



Annual Review

2015-16

INCORPORATING ABRIDGED
AUDITED ACCOUNTS

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The Australian Academy of Technology and Engineering is the business name of Australian the Academy of Technological Sciences and Engineering (company name). The acronym ATSE is used for both.

Annual Review 2016

The full Audited Accounts of the Academy of Technological Sciences and Engineering for 2015-16 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 of the Academy of Technological Sciences and Engineering for 2015-16 will be presented to the Annual General Meeting on 25 November 2016 at the Intercontinental Melbourne The Rialto, 495 Collins Street, Melbourne.

This Annual Review contains Abridged Audited Accounts of the Academy of Technological Sciences and Engineering for 2015-16.

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Productivity and prosperity through technology, innovation and collaboration

It has been a great privilege to lead the Academy during an exciting period in the first half of 2016, following Dr Alan Finkel's appointment as Australia's Chief Scientist, and to have Professor Hugh Bradlow succeed me later this year. We achieved much in the period during which the announcement of the \$1.1 billion National Innovation and Science Agenda (NISA) indicated the Federal Government's commitment to boosting science, research and innovation in Australia and recognising that our continued prosperity as a nation will require us to be a knowledge economy. The NISA announcement had much for Australia's scientists, engineers and innovators to be pleased about, and provided encouragement for ATSE to continue its engagement with the Government at various levels to ensure the ambitious NISA agenda can be fully realised.

Several key issues and initiatives flowed from the NISA and enhanced ATSE's position in helping form attitudes and shape policy in key technology areas for Australia. One was the introduction of impact and engagement measures for university research, built on the existing work by ATSE on Research Engagement for Australia (REA). ATSE is already engaged with the Australian Research Council (ARC) and Department of Education and Training on the development of these measures. Another was confirmed funding over 10 years for the National Collaborative Research Infrastructure Strategy (NCRIS), following on from the Research Alliance campaign around NCRIS and the Research Infrastructure Review, in which ATSE participated strongly.

A third was Global Innovation Strategy, including funding to expand programs such as CAESIE (Connecting Australian-European Science and Innovation Excellence) to foster collaboration between SMEs and researchers in Australia and overseas. ATSE manages the Global Connections Fund for the government and launched the first call for Priming Grants in May, drawing a very strong response. Equally important was the NISA Funding to expand the pilot of the Science in Australia Gender Equity (SAGE) program, jointly run by ATSE and the Academy of Science, which aims to enhance gender equity in Australia's academic and research institutions. It was a fillip to ATSE's strong endeavours to boost gender equity in the Academy and more generally across the broad science and technology communities.

ATSE was pleased to note that many of its consistent recommendations were recognised in the NISA announcement, including those on research and pilot project funding, fast-tracking of ARC Linkage grants and expanded funding for the rebadged Innovation Connections program. ATSE also played its part in the commentary that flowed in response to Infrastructure Australia's announcement of the nation's first 15-year Infrastructure Plan and a reinvigorated Infrastructure Priority List. We again emphasised

that major reforms were needed to improve the way Australia plans, finances, constructs, maintains and operates infrastructure to ensure it can underpin gains in productivity and contribute to economic growth. A key priority identified in ATSE's submission to the 2015 Australian Infrastructure Audit, which informed the new Infrastructure Plan, was the need to commit to robust long-term infrastructure planning.

The Academy also took a leading role in energy issues. It conducted a major conference on unconventional gas in Sydney with leading international and national speakers and also made a submission to the Senate Select Committee on Unconventional Gas Mining and contributed to inquiries into unconventional gas in Victoria and the Northern Territory. It also played a strong role in the South Australian Nuclear Royal Commission, making a submission and holding facilitation discussions with the Commission.

ATSE produced a major report *Wastewater – An Untapped Resource?* – which identified barriers to commercial success, discussed industry opportunities for wastewater resource recovery in Australia and considered ways to realise these opportunities. It maintained focus on climate change consequences and mitigation with its NSW Division launching a climate change lunch series.

It was a delight to see two women among the three winners of the 2016 Clunies Ross Awards, presented at our inaugural Innovation Dinner in Sydney. This was a key part of the National Technology Challenge Dialogue – *Agribusiness 2030* – which was attended by some 150 industry experts and observers. The Dialogue was an outstanding success and had massive media pick-up which helped position ATSE as a go-to organisation in Australia for considered and effective thought and advice on the future of our national agribusiness industries. At the same time we conducted a strong international engagement program – focused on Europe and Asia – and played a strong role in the operations of the International Council of Academies of Engineering and Technological Sciences (CAETS).

