaped' engineers who are able to be innovative, entrepreneurial and more importantly, able to understand and interact with people from other disciplines. This led to a lively discussion amongst attendees on the importance of incorporating entrepreneurship and innovation into higher education courses in Australia.

The Tripartite Committee on Engineering Education, which consists of representatives from ATSE, the Australian Council of Engineering Deans and Engineers Australia, reconvened in September 2014, chaired by Professor King. The member bodies discussed their recent activities, the Chief Scientist's initiatives to develop a national science policy, research and innovation policy, higher education reform, recommendations of the 2014 AWPA engineering workforce study, and ways to incentivise industry-student interaction.

In June 2015, the Department of Education and Training released for consultation the Draft National Strategy for International Education.

ATSE submitted feedback to the consultation process through the Education Forum, with reference to ATSE's continued support for STEM education across all education levels. Professor King participated in a ministerial forum on the Strategy in August 2015.

The presentation took an oblique perspective on this debate; grounding the discussion on a future education paradigm that takes a trans-disciplinary approach to higher education, integrating a range of industry experiences, real-world projects and self-initiated proposals to equip students to address wicked problems and complex challenges.

The Academy continued its well-established international initiatives during the year, all aimed at maintaining Australia's links with leading scientific, technology and engineering bodies overseas to help ensure that the nation stays abreast of latest worldwide thinking and trends in the STEM area.

Our international program was strategically formulated and managed to underpin the Academy's seven National Technology Challenges in the belief that international cooperation and collaboration are keys to ensuring that Australia remains relevant to the rest of the world and has access to the latest in world technological developments of relevance to the nation.

Strong relations with sister academies, international scientific and research bodies – and Government ministries – in partner countries, provide ATSE with a structure for joint activities and exchange of information via:

- Exchange visits, involving universities, research institutes and industry, sharing information and establishing new relationships;
- Joint workshops and delegations to exchange technical information and identify new collaborative opportunities; and
- Fostering international engagement and assisting Australian science and industry stakeholders to deepen people to people linkages.

These relationships and activities ensure sustained strong ATSE global linkages and networks.

ATSE has a strong cohort of international Fellows drawn from the Asia-Pacific, Europe and the Americas, allowing the Academy to utilise its extensive international networks and garner intelligence on a wide range of issues.

ATSE is an active member of the International Council of Academies of Engineering and Technological Sciences (CAETS), an independent non-political and non-government international organisation, encompassing 26 engineering and applied science academies from Europe, Asia-Pacific region and the Americas. Participation at CAETS annual meetings and in CAETS projects gives ATSE direct links to influential Academies and their Fellows and enables us to network extremely effectively.

Key initiatives during the year included:

China – JCG meeting in Perth

The ATSE/CERI (China Huaneng Group Clean Energy Research Institute) Workshop, part of the 8th Australia-China Joint Coordination Group on Clean Coal Technology Meeting in Perth in February 2015, promoted closer low-emission coal technology linkages between Australia and China, bringing together more than

120 Australian and Chinese eminent low-emission coal technology representatives. The previous two ATSE-CERI RD&D workshops focused on advanced low-emission coal (LEC) technologies under active development world-wide, such as gasification, post-combustion capture (PCC) and oxyfiring. The Perth workshop continued this theme, but introduced some new areas, including: how bioenergy with carbon capture and storage (BECCS) might be combined with coal combustion or gasification to achieve true zero-emissions; chemical looping; catalysis of carbon dioxide reaction; and microbial conversion of coal into methane.

China - YSEP

Under the Australia China Young Scientists Exchange Program, 16 Chinese researchers visited Australia in November 2014, while 15 Australian researchers visited China, also in November, to undertake two weeks of individual visit programs to establish and develop personal and institutional linkages. This program was funded by the Australian Government and the Ministry of Science and Technology, China. The program was administered by the China Science and Technology Exchange Centre (CSTEC) and ATSE.

China - stakeholder visit

ATSE staff visited China in April 2015 with key stakeholders to progress linkages and explore new opportunities through meetings with the Ministry of Science and Technology (MOST); the Chinese Academy of Engineering (CAE); the Chinese Academy of Sciences (CAS); the Huaneng Clean Energy Research Institute (CERI); the Shanghai Association for Science & Technology (SAST); the General Research Institute for Nonferrous Metals (GRINM) and the Australian Embassy in Beijing.



Dr Dongwha Kum, Vice President of the National Academy of Engineering of Korea, meets with Mr Peter Laver (right) and Dr Vaughan Beck.

Korea – ERLEP

The second exchange of the Australia Korea Emerging Research Leaders Exchange Program funded six Australian researchers to travel to Korea, 11-22 May 2015, to progress individual and institutional linkages, with funding from the Australia Korea Foundation, DFAT, and the Korean National Research Foundation. The Australian researchers selected are focused on promotion of healthy ageing; environmental sustainability and capturing the benefits of ICT in a digital economy.

Korea - Researcher-to-Innovation Workshop

The Korea-Australia Researcher-to-Innovation Workshop to in Korea in May 2015 explored mechanisms, initiatives and incentives currently in place in Australia and Korea; leading to the promotion of an Australia-Korea researcher-to-business collaboration model – combining the best elements from each country’s experiences – that promote the successful translation of research into commercial outcomes.

Japan - JASIC

Discussions commenced in Japan on a proposed Japan Australia Science Industry Connect (JASIC) project to enable a pilot visit to Australia by eight Japanese senior researchers to develop international linkages for research translation activities.

Japan - AJERLEP

The Japan Society for the Promotion of Science (JSPS) announced support for another two rounds of the Australia Japan Emerging Research Leaders Exchange Program. The Australia Japan Foundation, Department of Foreign Affairs and Trade and the Department of Industry will fund this program, with Japanese researchers scheduled to visit Australia in October 2015.


Indonesia – Academy visit

A delegation of young Indonesian scientists visited Australia in November 2014, led by the President of the Indonesian Academy of Sciences, Professor Sangkot Marzuki, as part of their Academy’s science enrichment program, to focus on the major challenges faced by Indonesia. ATSE hosted the visits in Melbourne to Bio21 and Monash University along with a debrief session, with the delegation attending the 2014 Oration Dinner.

EU – Raw materials

In the raw materials area, ATSE has been participating in a project funded by the EU’s Horizon 2020 program and led by the European Federation of Geologists to examine raw materials industries around the world. The project aims to establish an International Raw Materials Observatory to act as a clearinghouse for data on mining and minerals in industrialised countries, with ATSE providing information and data from Australian sources on the Australian minerals industry. ATSE’s involvement is being guided by an Expert Reference Group of ATSE Fellows and invited stakeholder groups, led by Ms Denise Goldsworthy FTSE.

The project aims to establish an International Raw Materials Observatory to act as a clearinghouse for data on mining and minerals in industrialised countries, with ATSE providing information and data from Australian sources on the Australian minerals industry.



Driving collaboration through education – a STELR workshop in Bandung, Indonesia.

The importance of CAESIE as a bilateral program between Europe and Australia has been its ability to build sustainable linkages between SMEs and researchers in the area of science and technology. These areas build on existing EU-Australia cooperation activities and focus on areas of research strength and complementary capabilities – clean energy, healthy ageing through enabling technology and sustainable cities.

The final year of the CAESIE program (Connecting Australian European Science and Innovation Excellence) has been busy with a range of key activities coming to fruition, including the Priming Grants Program and the Info-Exchange tours into Europe.

The Priming Grants Program

Priming Grants were aimed facilitate the initial stages of SME-research partnerships by offering modest funding associated with consortium meetings (travel-related costs), assistance with minor project expenses and/or costs associated with establishing formal relationships (legal agreements), or funding applications for joint activities.

Over two calls, 62 Priming grants were awarded and 58 awardees went on to take up their grants and progress through to final reporting. Of these 77 per cent (45) regarded their collaborative projects as *very successful*, 21 per cent (12) grantees regarded their projects as *partially successful* and works in progress, and only one project failed early on. Outcomes far exceeded expectations with most grantees taking the opportunity to identify funding sources to develop their projects further; identify new additional collaborative partners; and develop additional business or research opportunities.

In both rounds the majority of grantees went on to apply for funding to either Australian or EU sources. Grantees reported that, as a result of being supported by the CAESIE Priming Grants, they applied for or raised more than €15 million – a multiplier of some 43 times the €355,725 invested in the grants.

Outcomes and feedback from the two calls indicates that this model for early stage funding of new ideas between SMEs and researchers is a proven success and has global applicability.

Info-Exchange tours

The first CAESIE tour in September 2014 sought to increase the European research community's awareness of opportunities to participate in open programs in Australia and to promote the Australian R&D and Innovation landscape to key target audiences. It attracted a total of 134 participants during the visits to Helsinki, Bonn, Paris, and London, representing 91 research and innovation policy organisations. Overall the participants agreed the exchange of ideas and potential for future collaborations and linkages made the tour very worthwhile. This preceded a second tour planned for September 2015, with a focus on EU Innovation Clusters, where representatives of Australian Clusters and CRCs would visit five EU countries over a 10-day period – Sweden, Denmark, Netherlands, Germany and France.

Advisory Services

An important function of CAESIE has been the establishment of a National Contact Point (NCP) network of advisers who can assist with queries on accessing Australian and EU funding programs which are relayed to CAESIE through our contact page on the CAESIE website. During the past year we have fielded and responded to hundreds of enquiries from Europe and Australia. The majority of requests were for information on Horizon 2020 or funding available within the Australian system for use in Europe.