At home, our Divisions, Forums, Working Groups and Committees contributed strongly to ATSE's positioning at the heart of technology policy in Australia. None of this would have been possible without the knowledge, energy and generosity of our Fellows and the dedicated and professional support of the ATSE Office.

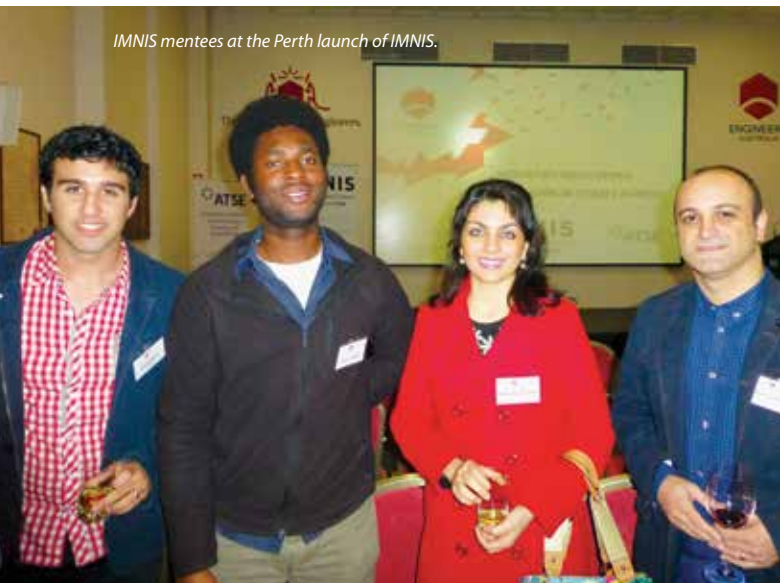


PROFESSOR PETER GRAY FTSE
President

CEO'S REVIEW

Influencing the innovation agenda

Over 2015-16 ATSE Fellows collectively made a significant contribution to evidence-based policy advice and innovation thinking to support the research, science and innovation system in Australia.



The Academy was active in identifying priority issues such as enhanced STEM education, a robust and well-resourced research sector with world-class infrastructure, better researcher-industry engagement and collaboration, new pathways for industry innovation and international engagement.

Our efforts were largely directed to supporting decision makers and policy formulation in addressing Australia's competitive advantage through advocating for technology and innovation led productivity and prosperity. We were able to do this by undertaking major reports, research synthesis and submissions to government on key national science, technology and innovation issues.

A further strength has been that we have engaged across many sectors under our National Technology Challenges (NTCs) – all with a focus of promoting prosperity and growth through knowledge translation and technology innovation.

In this respect, ATSE was greatly encouraged by the National Innovation and Science Agenda (NISA) released in December 2015 by the Government. The Agenda provided a platform approach to support innovation policy and activity across the science, research and industry sectors.

Many elements within the NISA directly reflect the Position and Actions Statements developed by ATSE via our Forums and Working Groups supporting the seven National Technology Challenge sectors of Energy, Education, Agriculture, Health Technology, Infrastructure, Industry and Innovation, Natural Resources (Water, Mining and Minerals) – as well as via international engagement strategies.

We delivered high-quality influential reports, advice and technical analysis and raised awareness via dialogues, symposia, workshops and public lectures and presentations.

The table and chart summarise some of these activities.

ATSE activities were impactful in a number of important areas, including:

- **Boosting researcher-industry engagement and ultimately research translation into commercialisation outcomes for Australia through:**
 - leading on metric development for measuring researcher-industry engagement;

- developing and implementing early stage engagement grants (Priming Grants) and early stage commercialisation grants (Bridging Grants) under the NISA- funded Global Connections Fund; and
- establishing pilot program of industry mentoring for PhD students from biotechnology, engineering and Mining fields via the IMNIS program (Industry Mentoring Network in STEM).
- Partnering with AAS to deliver the SAGE Gender Equity pilot initiative now being trialled in 40 institutions including universities, research institutes and government research organisations;
- Introducing the ATSE annual Innovation Dinner where our prestigious Clunies Ross Awards are presented;
- Building our schools STEM project STELR – Science and Technology Education Leveraging Relevance – so that it now operates in more than 500 schools with more than 70,000 students engaged nationally. STELR is making an impact with enrolments in senior science increasing in STELR schools, and more students learning the real world relevance of science to their lives;
- Staging two NTC Dialogues – *Unconventional Gas and Agribusiness 2030*. These followed a new model for ATSE and focused on promoting the role of technology as well as societal issues in achieving industry innovation and productivity and global competitiveness;
- Running a series of lectures and workshops around the country and Parliamentary Science and Technology Briefing programs run with NSW, SA and Victorian parliaments.

The Academy benefited in its activities by working to enhance the engagement of all the Fellows as well as effective engagement with governments, industry, the research sector and by our determination to improve gender equity outcomes both within the Academy as well as more broadly in the science and technology and engineering sectors.

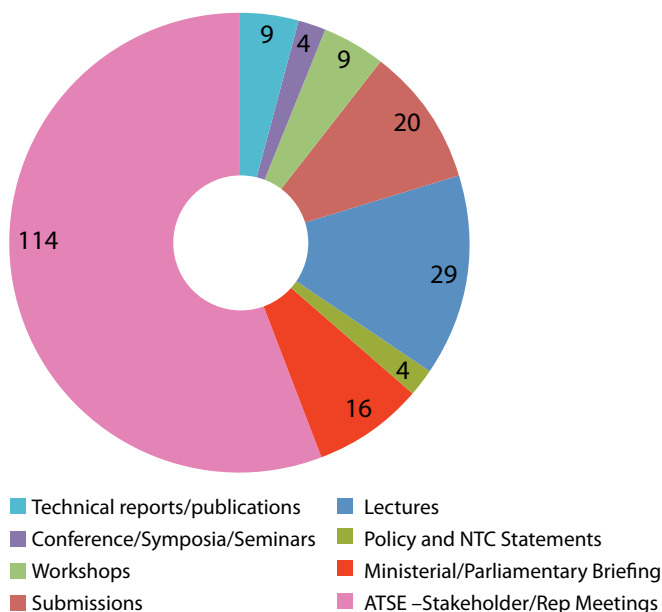
The impressive list of achievements and activities over 2015-16 reflects the talents, capabilities and efforts provided by our Fellows, led by the Board and its Committees, Forums and Divisions facilitated through the ATSE Office.

The Academy looks forward to continuing to support 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



Evidence-based advice and engagement in 2016



Comparative performance at a glance 2015-2016

	FY 2015	FY 2016
EVIDENCE- BASED ADVICE & ENGAGEMENT		
Technical Reports/Publications	8	9
Conference/Symposia/Seminars	7	4
Workshops	5	9
Submissions	18	20
Lectures	28	29
Policy and NTC Statements	15	4
Ministerial/Parliamentary Briefing	14	16
ATSE –Stakeholder/Rep Meetings	82	114
COMMUNICATIONS		
Editions of <i>Focus</i>	6	6
Media Releases	7	51
Monthly Newsletters	11	11
Enhanced web functionality	√√	√√√
INTERNATIONAL ENGAGEMENT		
Hosted International Meetings/Roundtables	18	29
International Exchange (Programs)	4	4
Priming Grants Awarded	28	74
STEM EDUCATION		
Students in STELR	54,500	73,900
STELR schools at end year	465	528

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 technology challenges of our time.



Christopher Pyne launches the Global Connections Fund in Adelaide

ATSE maintains a strong focus in all its activities on key national technology challenges.

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

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 that can be used 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 undertook a pilot with universities in Queensland and South Australia, in cooperation with Governments in those states. The pilot involved working with universities to trial and refine the metrics, with a focus on resolving several remaining questions from the original REA report. The pilot and summary reports for this project were published in March 2016, and were covered in *The Australian Higher Education Supplement* and through an opinion piece by President Peter Gray.

This work informed the National Innovation and Science Agenda and was identified in the NISA as forming the basis of the engagement and impact measures being developed by the Australian Research Council, which ATSE remains engaged with. Professor Margaret Sheil FTSE, an ATSE Director, represents the Academy on the Performance and Incentives Working Group for this project. A national trial of the ATSE metrics began in June 2016, including all 41 Australian universities.

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 John Bell FTSE. The project utilised country comparisons and analysed international best-practice approaches to encourage and facilitate research translation, commercialisation and collaboration, and examined their applicability for Australia – examining Canada, US, Japan, Brazil, China, South Korea, Chile, Israel, Finland, Denmark, Sweden, Germany, UK and Singapore. The report was launched by Professor Ian Chubb AC FTSE, Australia's then Chief Scientist, in November, at Parliament House in Canberra. Dr Bell also briefed the taskforce preparing the National Innovation and Science Agenda on the findings of the report.