MAJOR INITIATIVES

Working across Australia to elevate both awareness and discussion of the technologies that underpin our future

ATSE plans and manages a variety of events – at both national and Divisional levels – each year to maintain public focus on key issue in the technology and innovation field and support the Academy’s positioning as a strong leader in this area. These events recognise and proclaim excellence and encourage the next generation to embrace STEM topics in pursuit of a scientifically literate nation.

Dr Alan Finkel presents a Fellowship certificate to Professor Anne Green.



We conducted numerous initiatives in the year under review, of which the following are highlights:

Annual General Meeting

The 2014 Annual General Meeting and Oration Dinner events took place in November at The Langham Hotel, Melbourne, attended by Fellows, which confirmed the election of new Directors Dr Hugh Bradlow and Professor Karen Reynolds and the re-election of Dr Paul Greenfield and Professor Tanya Monro.

The meeting heard reports from the President, the Chair of the Audit and Risk Committee, Dr Susan Pond, Professor Miller and the Acting CEO Mr Bill Mackey.

Following the AGM most of the new Fellows described their aspirations and work in a series of captivating presentations during the New Fellows Seminar, which was well-attended.

Oration Dinner

Some 200 Fellows and guests attended the Academy's 2014 Oration Dinner following the AGM and New Fellows Seminar, to hear the 2014 Academy Orator, Ms Kathryn Fagg FTSE, and welcome the new Fellows.

Ms Fagg's Oration, *Competing for the Future*, was an inspiring and thought-provoking speech, loudly applauded by the 200 attendees. Ms Fagg, a Reserve Bank Board Member and public advocate for women in leadership in engineering organisations, was named as one of Australia's 100 Women of Influence 2014.

The President, Dr Alan Finkel AO FTSE, presented Fellowship certificates to most of the 26 new Fellows at the dinner, supported by retiring Director and Vice President Professor Mike Miller AO FTSE.

Dr Finkel also presented a sponsorship certificate to Mr Gavin Jackman, Executive Global Head Corporate Affairs and Social Responsibility at Orica to mark the fact that Orica has been a backer of ATSE's STELR program in schools since its inception, making its first grant of \$150,000 to STELR in 2009, followed with further grants of \$150,000 for the calendar years 2011 to 2014.

Assembly

The ATSE Assembly is made up of some 30 Fellows, including the Chairs of the State and Territory Division Committees, Topic Forums and Working Groups and other committees. The Assembly meets at least twice a year and works to advise the Board on the Academy's policies and strategic direction. It develops insightful analysis and advice on strategic issues in collaboration with the wider Fellowship and external stakeholders.

The Assembly met twice during the year – in November 2014 and May 2015.

Assembly 13 was part of the two-day AGM program in Melbourne which included a meeting of the Joint Chairs of the Divisions and Forums, to harmonise Forum and Division activities and assist their alignment with ATSE's Strategic Plan. Assembly 13 heard updates from the Topic Forums on recent and planned work, encompassing delivery of ATSE's Strategic Plan and National Technology Challenges in addition to discussion on the progress on industry and fellowship engagement, including gender equity, and overviews of activity within the ATSE office and the relevant Government policy landscape.

As part of the 2014 AGM program, two Forums held Seminars. The Education Forum Seminar was titled *Challenging Education Paradigms in Engineering and Technology*. The Infrastructure Forum heard Mr Peter Watson FTSE, Board Member of Infrastructure Australia, speak on *Australia's priority infrastructure for the future – the new role of Infrastructure Australia*.

Assembly 14 was held in Brisbane in May preceding the 2015 Clunies Ross Awards dinner. This was followed next day by a Joint Chairs meeting.

2015 Clunies Ross Awards

The Clunies Ross Awards help drive the ATSE mission by rewarding the best in commercialisation of research and innovation.

The Awards seek to identify and acclaim people who have, often against difficulties and always with persistent commitment, made important contributions to science and its application for the economic, social and environmental benefit of Australia. They are unique in recognising the simultaneous mastery of new technology and business expertise.

The Clunies Ross Awards dinner and Extreme Science Experience (Wonder of Extreme Science) were held in Brisbane in May – and the combined events were again an outstanding success.

A crowd of more than 500 attended the dinner at the Brisbane City Hall. Organised by a committee of the ATSE Queensland Division and ATSE Head office Events staff, the dinner continued a long tradition of landmark Clunies Ross events.



Dr Cathy Foley and Mr Keith Leslie receive their 2015 Clunies Ross Award from Mr Shaun Kenny, MD of Bechtel Australia, a Clunies Ross Sponsor.

The dinner attracted some stellar guests, including the Queensland Science and Innovation Minister Leeanne Enoch. University of Queensland Vice Chancellor Professor Peter Høj FTSE delivered the opening address, Academy President Dr Alan Finkel AO FTSE delivered the closing address and the guest speaker was ARC Laureate Fellow and Nobel Laureate Professor Brian Schmidt AC FRS FAA.

The 2015 ATSE Clunies Ross Award Winners were:

- Dr Cathy Foley PSM FTSE and Mr Keith Leslie – both from CSIRO – for their work on LANDTEM™, a highly sensitive magnetic detection device capable of detecting ore bodies with extremely weak magnetic fields;
- Associate Professor Leigh Ward, from UQ, for his work using bioimpedance spectroscopy (BIS) to develop an accurate yet inexpensive tool for early detection of lymphedema; and
- Professor Zhiguo Yuan, also from UQ, for his campaign to 'put science in sewers' which has fundamentally changed industry's understanding and practice for sewer corrosion and odour management.

Associate Professor Jim Patrick AO FTSE received a Lifetime Achievement Award. He is one of the original engineers who pioneered the development of the multichannel cochlear implant and is recognised as a world authority on cochlear implants.

The following day, Award winners and leading scientists joined 200 students and teachers from Queensland schools for the Wonder of Extreme Science event, at the Queensland University of Technology, which showcased both ATSE's STELR program and the Queensland Wonder of Science Program.

ATSE's seven Divisions conduct a wide spectrum of activities to support the ATSE mission – including seminars and workshops, presentations, site visits and briefings, often in conjunction with other bodies. These are increasingly aligned with our National Technology Challenges. Additionally, each Division holds frequent events to facilitate engagement and learning among the Fellows.

Division Events

ATSE Divisions have established and run Parliamentary Briefings on topical issues in several states for parliamentarians and staff. Experts in these areas of interest – often Academy Fellows – brief parliamentarian, advisors and parliamentary staff.

Each Division also holds a New Fellows event, where newly inducted Fellows share their experiences and aspirations with the Fellowship.

A number of Divisions actively engaged with other Learned Academies, Royal Society branches and RIAus taking leading roles in initiatives aimed at enhancing public understanding of science and technology issues. Divisions engaged actively with the relevant State governments, particularly through the Chief Scientists in each State – four of whom are Fellows.

The **NSW Division** maintained an energetic program of events through the year including its *Intelligent Grid Symposium* in May to examine the potential for smart electricity grids. Through the year the

Division ran its successful manufacturing luncheon series, featuring key speakers on core topics. It also held the 2014 Malcolm Chaikin Oration dinner, delivered NSW Chief Scientist and Engineer, Professor Mary O’Kane FTSE.

The **SA Division** continued its established Teacher’s Award. The 2014 ATSE Teacher’s Award went to Mr Jeremy Le Cornu, from Brighton Secondary School, and was presented during the finals of the SA Science and Engineering Challenge. It also ran its annual Norton Jackson New Fellows event.

The **Victorian Division** conducted a strong program of events – headlined by its Annual Dinner addressed by Professor Alan Trounson FTSE on *The Promise of Stem Cells* – and a series of informative events on key topics addressed by its Fellows.

The **Queensland Division** continued its strong focus on education with its Wonder of Science and Young Science Ambassadors programs, organised the highly successful 2015 Clunies Ross Awards event and conducted several high-impact public lectures

The **WA Division** – presented its annual Eminent Speaker program in Perth and regional centres, featuring Dr Rob Hough – from CSIRO’s Australian Resources Research Centre – titled *Keeping Australia Prosperous*. ATSE worked with Scitech and three WA universities to present this attraction.

The **ACT Division** held a number of events during the year, including a dinner with The University of Western Australia Graduates Association (ACT) to hear ARENA Chair Mr Greg Bourne presenting on *All Change in the Energy World – Implications for Australia*; began planning for a major workshop on STEM teacher training; and represented ATSE at numerous functions in the national capital.

The **Tasmanian Division** completed its successful public lecture series in Hobart, titled *Power Options for the Future*, working with the University of Tasmania, the Tasmanian Government, the Royal Society of Tasmania and Inspiring Australia. It also awarded Ms Robyn Aitken, of Kingston High School its prize for secondary science teaching, in partnership with the University of Tasmania.

Each Division also holds a New Fellows event, where newly inducted Fellows share their experiences and aspirations with the Fellowship.

A key ATSE initiative – which now impacts across all states and approaching 500 schools – is the STELR program. STELR (Science and Technology Education Leveraging Relevance) has developed into modular units targeted to the Australian Curriculum for physical sciences, chemical sciences, mathematics, and earth and space – covering more than 150 guided lessons across Years 6 to 10. It uses hands-on problem solving within a context of sustainability, climate and renewable energy.