ATSE was commissioned by the Department of Industry, Innovation and Science to conduct a literature review and report on industry-research collaboration in Australia. The report examined research

that has been undertaken, as well as policies and programs existing in Australia and overseas over the past 10 years. An in-depth synthesis of reports and policies began in June 2016.

The Industry and Innovation Forum hosted three seminars in October and November 2015 and in April 2016, titled *Greater Collaboration - The Industry Challenge*. The seminars discussed what changes needed to occur in the Australian industry to generate greater collaboration between industry and research. Following the success of these events, a further seminar in Sydney is planned for later in 2016.

In light of the Commonwealth Science Council's National Science and Research Priorities, which include manufacturing, several Fellows from the Industry and Innovation Forum prepared a draft of the Advanced Manufacturing Action Statement. Another Action Statement entitled *Greater Collaboration: the industry challenge* was also drafted, in line with the successful Forum seminars on the same topic.

Both Action Statements are expected to be published by end of 2016.

ATSE made a submission to the R&D Tax Incentive Review on 29 February 2016. The submission was informed by a survey of Fellows' attitudes and past work in which ATSE had been involved, including ACOLA's *Securing Australia's Future* Project 9 report.

2. Advance technological solutions for a healthy Australia

Following the success of ATSE's 2016 National Technology Challenges Dialogue: *Agribusiness 2030*, the ATSE Board decided on a health technology theme for the 2017 Dialogue. A Dialogue Committee was formed and planning for the event has been underway since April 2016. It is expected that the Dialogue will be held in June 2017 and will examine the role of technology in making ageing more affordable.

The Health Technology Forum prepared a number of submissions during the year. In July 2015, ATSE made a submission to the inquiry into the Medical Research Future Fund Bill 2015 and the Medical Research Future Fund (Consequential Amendments) Bill 2015, carried out by the Senate Community Affairs Legislation Committee. The submission highlighted that future discoveries in medical research would contribute to improving the health and wellbeing of all Australians and that discoveries in medical research required translation into medical services, technologies and devices.

ATSE submitted its response to the Victorian Government's Future Industries Medical Technologies and Pharmaceuticals Discussion Paper in September 2015. The submission highlighted the need for research translation, development and deployment of medical technologies and subsequent growth of the medical device industry, and the role of Information Communications Technology to transform the healthcare system to benefit the community.

NATIONAL CHALLENGES

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

The Energy Forum published two Action Statements during the year – *Enhancing Australia's Solar Photovoltaic Advantage* and *Advancing Energy Storage for Australia* – and was heavily engaged with the Australian Renewable Energy Agency (ARENA), providing input to their ARENA Solar RD&D Refresh and ARENA General Funding Strategy and Investment Plan Consultations.

ATSE also contributed to the national discussions on the pressing issues of nuclear fuel and unconventional gas. The Energy Forum was a key driver of ATSE's engagement with the South Australian Royal Commission on the Nuclear Fuel Cycle. It prepared a detailed submission to the Commission's issues papers, and a response to its tentative findings.

ATSE played an important role in facilitating balanced discussion


around the potential economic, social and environmental opportunities and risks around coal seam and shale gas extraction in Australia. In September 2015, it held a successful Unconventional Gas Conference and Workshop in Sydney with more than 150 delegates attending. International and domestic speakers included representatives from government, academia, industry, NGOs and community groups. It also incorporated a public forum, held at the University of NSW.

Following on from the Conference, ATSE facilitated an Academies Workshop to draw on the findings from several international Academy reports, in addition to the deliberations held throughout the Conference, and produced a communiqué reflecting the key findings produced at the Workshop.

ATSE also made submissions to the *Inquiry into Unconventional Gas in Victoria* and the *Senate Select Committee on Unconventional Gas Mining*.

John Thwaites, Chair of Melbourne Water, launches the ATSE Wastewater report in Melbourne





In October 2015, ATSE published *Wastewater – An Untapped Resource?*

4. Efficient and sustainable resource management

In October 2015, ATSE published *Wastewater – An Untapped Resource?* which is a seminal report that will serve as a valuable resource for the Australian water industry and policymakers. It was the result of a project, led by Dr John Burgess FTSE and funded by the Australian Water Recycling Centre of Excellence, which examined the potential industry opportunities for wastewater resource recovery in Australia, highlighting key learnings from initiatives elsewhere.

The report identifies barriers to commercial success, discusses industry opportunities for wastewater resource recovery in Australia and considers ways to realise these opportunities.

The Mineral Resources Forum has plans for three Action Statements targeting the challenges of productivity, discovery and sustainability in the mineral resources sector. The first Action Statement – tentatively titled *Leveraging technology, human resources and innovation to improve productivity in the mineral resources sector* – is expected to be published in late 2016.