STELR is making strong progress across Australia and overseas.

iSME

A key development in the year under review was the iSME (Inspiring Science and Mathematics Education) Project, which was successful in attaining funding of \$996,500 for over two years through the Australian Mathematics and Science Partnerships Program (AMSP). The Lead Partner is Southern Cross University. The other partners are the University of Wollongong, Charles Darwin University, ATSE’s STELR Project and Stile Education.

iSME is developing at least five authentic, multidisciplinary classroom modules for Year 7 – 10 students that use cutting-edge science and engineering contexts and the latest educational theory from the partner universities and other research institutions to excite and engage students.

iSME is using the expertise of university science, engineering and education faculties and other research institutions to develop the modules to engage secondary students through relevant contexts. The modules will involve hands-on, inquiry-based science and mathematics activities supported by background information and career profiles of recent graduates working in the relevant industries.

iSME modules will be delivered digitally through the web-based platform, provided by Stile education, and using paper-based methods.

A steering committee with members from each university and ATSE has been established, along with the iSME Curriculum Development Group, with education specialists from the three universities, a

teacher representative and a representative from the SEAMEO QITEP for Science in Indonesia.

[The Southeast Asian Ministers of Education Organisation (SEAMEO) is a regional intergovernmental organisation established in 1965 among governments of Southeast Asian countries to promote regional cooperation in education, science and culture in the region. Hosted by the Ministry of National Education Indonesia, the SEAMEO QITEP in Science (Regional Centre for Quality Improvement of Teachers and Education Personnel) offers courses and training programs for educators and teachers development.]

Schools progress

By the end of the 2014-15 financial year, the STELR program had been implemented in nearly 460 schools nation-wide. This involved more than 50,000 students and more than 1500 teachers each year.

There has been an emphasis on recruiting remote and disadvantaged schools with some schools being based at indigenous communities. STELR has been adopted by many girls' high schools where the STELR approach is recognised as an ideal way to engage girls in science and technological careers.

Solar cars

The Australian Power Institute funded the API STELR Solar Car Challenge – 49 schools participated in 2014 and a further 34 schools participated in 2015. Schools were provided with easily assembled solar car kits that can be re-used from year to year. Each class set contained 14 solar car kits. The kits were provided to schools free of charge. The cars were judged by API bursary holders who also spoke about their careers in the renewable power industry.

Funding and Sponsorship

Orica made a commitment to fund STELR for three years at \$150,000. The Australian Power Institute provided funding of \$75,000. These funds were used for base-line operations and to provide subsidies to schools from other parts of Australia.

The Australian Power Institute has provided \$30,000 to produce re-usable solar car class sets to 40 STELR schools; CIGRE provided a grant of \$10,000; Cochlear provided a grant of \$10,000; and the Pratt foundation provided \$27,500.

International Engagement

STELR presented a one-day workshop in Yogyakarta, Indonesia – attended by 50 teachers, science teacher educators and government advisors from Fiji, Indonesia, Malaysia, The Philippines, Thailand, Tonga and Vietnam. The STELR activities and equipment packs were enthusiastically received and STELR is part of the network established following the workshop, with several countries expressing strong interest in incorporating STELR into their science curricula.

The STELR program was presented at the SEAMEO Centre Directors Meeting held in Bangkok, in June 2015.



Students at Kurri Kurri High School, STELR's 400th Australian school, use the STELR equipment.

Orica provided class sets of STELR Renewable Energy equipment to three schools in the Philippines, two schools in Indonesia and one school in India.

New Zealand

The STELR program is now implemented in eight New Zealand schools.

A STELR Renewable Energy workshop was conducted at the Science Symposium in New Zealand, followed by a professional development workshop for teachers at Tauranga Boys College. Teachers from Tawa College presented a workshop on STELR at the New Zealand Science Teachers Conference, July 2014.

Professional Training

Professional development training is vital to the success of the STELR project as many secondary teachers do not have extensive science backgrounds, especially in the physical sciences. During the year 147 teachers attended development workshops in 13 cities across Australia and New Zealand.

STELR workshops were presented at the National Conference of the Australian Science Teachers Association (CONASTA) in Adelaide, the conference of the Victorian Science Teachers Association Conference (STAVcon) and the Laboratory Assistants' Conference (Labcon).

Mentors

The STELR mentor program involves experienced teachers travelling to participating schools and supporting science teachers in the implementation of the program. Mentors encourage networking between schools and provide feedback on how the program is running in individual schools and to provide advice on improving the program's implementation.

There is one mentor in Tasmania, South Australia and the Northern Territory. There are two mentors covering each of Queensland, Western Australia, New South Wales and Victoria.

Getting a better deal for women

ATSE continues to make noteworthy progress in optimising the role of its female Fellows. This progress has accelerated markedly since the introduction of the Gender Equity Policy five years ago in November 2010. ATSE has a strong and active Gender Equity Working Group and is a proud partner in the Athena Swan initiative to promote the role of women across Australia, initially through research institutions and organisations.

Women’s participation in ATSE initiatives and bodies during the year showed a strong increase over the previous period. The admission of Female Fellows has grown dramatically in recent years. Female admissions have been virtually at the target level of 33 per cent per year of all new Fellows over the past three years (Figure 1). The most visible change has been the gender representation on the ATSE Board, with participation rising to 50 per cent for 2014 and 2015 (Figure 2). Similarly, the Assembly had female membership of 21 per cent for the third consecutive year.

Females on the Membership Committee rose marginally from 24 per cent to 25 per cent in the year under review while the Audit and Risk Committee was 33 per cent female for the third straight year. ATSE is proud that women play leading roles in its Forums and Division Committees. The Forums’ Leadership Groups in 2014-2015 reflected much increased gender equity, with women elected as Chair and Deputy Chairs of the Minerals Resources Forum, Chair of the Industry and Innovation Forum, Chair of the Health Technology Forum, and Deputy Chairs of the Water Forum, the Infrastructure Forum, the Education Forum and the Agriculture Forum.

Female Forum membership has increased incrementally over the past three years – from 11 per cent (2013), to 13 per cent (2014), to 15 per cent (2015). Women played an increased role in Division affairs, with the Queensland and South Australian Divisions led by a woman Chair and most Division committees being comprised of 20 per cent or more women.

A major initiative during the year was the establishment of the Academy’s Gender Equity Working Group, charged with pursuing gender equity targets within ATSE and advocating for gender equity in ATSE’s broader areas of influence. This Group, like the ATSE Board, has 50 per cent female membership (three of its six members).

SAGE/Athena SWAN

As a key part of ATSE’s program to advocate for gender equity more broadly, ATSE has joined the Academy of Science to launch the Science in Australia Gender Equity (SAGE) pilot program to trial of the successful UK Athena SWAN gender equity accreditation program.

More than 30 organisations will participate in the pilot – including universities, medical research institutes and the CSIRO – which was launched at Parliament House, Canberra, early in the latest financial year. The program rates the gender equity policies and practices of participating organisations with a gold, silver or bronze award and helps them to develop ways to promote and retain women and gender minorities in their organisations.

Fig 1 New Fellows

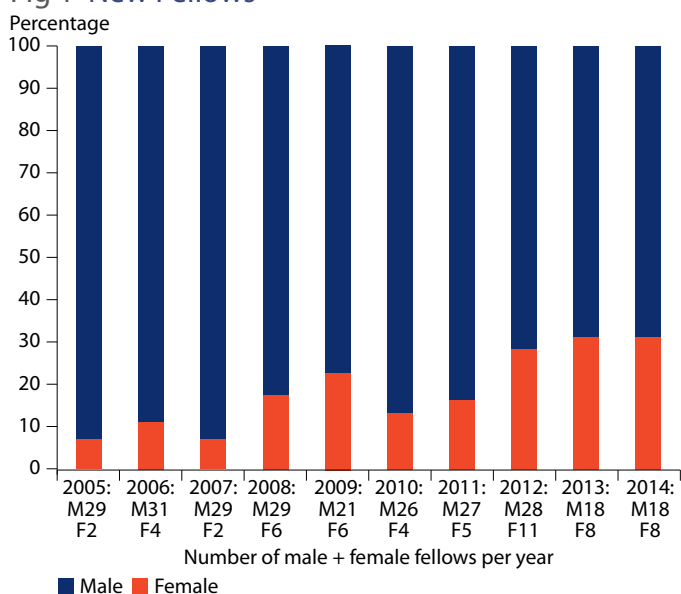
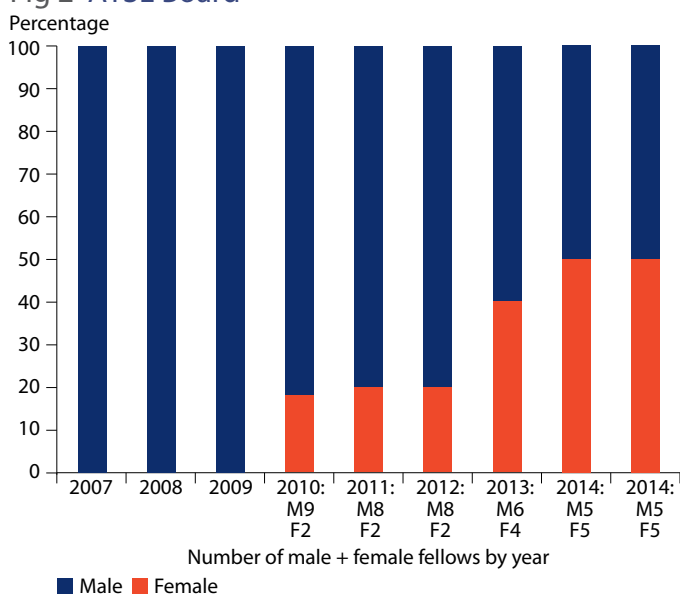


Fig 2 ATSE Board



CRAWFORD FUND

Winning value from agricultural research

Master Classes focus on market access and biosecurity including disease risk and management; water and soil management for sustainable intensification of agriculture; research management; and innovation systems and platforms including information technology and communication.

In 2014-15 the Crawford Fund maintained momentum in its traditional activities of public awareness, policy development and training on food security and embarked on efforts to widen its revenue base.

The Fund is involved with two large partnership projects, which will both include tailored master classes:

- Biosecurity Capacity Building in Eastern and Southern Africa with ACIAR (the Australian Centre for International Agricultural Research) and the PBCRC (Plant Biosecurity CRC); and
- Demand-led plant-breeding with the Syngenta Foundation and the University of Queensland.

The 2014 Crawford Fund Annual Conference, titled *Ethics, Efficiency and Food Security, Feeding the 9 Billion, Well*, filled venues and attracted considerable media attention. It was opened by the Minister for Foreign Affairs, Hon Julie Bishop MP, who

emphasised that policy change, research and training were needed in development. She confirmed that Australia was prepared to play its role with renewed priority for agriculture in its aid program and support for an open trade environment.

Conference discussions highlighted:

- the pivotal role of women in food security and development;
- the importance of nutritional security;
- intertwining of the issues of population, development and food security;
- trade and investment as key in global development, and the legitimate role of 'aid for trade' in encouraging a more open global trading system; and
- the re-emergence of agriculture as a key tenant of a broader Australian aid strategy and the priorities of other international aid programs.

At the conference the Crawford Fund Medal for contributions to food security was awarded to Dr Robyn Alders from Sydney University for her work on Newcastle Disease in chickens and her tireless efforts to improve African small holder farmer livelihoods.

It was also announced at the conference that Hon John Kerin AM FTSE, Crawford Fund Chair, has been named an ICRISAT Ambassador of Goodwill. This honour, given by the International Crops Research Institute for the Semi-Arid Tropics, put Mr Kerin in good company with other Ambassadors including Bill Gates, Professor MS Swaminathan, known as the father of the Green Revolution in India, and Rt Hon James Bolger, former Prime Minister of New Zealand.

The Fund is building its efforts to encourage young people into international agricultural research. It again sponsored a group of



Mr John Kerin (right) receiving the ICRISAT Ambassador of Goodwill plaque from Dr William Dar, ICRISAT Director General.



Executive Director Dr Denis Blight, Hon Kyam Maher and Dr Nick Austin.

young Australian agricultural researchers and students to attend its annual conference and a day focused on “careers in international agricultural research”. An alumni group is being supported with its own Facebook and regular newsletter contact. Other activities with young researchers involve engagement with the Researchers in Agriculture for International Development; a monthly gathering in Tasmania of *Young Crawford*, regular meetings in WA of young agricultural researchers and students, and the involvement of young people in our State events.

A related new activity in 2014/15 had the Crawford Queensland and Tasmania State Committees offering scholarships to support young Australian agricultural students to include an international component to their studies.

The Fund’s public awareness activities included:

- A seminar in Adelaide, as one of our series of State events following on from the launch of the *Doing Well by Doing Good* report, opened by Hon Kyam Maher, Member of the South Australia Legislative Council.
- Involvement in the *Olympics of Horticulture* – the International Horticulture Congress, for which the Fund managed the media effort resulting in national coverage of food security issues around fruit and vegetables

production and nutrition issues;

- The annual Food Security Journalism Award, won by James Mitchell Crow at Cosmos Magazine in 2014, who subsequently travelled to India in April 2015;
- Assistance to the Gardiner Foundation with a National Press Club address by Dr Aalt Dijkhuizen, a leading authority on international agriculture and food, and former President and Chairman of Wageningen University and Research Centre, Holland;
- A Victorian Rural Press Club event on biosecurity issues featuring Dr Tony Gregson AM FTSE and Dr Nick Austin, CEO of ACIAR;
- A *Having a Go* gathering and panel discussion in Brisbane to encourage young people to volunteer, study and mentor in agricultural research;
- Media and stakeholder meeting assistance to international visitors including the Director General of Bioversity International and the Global Crop Diversity Trust; and
- Production and launch of videos to explain the Fund’s work with volunteers in agricultural development.

Congratulations are in order for:

- Hon Neil Andrew FTSE for his appointment as Chair of the Murray Darling Basin Authority; Dr Tony Gregson for his appointment to the ACIAR Commission;
- Dr Tony Fischer AM FTSE for his appointment as Chair the Independent Steering Committee of the WHEAT CGIAR

Research Program;

- Dr Kaye Basford FTSE for her appointment to the Board of the International Rice Research Institute; and
- Ms Cathy Reade, Crawford’s Public Affairs Director, for her appointment to the Board of the World Vegetable Centre.

In 2014-15 the Fund trained 338 people for a total of 2400 person days at an estimated total cost to the Fund of \$252,000 or just over \$100 a day per trainee. Another 60 people were trained through three Master Classes.

The Fund held a review of its Master Classes and Training, involving more than 50 agencies, companies and individuals, to ensure that reliance on core funding for Training and Master Classes became less ad hoc and more demand driven, to revitalise the program and to redefine the key challenges.

It recommended a focus in future Master Classes on market access and biosecurity including disease risk and management; water and soil management for sustainable intensification of agriculture; research management; and innovation systems and platforms including information technology and communication.

The review report was published in June and its recommendations were accepted by the Crawford Fund Board.



Bangladeshi trainees investigate weed control by herbicide application in field trial in WA.



The Fund supported a tree grower course in Uganda aimed at promoting the planting of trees on farms for conservation and profit.

THE FELLOWSHIP

Academy Fellows are Technology Leaders

ATSE's Fellows come from industry, universities, research institutes and government, representing excellence and achievement in the technological sciences and engineering. This breadth allows ATSE to provide input on key national issues with the broadest and deepest of perspectives. ATSE is well positioned to contribute to and guide the debate on innovation for the national prosperity.

The Academy is an independent organisation dedicated to driving technological change for a better Australia.

It was formally inaugurated in February 1976. The concept of an applied sciences academy had its origins in the late 1960s when the Australian Industrial Research Group (AIRG), an informal association of directors and managers of industrial research and development laboratories, appointed a small committee to study the proposal for such a body put forward by the late Dr W A S Butement, the former Chief Defence Scientist.

The Academy consists of more than 800 Australian men and women who are notable for their achievements in four areas of endeavour: Applied Physical Science and Technology; Applied Biological Science and Technology; Engineering; and Management, Development and Leadership.

Fellows are elected each year through a rigorous nomination process managed by the Academy's Membership Committee. The Fellowship covers many fields of endeavour – universities, research organisations, commerce, industry and government.

Many of our Fellows are recognised for their leadership and achievements. In 2014-15 these included:

AUSTRALIA DAY HONOURS 2015

Professor Jim Patrick AO FTSE, Senior Vice-President and Chief Scientist, Cochlear Limited, was honoured "for distinguished service to science through the development of cochlear implant technology, to biomedical research and engineering innovation, and to education and professional associations".

The late Professor John Freney AO FTSE, former Chief Research Scientist with the CSIRO Division of Plant Industry, was honoured "for distinguished service to conservation and the environment through research into greenhouse gas production, climate change and the efficient use of nitrogen fertiliser".

Dr Alexander Gosling AM FTSE, Principal Partner, Capstone Partners Pty Ltd, was honoured "for significant service to business, through innovative support for research and development, and to the community".

Mr Jim Hallion AM FTSE, Chief Executive, Department of the Premier and Cabinet, SA, was honoured "for significant service to public administration in South Australia particularly to transport infrastructure, energy and agriculture".

Professor Milton Hearn AM FTSE, Professor of Chemistry and Science Lead, Victorian Centre for Sustainable Chemical Manufacturing, Monash University, was honoured "for significant service to science through major contributions to advances in chemical engineering".

Mr Menno Henneveld AM FTSE, former Managing Director, Main Roads WA, was honoured "for significant service to engineering, particularly road transport infrastructure".

QUEEN'S BIRTHDAY HONOURS 2015

Professor John William Boldeman AO FTSE, was honoured "for distinguished service to nuclear science and technology, particularly through the design and construction of the Australian Synchrotron particle accelerator, and as a mentor of young scientists".

Mr Peter Stewartson Cockbain AM FTSE was honoured "for significant service to electrical engineering, particularly in the mining and energy sectors, and to professional organisations".

Ms Dianne Margaret Davidson AM FTSE, was honoured "for significant service to the wine making industry, to horticultural management science, and to higher education administration".

AWARDS AND APPOINTMENTS 2014-15

Professor Rose Amal FTSE, leader of the Particle and Catalysis Group in the UNSW School of Chemical Engineering, was awarded an Australian Laureate Fellowship and was again named as one of Australia's most influential engineers 2015 by Engineers Australia.

Mr Neil Andrew AO FTSE, former Chair of the Crawford Fund, was appointed Chair of the Murray Darling Basin Authority.

Former WA Chief Scientist **Professor Lyn Beazley AO FTSE**, was named Western Australia's 2015 Australian of the Year.

Professor John Beynon FTSE, Chair, Global Engineering Deans Council, was named as one of Australia's most influential engineers 2015 by Engineers Australia and awarded the Bessemer Gold Medal by the Institute of Materials, Minerals and Mining.

Professor Don Bursill AM FTSE completed his three-year term as South Australian Chief Scientist.

Professor Ashley Bush FTSE, from the Florey Institute of Neuroscience and Mental Health, won the 2014 Victoria Prize for Science & Innovation (life sciences).

Mr Michael Chaney AO FTSE, Chair of National Australia Bank and Woodside, was appointed to the Government's Commonwealth Science Council and to the government bilateral Australia-Germany Advisory Group.