The Water Forum has begun the development of an Action Statement on groundwater in Australia with development led by an expert group headed by Professor Craig Simmons FTSE.

ATSE is the Australian partner in the European Union project *International Raw Materials Cooperation (INTRAW)*, funded under its Horizon 2020 program. INTRAW aims to characterise the contextual environment of five reference countries (Australia, Canada, Japan, South Africa and the United States) in relation to raw materials research and innovation, educational and skills programs, trade, exploration, exploitation, processing, recycling and substitution. This, together with the mapping of corresponding policies and practices, will facilitate the comparative evaluation and cross-impact analysis of the raw materials domains between the participating countries and the EU, and lead to the establishment of an

International Raw Materials Observatory.

ATSE's input is being guided by an Expert Reference Group, led by Mineral Resources Forum Chair Ms Denise Goldsworthy FTSE. ATSE provided expert input and review services for the project's contextual analysis of Australia, which was published in December 2015.

5. Improved agricultural productivity, quality and sustainability

The Agriculture Forum activities in the 2015-2016 period focused largely on the *Agribusiness 2030* National Technology Challenges Dialogue, which took place in Sydney in June 2016.

The Dialogue attracted about 150 people and the sessions included speakers from government agencies such as CSIRO and the Bureau of Meteorology, agribusiness researchers, farmers, scientists and financiers. Discussions following each session engaged the audience on the topics of:

- *Winning Community Support* – understanding community acceptance of technology, such as agricultural biotechnologies, finance and investment in food and agribusiness, and the implications of technology for sustainable agriculture and communities in Northern Australia;
- *Profiting from the Technology Revolution* – Australian agribusinesses making the most out of this technology revolution;
- *Leading the Charge* – where the application of new technologies has helped strengthen and improve agribusinesses around Australia;
- *Farming the Future* – what is expected of, or needed by, the next generation;
- *Working with Climate Change* – what impacts can Australian agribusinesses expect to see from climate change over the next 15 years and how can we use technology to prepare and adapt to these changes; and
- *Grasping Agricultural Biotechnology* – what is the role of biotechnology in food and agribusiness around the world, including

NATIONAL CHALLENGES

breeding, resistance to disease, drought and heat, and improved nutritional value and how can Australia benefit from these?

In September 2015, the Agriculture Forum made a submission to the House of Representatives Standing Committee on Agriculture and Industry Inquiry into Agricultural Innovation. The submission emphasised that new technologies, including new practices, and their rapid adoption and adaptation to local conditions had been

central to historical increases in productivity and profitability in Australia's agriculture and food sectors. It also emphasised that expanding the export sector and focusing on high quality agrifood products would require new technologies to underpin continued productivity growth and international competitiveness.

ATSE appeared before the Committee to discuss the submission in January 2016. ATSE's evidence highlighted that Australia should seek

The Academy also developed a response to Infrastructure Australia's call for input into the Australian Infrastructure Audit, which will inform the development of the 15-year Australian Infrastructure Plan. The submission was developed with the coordination of the ATSE Infrastructure, Energy and Water Forums.

(From left) John Richards, Robin King, Pennie Stoyles, Ian Chubb and Alan Finkel at the STEM workshop in Canberra



NATIONAL CHALLENGES

to use scientific and technological advances to target high-value and high-margin produce with a global reputation for food safety, not aim to be the most cost efficient producers of cheap food. ATSE also pointed out that emerging technologies would play an increasingly important role in improving the efficiency and productivity of Australian agriculture and associated down-stream sectors such as food processing and manufacturing.

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

The Infrastructure Forum held a seminar in conjunction with the Victorian Division on 5 November 2015, titled *Planning and Delivering Major Infrastructure Projects* with Mr Geoff Rayner, consulting civil engineer, and Mr Iain Walker from The New Democracy Foundation discussing the opportunities for deliberative democracy in infrastructure planning and decision making.

The Academy developed innovative new programs to further international research-to-industry linkages during the year, feeding into the Government's National Innovation and Science Agenda. In addition, it continued its well-established international exchange programs and initiatives aimed at furthering Australian international collaboration and links with leading scientific, technology and engineering institutions and bodies.

The Forum committee developed a draft Action Statement on robust long-term infrastructure planning and decision making, which emphasises that infrastructure decisions must meet the needs and aspirations of the population, align with changing technology and ensure sustainability both now and into the future. The Action Statement is expected to be published by the end of 2016.