Laureate Professor Emeritus Graeme Clark AC FRS FAA FTSE, Australia's bionic ear pioneer, was named a joint recipient of the 2015 Russ Prize, awarded by Ohio University and the US National Academy of Engineering.

Dr Megan Clark AC FTSE, former CEO of CSIRO, joined the Board of Rio Tinto.

Professor Michael Cowley FTSE, an internationally recognised physiologist, won the Inaugural Jacques Miller Medal.

Mr Peter Coleman FTSE, MD and CEO, Woodside, was appointed Chair of the Australia-Korea Foundation and was named as one of Australia's most influential engineers 2015 by Engineers Australia.

Ms Dianne Davidson FTSE was appointed a Director of the Board of the Plant Biosecurity Cooperative Research Centre (PBCRC).

Dr Elizabeth Dennis FAA FTSE won the 2014 Farrer Medal.

Dr Bronwyn Evans FTSE, CEO of Standards Australia, was awarded Engineers Australia's 2014 President's Prize and was named chair of the Government's Medical Technologies and Pharmaceuticals Growth Centre and was again named as one of Australia's most influential engineers 2015 by Engineers Australia.

Dr Bob Every AO FTSE, Chairman of Wesfarmers and Boral, was again named as one of Australia's most influential engineers 2015 by Engineers Australia.

Ms Kathryn Fagg FTSE, Director, Reserve Bank of Australia, delivered the 2014 Academy Oration and was named as one of Australia's most influential engineers 2015 by Engineers Australia.

Dr Alan Finkel AM FTSE, ATSE President and Monash University Chancellor, was again named as one of Australia's most influential engineers 2015 by Engineers Australia.

Dr Catherine Foley PSM FTSE, Chief, CSIRO Materials Science and Engineering, received an IEEE Council on Superconductivity Award, for continuing and significant contributions to the field of applied superconductivity (small scale applications) and won a 2015 Clunies Ross Award.

Professor Simon Foote FTSE was appointed Director of the John Curtin School of Medical Research at the Australian National University.

Scientia Professor Neil Foster FTSE, from the School of Chemical Engineering at the University of NSW, was elected to the European Academy of Sciences and Arts.

Professor Ian Frazer AC FAA FTSE, Chief Executive of the Translational Research Institute in Brisbane, was appointed to the Government's Commonwealth Science Council.

Ms Denise Goldsworthy FTSE was appointed as a Board member of Export Finance and Insurance Commission (EFIC).

Dr Tony Gregson AM FTSE, a Crawford Fund Director, was appointed to the Commission for International Agricultural Research.

Mr John Grill AO FTSE, Chair, John Grill Centre for Project Leadership, was appointed Chair of the Australian Government's Industry Growth Centres independent Advisory Committee.

Professor Jay Guo FTSE, Director, Global Big Data Technologies Centre at UTS, was named as one of Australia's most influential engineers 2015 by Engineers Australia.

Mr Jim Hallion AM FTSE, SA Coordinator-General, was named as one of Australia's most influential engineers 2015 by Engineers Australia.

Ms Kathy Hirschfeld FTSE, company director, was named as one of Australia's most influential engineers 2015 by Engineers Australia.

Professor Mark Hoffman FTSE, was appointed Dean of Engineering at The University of NSW.

Professor Buddhima Indraratna FTSE, of the University of Wollongong, a world-leading geotechnical expert on road and rail infrastructure, was awarded the Ralph Roscoe Proctor Award.

Professor Chennupati Jagadish FAA FTSE, from the Australian National University, was named as one of Australia's most influential engineers 2015 by Engineers Australia. He was awarded the 2015 IEEE Nanotechnology Council Pioneer Award in Nanotechnology.

Laureate Professor Graeme Jameson AO FEng FTSE, from the Centre for Multiphase Processes at the University of Newcastle, was elected a Foreign Member of the US National Academy of Engineering (NAE).

Mr Colin Jensen FTSE, CEO, Brisbane City Council, was named as one of Australia's most influential engineers 2015 by Engineers Australia.

Professor Archie Johnston FTSE, Dean of Engineering and IT, University of Sydney, was named as one of Australia's most influential engineers 2015 by Engineers Australia.

Dr Marlene Kanga AM FTSE, Chair, R&D Incentives Committee, was named as one of Australia's most influential engineers 2015 by Engineers Australia.

Mr David Knox FTSE, Chief Executive Officer and Managing Director of Santos Limited, was appointed to the Government's Commonwealth Science Council.

Professor Peter Lee FTSE, Vice Chancellor, University of Southern Cross, was again named as one of Australia's most influential engineers 2015 by Engineers Australia.

Mr Philip Laffer FTSE was named first Life Member of the Australian wine industry.

Dr Max Lay AM FTSE was awarded Engineers Australia's top award – the 2014 Peter Nicol Russell Medal.

Dr Andrew Liveris AO FTSE, Chair and CEO, Dow Chemical, was appointed to the Australian Government's Industry Growth Centres independent Advisory Committee and was again named as one of Australia's most influential engineers 2015 by Engineers Australia.

Ms Catherine Livingstone AO FTSE, Chair of Telstra, was appointed to the Government's Commonwealth Science Council and the Industry Growth Centres independent Advisory Committee.

Professor Nigel Lovell FTSE, Graduate School of Biomedical Engineering, UNSW, was named as one of Australia's most influential engineers 2015 by Engineers Australia.

Professor Max Lu FTSE, Provost and Senior VP, University of Queensland) was named as winner of the inaugural Education Category winner in the Australia-China Awards.

Professor Michael McLaughlin FTSE, a CSIRO Science Fellow and a Research Professor in Soil Science at the University of Adelaide, was named the 2015 IFA Norman Borlaug Award laureate.

Professor Iven Mareels FTSE, Dean, Melbourne School of Engineering, was named as one of Australian most influential engineers 2015 by Engineers Australia.

Dr Christopher Mallett FTSE, Vice President of R&D at Cargill Inc, was named a member of Board of Directors of the US Foundation for Food and Agricultural Research (FFAR).

Emeritus Professor Mike Miller AO FTSE was inducted into the Engineers Australia's South Australian Hall of Fame.

Professor Tanya Monro FAA FTSE was appointed Deputy Vice Chancellor Research and Innovation at the University of South Australia; named Chair of the National Youth Science Forum (NYSF) and appointed to the Government's Commonwealth Science Council.

Ms Susan Murphy FTSE was named as one of Australian most influential engineers 2015 by Engineers Australia.

Dr Mary O'Kane FTSE, NSW Chief Scientist and Engineer, won the 2014 Pearcey Medal and was again named as one of Australian most influential engineers 2015 by Engineers Australia.

Dr Adi Paterson FTSE, CEO, ANSTO, was again named as one of Australian most influential engineers 2015 by Engineers Australia.

Professor Jim Patrick AO FTSE, won a Clunies Ross Lifetime Achievement Award.

Professor Judy Raper FTSE, Deputy Vice Chancellor (Research), University of Wollongong, was again named as one of Australian most influential engineers 2015 by Engineers Australia.

Dr Leanna Read FTSE was appointed Chief Scientist for South Australia.

Professor Karen Reynolds FTSE, Director, Medical Devices Research Institute, Flinders University, was named as one of Australian most influential engineers 2015 by Engineers Australia.

Dr Chris Roberts FTSE, CEO, Cochlear, was again named as one of Australian most influential engineers 2015 by Engineers Australia.

Professor Alan Robson AO FTSE joined the WA Science Hall of Fame and was appointed to the new Higher Education Standards Panel which replaced the TEQSA Advisory Council.

Professor Veena Sahajwalla FTSE, Director of UNSW's Centre for Sustainable Materials Research and Technology, was awarded an Australian Laureate Fellowship and was named as one of Australian most influential engineers 2015 by Engineers Australia.

Dr Ron Sandland AM FTSE was appointed chair of the Technical Advisory Forum to review the Bureau of Meteorology's climate record.

Professor Graham Schaffer FTSE, was appointed the inaugural Pro Vice-Chancellor for the College of Science, Health and Engineering (SHE) at La Trobe University.

Mr David Singleton FTSE, Chair, Infrastructure Sustainability Council of Australia, was named as one of Australian most influential engineers 2015 by Engineers Australia.

Professor Stan Skafidas FTSE, Director, Centre for Neural Engineering, University of Melbourne, was named as one of Australian most influential engineers 2015 by Engineers Australia.

Professor Scott Sloan FTSE, Founding Director ARC Centre of Excellence for Geotechnical Science and Engineering, University of Newcastle, was named as one of Australian most influential engineers 2015 by Engineers Australia.

Mr Peter Watson FTSE was appointed to the Board of Infrastructure Australia.

Professor Richard Williams OBE FREng FTSE was been appointed Vice President of Royal Academy of Engineering and Principal and Vice-Chancellor of Edinburgh's Heriot-Watt University.

Professor Glenn Wightwick FTSE, Director, IBM Research – Australia and IBM Australia Chief Technologist, was appointed Deputy Vice-Chancellor, Research at the University of Technology Sydney (UTS).

Professor Ian Young AO FTSE, Vice Chancellor, ANU, was again named as one of Australian most influential engineers 2015 by Engineers Australia.

Professor Alex Zelinsky FTSE, Chief Defence Scientist and Head of DSTO, was awarded the 2015 M A Sargent Medal by the Electrical College of Engineers Australia and was again named as one of Australian most influential engineers 2015 by Engineers Australia.

VALE TO OUR FELLOWS 2014-2015

Mr Keith Alder AM FTSE died in Sydney on 22 September 2014, aged 93.

Dr Donald Brown AO FTSE died in Sydney on 23 October 2014, aged 90.

Emeritus Professor Keith Bullock FTSE died in Brisbane on 20 March 2015, aged 84.

Professor Gordon Dunlop FTSE died in Brisbane on 21 May 2015, aged 69.

Dr John Freney FTSE died in Canberra on 2 January 2015, aged 85.

Emeritus Professor Ron Huckstep CMG FTSE, died in Sydney on 10 April 2015, aged 88.

Dr Des Kelly AM FTSE died in Perth on 17 May 2015, aged 81.

Sir Brian Inglis AC FTSE died in Victoria on 24 September 2014, aged 90.

Mr Malcolm Kinnaird AC FTSE died in Adelaide on 25 September 2014, aged 80.

Dr Anthony Lawrance FTSE died in Sydney on 19 January 2015, aged 82.

Dr Gordon Long FTSE died in Melbourne on 5 July 2014, aged 77.

Mr Roderick Macdonald FTSE died in Melbourne on 16 October 2014, aged 91.

Professor Tony McMichael AO FTSE died in Canberra on 26 September 2014, aged 71.

Dr Kathleen Makinson AM FTSE died in Sydney on 16 September 2014, aged 97.

Professor Mike Raupach FAA FTSE died in Canberra on 10 February 2015, aged 64.

Mr Mark Rayner FTSE died in Melbourne on 30 May 2015, aged 77.

Emeritus Professor Ian Ritchie AO FTSE died in Perth on 12 August 2014 aged 78.

Dr Graham Russell FTSE died in Brisbane on 29 July 2014, aged 77.

Mr Stan Schaezel FTSE died in Sydney on 21 March 2015, aged 90.

Emeritus Professor John Swan AO FTSE died in Melbourne on 15 June 2015, aged 91.

Key People

The Academy operates through its key Fellow bodies and a small Executive Office. The key bodies through which Fellows act to achieve the Academy's mission are the Assembly, which meets twice a year to set the targets for the Academy; the Board, which takes responsibility for the operational policy to meet these targets; and the Divisions and Forums, which assist the Assembly, Board and Executive Office to deliver the Academy's programs.

Key Academy people are: THE ASSEMBLY 2015-16 (AT PUBLICATION)

Dr Alan Finkel AO FTSE, President and Chair

Professor Mark Bush FTSE, Deputy Chair

Professor Kaye Basford, Chair,
International Strategic Leadership Group

Dr David Cook FTSE, Director

Professor Bogdan Dlugogorski FTSE,
WA Division

Ms Kathryn Fagg FTSE, Chair,
Industry and Innovation Forum

Dr Bruce Godfrey FTSE, Chair, Energy Forum

Ms Denise Goldsworthy FTSE, Chair,
Minerals Resources Forum

Dr Alexander Gosling AM FTSE, Chair,
Victorian Division

Mr John Grace, Chair, Clunies Ross
Awards Committee

Dr Margaret Hartley FTSE, CEO

Dr Richard Hannink FTSE, Victorian Division

Dr Carmel Hillyard FTSE, Chair,
Queensland Division

Professor Ross Large FTSE, Chair,
Tasmanian Division

Professor Jocelyn McPhie FTSE,
Tasmanian Division

Professor Alison Ord FTSE, Chair, WA Division

Dr John Radcliffe AM FTSE, SA Division

Professor Timothy Reeves FTSE, Chair,
Agriculture Forum

Professor Karen Reynolds FTSE, Chair,
Health Technology Forum

Professor John Richards AM FTSE, Chair,
ACT Division

Dr Richard Sheldrake AM FTSE, Chair,
NSW Division

Mr David Singleton FTSE, Chair,
Infrastructure Forum

Dr John Soderbaum FTSE, ACT Division

Dr Brian Spies FTSE, NSW Division

Dr Lorraine Stephenson FTSE,
Queensland Division

Professor Doreen Thomas FTSE, Chair,
Education Forum

Dr Mark Toner FTSE, Chair, Gender
Equity Working Group

Dr Meera Verma FTSE, Chair, SA Division

Dr John Williams FTSE, Chair, Water Forum

DIVISIONAL SECRETARIES 2015-16 (AT PUBLICATION)

ACT

Dr Danny Llewellyn FTSE
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SA

Dr John Radcliffe AM FTSE
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Tasmania

Professor Jocelyn McPhie FTSE
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Victoria

Dr Ian Sare FTSE
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WA

Em Professor Lesley Parker AM FTSE
l.parker@curtin.edu.au

ACADEMY STAFF 2015 (AT PUBLICATION)

Dr Margaret Hartley FTSE

Chief Executive Officer

Mr Bill Mackey

Deputy CEO/ Executive Director Communications

Dr Matt Wenham

Executive Manager Policy and Projects

Ms Sue Wickham

Executive Manager Operations and Events

Mr Peter Pentland

Executive Manager Schools Program

Dr Mark Bradley

Manager International Innovation Programs

Mrs Lynn Pagoda

Company Secretary and Governance Manager

Ms Jane Crappsley

Digital Manager

Dr Andy Hastings

Senior Research and Policy Officer

Dr Carolyn O'Brien

Senior International Relations and Policy Officer

Mr Dan Raftopolous

Research and Policy Officer

Dr Milla Mihailova

Research and Policy Officer

Ms Robyn Lawford

Administration and Division Support Officer

(parental leave cover for Ms Sarah Madderson)

Ms Maria Pridham

Finance Officer

Mrs Elvira Copur

Membership and STELR Administration Officer

Ms Katje Krönke

Events Coordinator

THE ATSE BOARD

Leading the Academy Activities

ATSE Directors at 30 June 2015 were:



Professor Kaye Basford FTSE

Professor Basford is Professor of Biometry at the University of Queensland (UQ) and her research leadership and impact is at the interface between statistics, quantitative genetics and plant breeding, with a focus on building strong and influential partnerships.

She was previously President of UQ's Academic Board (2012-14) and Head of the School of Land, Crop and Food Sciences (2001-10). As President of the Board, she was a member of UQ Senate, the governing body of that institution.

Currently, Professor Basford is a member of the Board of Trustees of the International Rice Research Institute, the Grains Research Foundation Limited, Union College and the Crawford Fund. She has been President of the International Biometric Society and the Statistical Society of Australia Incorporated.

These various roles have enabled her to gain extensive experience in governance and strategic planning. She currently chairs the ATSE international strategy group.



Professor Hugh Bradlow FTSE

Professor Bradlow is Chief Scientist at Telstra Corporation in which capacity he acts as advisor to the CEO and the Board and other parts of the business on longer-term technology directions and technology disruption. Prior to becoming Chief Scientist he was Chief Technology Officer and Head of Innovation, responsible for investigating the future technologies that will impact Telstra's business.

Before joining Telstra in September 1995, Professor Bradlow was Professor of Computer Engineering at the University of Wollongong in Australia and Professor of Electrical Engineering (Digital Systems) at the University of Cape Town.

Professor Bradlow is a graduate in electrical engineering from the University of Cape Town in 1973 and received the DPhil degree for research in experimental nuclear physics from the University of Oxford. He is an Emeritus Professor of the University of Wollongong, a Professorial Fellow of the University of Melbourne, and a recipient of a Centenary Medal from the Commonwealth of Australia. He was elected as the joint 2009 Australian Telecommunications Ambassador of the Year. He was listed in the 2010 Global Telecom Business Power 100 rankings and was named by Smart Company as one of the 12 most influential people in Australian ICT.



Dr David Cook FTSE

Dr Cook lives in Sydney and holds a BE (Hons) from the University of Western Australia and MSc, PhD from the University of Calgary. He became a Fellow in 1990.

Dr Cook was a faculty member of the School of Civil Engineering, University of New South Wales, first Executive Director of the National Building Technology Centre and Executive Director of the Australian Nuclear Science and Technology Organisation from 1988 – 1994. He then served in various senior management positions for Boral Limited until 2004.

He is a Member of the Industry Advisory Network in the Faculty of Engineering and Information Technology at the University of Technology, Sydney.

Dr Cook has been a Member of the New South Wales Division Committee since 2006 and was Chair from 2010-2014. He is currently Vice President, Membership and has served on the Membership Committee since 2012.



Dr Alan Finkel AO FTSE

Dr Finkel is an engineer, entrepreneur and philanthropist and has served as Chancellor of Monash University since January 2008.

Dr Finkel received his Bachelor of Engineering in 1976 and Doctorate in Electrical Engineering from Monash University in 1981, following which he served for two years as a neuroscience research fellow at the John Curtin School of Medical Research, located at the Australian National University.

For three years until 2012 Dr Finkel was involved in the provision of low-emissions electricity to operate electric vehicles.

Previously, for 25 years Dr Finkel ran Axon Instruments, an American company that made electronic instruments used by pharmaceutical companies in the discovery of new medicines.

Between running Axon Instruments and joining Better Place Australia, Dr Finkel established two magazines. The first, Cosmos magazine, promotes science awareness and the second, G magazine, promotes environmental sustainability.

Dr Finkel has a passionate interest in education. He established the Australian Course in Advanced Neuroscience to provide advanced training to young scientists. He also established a secondary school science program named STELR, administered by ATSE, which is currently running in nearly 300 secondary schools around Australia.

Dr Finkel currently serves as the Chairman of the Australian Centre of Excellence for All-Sky Astrophysics, a research consortium that is preparing to analyse the data from the world's largest radio telescope that will be built by the end of this decade.



Professor Peter Gray FTSE

Professor Peter Gray was appointed in 2003 as the inaugural Director of the Australian Institute of Bioengineering and Nanotechnology (AIBN) at the University of Queensland.