A submission was prepared in August 2015 for the House of Representatives Standing Committee on Infrastructure and Communications inquiry on *The role of smart ICT in the design and planning of infrastructure*. ATSE's submission emphasised that information and communications technology (ICT), when used in smart ways, has the potential to increase efficiencies and productivity in a range of sectors. ATSE attended a public hearing of

the Committee to support its submission.

The Academy also developed a response to Infrastructure Australia's call for input into the Australian Infrastructure Audit, which will inform the development of the 15-year Australian Infrastructure Plan. The submission was developed with the coordination of the ATSE Infrastructure, Energy and Water Forums.

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

In December 2015, the Education Forum published an Action Statement, *World leading STEM teachers for Australia*. This focused on a need to ensure secondary school STEM teachers inspire students and have deep discipline expertise to give them self-confidence in the classroom. This is considered critical in light of estimates that 75 per cent of all replacement jobs in the next 15 years will require some degree of STEM skills.

The Action Statement was informed by a workshop convened by ATSE in Canberra in November 2015. The workshop tested the hypothesis that inspirational teachers are self-confident in their chosen speciality, and that self-confidence comes from being fully educated in their speciality STEM subject as part of their teacher education. ATSE identified that there were several key factors to be addressed for Australia to have the inspirational STEM teachers it needed and that these all required urgent attention.

ATSE's recommendations included:

- Initial teacher education and training for STEM teachers should require a bachelor's degree with appropriate major, along with either undergraduate or postgraduate qualifications in teaching;
- An independent national professional body for teachers, similar to those for other professions, should be established; and
- All out-of-field teaching in STEM disciplines needs to be eliminated as soon as practicable.

In July 2015 the Education Forum contributed to a submission to the Vision for a Science Nation consultation paper, highlighting the need for enhanced innovation-driven productivity linked to clear industry sector roadmaps for diversification and growth, leading directly to profitable companies, global competitiveness and economic wellbeing. ATSE suggested stronger recognition of the integral part STEM plays in growth, and more robust measures for improvement that would assist with this, with resources applied to STEM initiatives to be regarded as an investment in future growth, not just recurrent expenditure.

The Academy developed innovative new programs to further international research-to-industry linkages during the year, feeding into the Government's National Innovation and Science Agenda. In addition, it continued its well-established international exchange programs and initiatives aimed at furthering Australian international collaboration and links with leading scientific, technology and engineering institutions and bodies.

NATIONAL CHALLENGES

ATSE's international programs focus on key partner countries in the Asian region and are aligned with the Academy's seven National Technology Challenges. Its programs aim to strengthen Australia's international collaboration in science and technology innovation and are underpinned by strong relations with sister academies, international scientific and research bodies and Government ministries in partner countries. They include:

- Exchange programs, involving universities, research institutes and industry;
- Joint workshops and delegations to exchange technical information and identify new collaborative opportunities; and
- Grant programs to foster international researcher-to-industry engagement.

ATSE has a strong cohort of International Fellows drawn from 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 organisation encompassing 26 engineering and applied science academies from around the world. Participation at CAETS annual meetings and in CAETS projects gives ATSE direct links to influential Academies and their Fellows and effectively facilitates the ongoing development of international networks and access to new opportunities.

ATSE attended the annual CAETS Convocation in New Delhi in October 2015, titled *Pathways to Sustainability: Energy, Mobility and Healthcare Engineering*.

Key international initiatives during the year included:

Global Connections Fund

The Global Connections Fund is an innovative new program, funded through the Department of Industry, Innovation and Science, which ATSE is implementing. Aligned with the Government's National Innovation and Science Agenda (NISA), the Fund provides grants to help Australian researchers and SMEs collaborate in the global arena, link with international counterparts and expertise, and explore collaborative projects in global markets.

The scheme is based on the successful CAESIE Priming Grants program that ATSE developed and implemented in partnership with the EU from 2013-2015 and has two elements – Priming Grants and Bridging Grants. Expert ATSE assessment panels for the 107 GCF Priming Grant applications worked through June to assess and select the successful 74 applications who received a \$7,000 grant.

Linkages with Europe (25), the United States (19) and China (15) formed the bulk of the successful applications, with two thirds coming from researchers and one third from SMEs.

China: Young Scientists Exchange Program

ATSE has run the Australia China Young Scientists Exchange Program (YSEP) for 10 years, with the program now expanded to a two-way exchange. In the review year 16 Chinese scientists visited Australia and 13 Australian scientists visited China.