Prior to joining AIBN, he was Professor of Biotechnology and Director of the Bioengineering Centre at the University of New South Wales, and Senior Principal Research Fellow at the Garvan Institute of Medical Research in Sydney. He has held academic positions at University College London, and at the University of California, Berkeley and has had commercial experience in the USA working for Eli Lilly and Co and the Cetus Corporation.

Professor Gray is a founder and a past President of the Australian Biotechnology Association (AusBiotech). He serves on the Boards of Biopharmaceuticals Australia Pty Ltd, ACYTE Biotechnology Pty Ltd, the Advanced Water Management Centre, the Diamantina Institute for Cancer, Immunology and Metabolic Medicine, Engineering Conferences International (ECI) Inc, New York, and on a number of State and Federal Government committees in the fields of biotechnology, pharmaceuticals and education.

Professor Gray is an active researcher who has published and patented widely in the fields of bioengineering, the production of biopharmaceuticals and stem cell technology.



Dr Paul Greenfield AO FTSE

Professor Greenfield is a former Chair of the Australian Nuclear Science & Technology Organisation (ANSTO). He chairs the International Water Centre, a joint venture between two universities, and the International Energy Centre, a joint venture between three universities and Xstrata Coal.

He has a Bachelor degree with Honours and a PhD in Chemical Engineering from the University of New South Wales and a Bachelor of Economics from The University of Queensland. Awarded the Chemeca Medal in 1995, he is a Fellow of the Institution of Chemical Engineers, UK and an Honorary Fellow of the Institution of Engineers, Australia.

Dr. Greenfield worked at The University of Queensland from 1975-2011. Initially a Lecturer in Chemical Engineering, he held the roles of Deputy Vice Chancellor (Research) and Senior Deputy Vice Chancellor and Provost from the mid 1990's until 2008. He was Vice Chancellor from 2008 -2011.

Dr. Greenfield has extensive experience as a Director and is currently a Director on a number of company boards. He has worked widely with industry on a range of projects spanning the biotechnology, water and energy sectors.

He currently holds positions on the boards of Healthy Waterways Ltd and the Great Barrier Reef Foundation as well as chairing two expert panels, one on Hazardous Wastes and one on water related issues in CSG extraction.



Dr Margaret Hartley FTSE

Dr Hartley lives in Melbourne and holds a degree in Applied Science (RMIT) and a PhD (Monash University). She joined the Academy as Chief Executive Officer in 2009.

Dr Hartley was previously the Principal Scientific Advisor to the Australian Government Department of Health and Ageing and the Director of the Office of Chemical Safety. She led the Department's human health risk assessment of pesticides and chemicals as well as regulatory policy and environmental health policy. She oversaw regulatory compliance activities for the licit use of narcotics, other controlled substances, antibiotics and drugs in sports and advised the Commonwealth on chemical security issues.

Dr Hartley was Australia's Industrial Chemical Regulator from 1997-2006, responsible for leading and managing the regulation of chemicals and cosmetics and promoting safe and sustainable use of industrial chemicals. As CEO she oversaw governance, financial, and all performance aspects of the business. She oversaw the implementation of best practice regulatory reform within the chemicals sector and led the development of a Community Charter for chemicals regulation and safe use.

Dr Hartley is a respected national and international leader in regulatory policy and science with wide experience in leading and managing Australia's chemical regulatory policy framework. She has overseen human health and safety and environmental protection aspects of chemical safety. She has led international harmonisation efforts in risk assessment methodology via OECD and WHO programs.

Dr Hartley formerly held positions in pharmacology and epidemiology at Monash University and the ANU.



Professor Tanya Monro FAA FTSE

Professor Tanya Monro is Deputy Vice Chancellor Research and Innovation and an ARC Georgina Sweet Laureate Fellow at the University of South Australia. She was the inaugural Director of the Institute for Photonics and Advanced Sensing (IPAS) from 2008 to 2014 and was also the inaugural Director for the ARC Centre of Excellence for Nanoscale BioPhotonics (CNBP) at the University of Adelaide.

She is a member of the Prime Minister's Commonwealth Science Council (CSC), the AAS National Committee for Physics, South Australian Economic Development Board and a member of South Australia's Riverbank Authority. She is Chair of the Council of the National Youth Science Forum (NYSF) and is also an inaugural Bragg Fellow of the Royal Institution of Australia (RiAus).

Professor Monro was awarded a 2015 Eureka Prize for Excellence in Interdisciplinary Scientific Research, the 2014 Beattie Steel Medal of the Australian Optical Society and the 2012 Australian Academy of Sciences' Pawsey Medal. In 2011, she was named South Australia's "Australian of the Year" and the Scopus Young Researcher of the Year. In 2010, she became South Australian Scientist of the Year and Telstra Business Women of the Year (in the Community and Government category). In 2008, she won the Prime Minister's Malcolm McIntosh Prize for Physical Scientist of the Year.

In 2000, she received a Royal Society University Research Fellowship at the Optoelectronics Research Centre at the University of Southampton in the UK. She came to the University of Adelaide in 2005 as inaugural Chair of Photonics.



Dr Susan Pond AM FTSE

Dr Pond lives in Sydney and holds a MBBS (Hons1) from the University of Sydney, MD from the University of New South Wales and DSc from the University of Queensland. She became a Fellow in 1996 and joined the ATSE Board in June 2010.

Dr Pond has a distinguished record in medicine, science and the biotechnology industry. From 1997-2009, she was Director of Pharmaceutical Research for six years and then Chairman and Managing Director of Johnson & Johnson Research Pty Ltd. In these roles, Dr Pond led the research and development of transformational diagnostic and therapeutic products and created strong alliances with research institutions, innovation networks, start-ups and established companies. She served as Chairman of AusBiotech Ltd for three years until 2008.

In her current position at the United States Study Centre at the University of Sydney, Dr Pond is Interim Chief Operating Officer and Adjunct Professor in Sustainability. Her interests include the nature and cost-effectiveness of technologies, systems and public policies to achieve sustainable transport, particularly for sectors with critical needs, such as aviation. She is also on the Boards of Biotron Ltd, Australian Institute for Bioengineering and Nanotechnology, and Engineering Sydney and Physics Foundation at the University of Sydney.



Professor Karen Reynolds FTSE

Professor Reynolds is Director of the Medical Device Research Institute (MDRI) and the Medical Device Partnering Program (MDPP) as well as Deputy Dean of the School of Computer Science, Engineering and Mathematics at Flinders University. Bridging the divide between research and industry, she is considered as one of Australia's leading researchers in biomedical engineering.

Professor Reynolds is Immediate Past Chair of the College of Biomedical Engineers within Engineers Australia, Chair of the Academy's Health Technology Forum and member of the South Australian Science Council.

In recognition of her significant contributions, she was named South Australian Scientist of the Year 2012, and awarded Australian Professional Engineer of the Year 2010. In 2015, 2013 and 2012, she was named by Engineers Australia as one of Australia's 'Top 100 Most Influential Engineers', and in 2014 she received the Medical Technology Association of Australia's Outstanding Achievement award.



The ATSE Board – from left (front) Dr Susan Pond, Dr Alan Finkel, Dr Margaret Hartley (back) Professor Hugh Bradlow, Professor Karen Reynolds, Dr David Cook, Professor Kaye Basford. Missing are Professor Peter Gray, Professor Paul Greenfield and Professor Tanya Monro.

2014-15 Financial Summary

Australian Academy of Technological Sciences
and Engineering Limited
ABN 58 008 520 394

Principal Objectives

The long-term objective of the Academy is to promote in Australia the application of scientific and engineering knowledge to practical purposes. The activities of the Academy during the financial year were directed towards our key strategy of enhancing Australia's prosperity through technical innovation. In particular, the Academy:

- provided evidence-based advice on a range of technology and innovation policy issues to governments, industry and the community;
- provided a forum for debate and policy formulation on important national issues;
- undertook projects on matters of major national significance;
- fostered and recognised excellence in technological sciences and engineering;
- used its international linkages to provide access to expertise from around the world;
- conducted a program in some 460 Australian secondary schools to promote the relevance of science and technology and a more scientifically literate society; and
- provided training and other activities to promote agricultural research in Australia and sustainable improvement in agriculture in developing countries.

Principal Activities

The principal activities included governance and strategy (Learned Body), Technical Projects, International Linkages, Schools education programs – STELR (Science and Technology Education Leveraging Relevance) national program and the Queensland Wonder of Science program, Clunies Ross Awards events and the Crawford Fund Limited. Each engaged in significant activities and contributed to positive outcomes during the year.

During the year the Academy continued to operate Topic Forums in key policy areas of Agriculture, Education, Energy, Health Technology, Industry and Innovation, Infrastructure, Mineral Resources and Water. The Academy published seven Position Statements (Health Technology; Industry and Innovation; International Engagement; Water and Mineral Resources) and seven Action Statements (Health Technology and Energy), as well as a major report on Resource Recovery from Wastewater.

The Academy also operated substantial programs in states and territories through its seven State and Territory Divisions. It contributed 18 formal submissions to a variety of government inquiries.

Through its science education program, STELR, the Academy has interfaced with some 54,500 secondary school students at various year levels. We trained 145 secondary science teachers and 15 laboratory technicians in Australia and 25 teachers in New Zealand. We also ran a one-day workshop for 50 teacher trainers from the Asia - Pacific region. New Zealand teachers ran a workshop on STELR at the New Zealand Conference of Science teachers. ATSE staff ran workshops at state-based and national science teacher conferences interacting with over 100 additional teachers and laboratory technicians. QITEP (the SEAMEO Regional Centre for Quality Improvement of Teachers and Educational Personnel in Science, Indonesia) is working on resources to include in the iSME module on sustainable housing.

The Academy conducts assessment of the impact of its activities to measure their contributions to the achievement of its objectives. The directors are satisfied that all of its activities are contributing satisfactorily, either directly or indirectly, to the Academy's goals and objectives.

There has been no significant change in the principal activities of the Academy from the prior year.

Operating Result

The operating result for the consolidated group (ATSE and Crawford Fund Ltd) showed total revenue of \$6,502,744 compared to total revenue for the previous year of \$7,260,964. This represents a 10 per cent reduction in revenue overall mainly within ATSE and reflects the tight fiscal environment with respect to sponsorships and donations in 2014/15.

The total surplus for the consolidated group of \$506,928 represents an increase of 15.1 per cent compared to the previous year. The operating surplus represents some 7.8 per cent of revenue. The net asset financial position in financial year 2015 is very strong with gross assets of \$14.6 million and liabilities of \$5.28 million (or 36 per cent of assets) and indicates a financially viable group.

The assets to current liabilities ratio is 2.8 (a healthy financial position is reflected in a ratio greater than 1.0). The valuation on investments increased by \$304,904 (four per cent) from the previous year with the consolidated group's investments valued at \$7,506,965 at the end of the 2015 financial year.

2014-15 Donations

The Academy received donations during the year totalling \$163,743.

DONORS: The Academy gratefully acknowledges our generous donors:

Individuals

Professor R R Bitmead FTSE
 Dr John Black FTSE
 Prof Yi-Bing Cheng FTSE
 Dr Doreen Clark AM FTSE
 Dr G J Clark FTSE
 Dr David Cook FTSE
 Mr K P E Daniel FTSE
 Dr I E Galbally FTSE
 Dr R H J Hannink FTSE
 Dr Margaret Hartley FTSE
 Professor Milton Hearn AM FTSE
 Dr Edward Henzell AO FTSE
 Dr B S Hickman FTSE
 Peggy Horn
 Dr Peter Jones FTSE
 Mr Richard Kell AM FTSE
 Dr Geoffrey Knights AM FTSE
 Mr Philip Laffer AM FTSE
 Mr John Laurie AC FTSE
 Mr Peter Laver AM FTSE
 Professor T A McMeekin FTSE
 Sir Rupert Myers KBE AO FAA FTSE
 Dr John Nutt AM FTSE
 Professor Alison Ord FTSE
 Professor Allan Paull FTSE
 Em Professor I J Polmear AO FTSE
 Professor I C Potter FTSE
 Dr A Radford
 Em Professor C W Rose FTSE
 Professor Richard Simpson FTSE
 Dr N Smith FTSE
 Dr Geoffrey Vaughan AO FTSE
 Dr D N Wade AM FTSE
 Dr P Wood
 Professor Alex Zelinsky FTSE
 Dr John Zillman AO FAA FTSE

Corporate

Bechtel Australia
 Bremer & Co
 Commonwealth Bank
 Orica Limited

Philanthropic

Alan & Elizabeth Finkel Foundation
 Bechtel Foundation
 Cochlear Foundation Limited
 Farrell Family Foundation
 The Sun Foundation Pty Ltd
 Vonwiller Foundation

Statement of Profit or Loss and other Comprehensive Income

For the Year Ended 30 June 2015

Australian Academy of Technological Sciences and Engineering Limited
ABN 58 008 520 394

	Consolidated Group		Parent Entity	
	2015	2014	2015	2014
	\$	\$	\$	\$
Revenue	6,502,744	7,260,964	4,920,889	5,672,345
Expenses				
Learned Fund	(1,655,239)	(2,226,866)	(1,655,239)	(2,226,866)
Endowment Fund	(329,108)	(370,118)	(329,108)	(370,118)
Technical Projects	(390,951)	(538,351)	(390,951)	(538,351)
International Science and Technology	(768,611)	(1,186,651)	(768,611)	(1,186,651)
STELR	(748,112)	(595,884)	(748,112)	(595,884)
ATSE Clunies Ross	(594,706)	(362,745)	(594,706)	(362,745)
Crawford Fund Limited	(1,581,855)	(1,549,767)	-	-
	(5,995,816)	(6,830,382)	(4,486,727)	(5,280,615)
Surplus for the year	506,928	430,582	434,162	391,730
Other comprehensive income				
Items that may be reclassified subsequently to profit or loss:				
Fair value gain/(loss) on available-for-sale financial assets	(100,762)	146,267	(100,762)	146,267
Other comprehensive income for the year	(100,762)	146,267	(100,762)	146,267
Total comprehensive income for the year	406,166	576,849	333,400	537,997

Statement of Financial Position

As at 30 June 2015

Australian Academy of Technological Sciences and Engineering Limited
ABN 58 008 520 394

	Consolidated Group		Parent Entity	
	2015	2014	2015	2014
	\$	\$	\$	\$
Assets				
Current Assets				
Cash and cash equivalents	5,502,357	3,407,554	4,638,651	2,685,489
Trade and other receivables	1,047,269	398,803	997,487	303,513
Financial assets	40,344	40,344	-	-
Other assets	143,322	91,305	77,323	34,856
Total Current Assets	6,733,292	3,938,006	5,713,461	3,023,858
Non-current Assets				
Financial assets	7,506,965	7,202,061	7,506,965	7,202,061
Plant and equipment	148,980	117,582	127,490	97,268
Intangible assets	214,606	236,572	214,606	236,572
Total Non-current Assets	7,870,551	7,556,215	7,849,061	7,535,901
Total Assets	14,603,843	11,494,221	13,562,522	10,559,759
Liabilities				
Current Liabilities				
Trade and other payables	4,919,279	2,261,561	4,708,679	2,068,786
Provisions	293,904	255,953	267,097	238,308
Total Current Liabilities	5,213,183	2,517,514	4,975,776	2,307,094
Non-Current Liabilities				
Provisions	64,673	56,886	38,223	37,542
Total Non-Current Liabilities	64,673	56,886	38,223	37,542
Total Liabilities	5,277,856	2,574,400	5,013,999	2,344,636
Net Assets	9,325,987	8,919,821	8,548,523	8,215,123
Equity				
Reserves	395,763	496,525	395,763	496,525
Retained surplus	8,930,224	8,423,296	8,152,760	7,718,598
Total Equity	9,325,987	8,919,821	8,548,523	8,215,123

Statement of Changes In Equity

For the Year Ended 30 June 2015

Australian Academy of Technological Sciences and Engineering Limited
ABN 58 008 520 394

	Retained Surplus	Financial Assets Reserve	Total
	\$	\$	\$
Consolidated Group			
Balance at 1 July 2013	7,992,714	350,258	8,342,972
Comprehensive income			
Surplus for the year	430,582	-	430,582
Other comprehensive income for the year: net fair value gains on available-for-sale financial assets	-	146,267	146,267
Total comprehensive income for the year	430,582	146,267	576,849
Balance at 30 June 2014	8,423,296	496,525	8,919,821
Balance at 1 July 2014			
Balance at 1 July 2014	8,423,296	496,525	8,919,821
Comprehensive income			
Surplus for the year	506,928	-	506,928
Other comprehensive income for the year: net fair value gains on available-for-sale financial assets		(100,762)	(100,762)
Total comprehensive income for the year	506,928	(100,762)	406,166
Balance at 30 June 2015	8,930,224	395,763	9,325,987
Parent Entity			
Balance at 1 July 2013	7,326,868	350,258	7,677,126
Comprehensive income			
Surplus for the year	391,730	-	391,730
Other comprehensive income for the year: net fair value gains on available-for-sale financial assets	-	146,267	146,267
Total comprehensive income for the year	391,730	146,267	537,997
Balance at 30 June 2014	7,718,598	496,525	8,215,123
Balance at 1 July 2014			
Balance at 1 July 2014	7,718,598	496,525	8,215,123
Comprehensive income			
Surplus for the year	434,162	-	434,162
Other comprehensive income for the year: net fair value gains on available-for-sale financial assets		(100,762)	(100,762)
Total comprehensive income for the year	434,162	(100,762)	333,400
Balance at 30 June 2015	8,152,760	395,763	8,548,523

Statement Of Cash Flows

For the Year Ended 30 June 2015

Australian Academy of Technological Sciences and Engineering Limited
ABN 58 008 520 394

	Consolidated Group		Parent Entity	
	2015	2014	2015	2014
	\$	\$	\$	\$
Cash Flows from Operating Activities				
Receipts of grants	5,129,697	3,816,277	3,855,452	2,534,713
Interest and investment income	918,672	854,887	877,215	806,451
Other receipts	2,191,788	2,419,803	1,892,158	2,136,548
Payments to suppliers and employees	(5,600,618)	(6,883,437)	(4,134,639)	(5,254,919)
Net cash provided by operating activities	2,639,539	207,530	2,490,186	222,793
Cash Flows from Investing Activities				
Payment for plant and equipment and intangible assets	(139,070)	(152,211)	(131,358)	(140,275)
Proceeds from/(payment for) other financial assets	(405,666)	99,072	(405,666)	(403,985)
Net cash used in investing activities	(544,736)	(53,139)	(537,024)	(544,260)
Net increase/(decrease) in cash held	2,094,803	154,391	1,953,162	(321,467)
Cash and cash equivalents at the beginning of the financial year	3,407,554	3,253,163	2,685,489	3,006,956
Cash and cash equivalents at the end of the financial year	5,502,357	3,407,554	4,638,651	2,685,489



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