They undertook two-week programs to establish and develop individual and institutional collaborative linkages, with each researcher having an individually tailored program to reflect his/her research interests.

YSEP is funded through the Australian Department of Industry Innovation and Science and the Chinese Ministry of Science and Technology.

China: Next Steps 2015

2015 saw ATSE develop and implement a 'Next Step Initiative' to fund follow-up activities to progress S&T collaborative initiatives arising from the 2014 YSEP placements. A competitive process resulted in the selection of eight researchers who had participated in the 2014 program to progress their China collaborations.

Indonesia: Joint Water Workshop

The Indonesian Academy of Sciences (AIPI), the Australia-Indonesia Centre and ATSE convened a two-day workshop *Sustainable Urban Water Management in Indonesia* in Jakarta in October 2015. The workshop was also supported by the Monash University Sustainable Urban Water Management Project. It tackled the many and varied problems contributing to water issues in the Greater Jakarta Region.

Japan: JASIC

In February 2016 ATSE hosted the first exchange program between Australia and Japan under the Japan Australia Science Innovation Connect (JASIC) initiative. The JASIC program was established following negotiations between both countries and a May 2015 workshop in Tokyo.

Funded through the Department of Industry, Innovation and Science, the program aims to promote and strengthen Australia-Japan bilateral ties and increase researcher-to-industry linkages.

The focus of the one-week visits was on science and technology applications for *Healthy Ageing for Societal Benefit*, a topic of national importance to both economies. The eight JASIC participants were senior researchers from leading Japanese research institutions and industry focused on the development of their international linkages for research translation activities.

Japan: AJERLEP

A two-week visit by nine Japanese scientists under the auspices of the Australia Japan Emerging Research Leaders Exchange Program took place in October 2015. Funded by the Department of Industry, Innovation and Science and the Japan Society for the Promotion of Science (JSPS), it is aimed at mid-career researchers with strong

The ATSE Agriculture Forum activities in the 2015-2016 period focused largely on the Agribusiness 2030 National Technology Challenges Dialogue



leadership potential. In 2015 the Australia Japan Foundation (DFAT) also provided top-up funding to support a representative from Japanese industry to develop academic-industry linkages. ATSE arranged individually tailored visit programs for all participants as well as orientation and debrief sessions. Australian scientists will undertake a similar visit to Japan in November 2016.

China: Entrepreneurship Program

A successful Australia China Entrepreneurship Program took place in May 2016, developed and implemented by ATSE with funding assistance from the Department of Education and Training. Some of Australia's brightest post-graduates and early career researchers were selected to travel to Shanghai and Suzhou on a three-day program to highlight entrepreneurship and research commercialisation programs and opportunities in China.

Participants came from Monash University, Queensland University of Technology, University of Melbourne and University of Technology Sydney. They visited start-ups in Shanghai and attended a workshop hosted by Monash University in Suzhou to address the successful development of entrepreneurship skills in a globalised environment and work with Chinese students on innovative proposals to address major global challenges.

Korea: 5th Australia Korea Innovation Workshop

ATSE received Australian Government funding and approval to run its annual workshop in Korea in October 2015, focused on how to better support closer links between researchers and industry in Korea and Australia. This was co-organised with the National Academy of Engineering of Korea (NAEK).

The one-day workshop explored the mechanisms, initiatives and incentives currently in place in Australia and Korea and the best elements from each country's experiences that promote the successful translation of research into commercial outcomes.

The workshop focused on three areas – wearable smart devices, autonomous vehicles and personalised health care systems – and engaged presenters and participants from academia, research institutes and industry.

Korea: Research-Industry connections

An ATSE delegation visited Korea in March 2016 for a one-day workshop and associated site visits under the Korea Australia Science and Innovation Connect (KASIC) program, which was established to support closer collaboration between research and industry in Australia and Korea. KASIC is funded through the Department of Industry, Innovation and Science and administered by ATSE.

The workshop, hosted by the Australian Embassy in Seoul, focused on models for successful research-industry collaboration, both at a national and international level. Korean attendees included the Korea International Trade Association and Small and Medium Business Administration, as well as The National Academy of Engineering Korea (NAEK), the National Research Foundation (NRF) and representatives from the industry collaboration divisions at five leading universities. Australian delegates discussed industry collaboration from a variety of perspectives.

Indonesian Visit

ATSE attended an Australia-Indonesia Forum hosted by the Australian Academy of Science in Canberra in June. The Indonesian delegation was led by the President of the Indonesian Academy of Sciences (AIPI), Professor Sangkot Marzuki. The Forum discussed a proposed November 2016 joint symposium to be held in Australia – a joint undertaking between Australian Academies and the AIPI, and to be hosted at the AAS in Canberra.

MAJOR PROGRAMS

Taking STEM to schools through STELR – a program for the decades ahead and the jobs to come

A key ATSE project is the STELR program, which now impacts across all states and in more than 500 schools. STELR (Science and Technology Education: Leveraging Relevance) is ATSE’s inquiry-based, hands-on STEM program, using equipment packs and activities adaptable to both secondary and primary school year levels. STELR uses relevant themes such as sustainability, climate change and car safety.



Alan Finkel helps cut the cake to celebrate 500 STELR schools

MAJOR PROGRAMS

STELR is interdisciplinary and problem-based, encouraging deeper learning through real-world projects. A range of directed and student-designed practical investigations are an integral part of the program. STELR is designed to be taught as a part of the school curriculum so that all students benefit.

STELR aims to:

- Get more students studying maths and sciences at years 11 and 12;
- Improve science literacy and understanding in the community;
- Raise awareness of technology-related careers;
- Make students aware of science and engineering careers; and
- Improve the quality of science classroom teaching practice.

STELR Students demonstrate their work in authentic ways – through projects, plans and presentations that mirror what they will be required to do in their careers and in further learning.

Students work independently and collaboratively. They learn the way scientists do – by asking questions that lead them to discover solutions to authentic and complex problems.

STELR supports participation by girls and other underrepresented groups and teachers are fully supported through an initial professional development program and follow-up assistance. A STELR school is one that has purchased directly or through sponsorship a class set of STELR equipment. There is a range of different kits available.

500+ schools in Australia

Over the year the number of STELR schools increased from 465 to 528, an increase of 63 schools. Nearly 100 schools have purchased class sets of more than one type of kit.

A highlight of the year was the event to mark Victoria University Secondary College in Melbourne becoming the 500th STELR school in February 2016. The keynote speaker at the event was Dr Alan Finkel AO FAA FTSE, Australia's Chief Scientist and instigator of the STELR program.

Over the year STELR held teacher training workshops in all states and the Northern Territory – 13 workshops with 142 teachers receiving training.

STELR promotion

The number of subscribers receiving the monthly STELR e-newsletter increased from 2317 to 2454. This is a key outreach initiative to keep students, teachers and sponsors engaged with STELR progress and opportunities.

STELR had trade display tables at three conferences, presented

workshops at seven conferences and gave a plenary presentation at one additional conference during the year.

International engagement

A five-day STEM Workshop, titled *Training Course on STELR Renewable Energy*, was held at the Biotrop Research Centre in Bogor Indonesia, with 35 teachers from 11 South East Asian countries attending. The workshop, led by ATSE, was presented by STELR managers Mr Peter Pentland and Ms Pennie P Stoyles, Dr Greg Smith from Charles Darwin University and Mr Ian Cristie from the Victorian Education Department Space Science Centre. This was the first STEM workshop to be held in Indonesia.

Ms Stoyles conducted a Teacher Professional Learning Session at the Mariveles National High School, in the Philippines, for teachers from three schools in the Philippines and one school in India. This was sponsored by Orica.

Sponsorship and support

STELR is grateful to all its sponsors:

- Principal Sponsor: Orica
- Major Sponsor: Australian Power Institute (API)
- Niche sponsors: MM, Cochlear Foundation, Cigre, Arup, CSR, Bradford and Viridian Glass
- Curriculum digital delivery partner: Stile Education
- Supporters: Cosmos, Dulux InfraCOOL, Strand7, RioTinto
- iSME partner universities: Southern Cross University, Charles Darwin University and the University of Wollongong
- ASCA Education Foundation
- ATSE NSW Division

Donors

STELR also gratefully acknowledges its donors:

- Alan and Elizabeth Finkel Foundation
- Dr David Cook FTSE
- Mr Peter Laver AM FTSE
- Dr Margaret Hartley FTSE
- Mr Dick Carter FTSE
- Mr John Laurie AC FTSE
- Dr Robert La Nauze FTSE
- Mr Morrish Besley AC FTSE
- Dr John Floyd AM FTSE
- Mr John Ralph AM FTSE
- Dr Mark Bradley
- Dr Geoffrey Knights FTSE
- John T Reid Charitable Trusts

Solar Car Challenge

The 2015 Australian Power Institute (API) STELR Solar Car Challenge involved class sets of reusable model solar car kits being sent to 33 participating schools across five states. Each class set makes 14 model solar cars comprising a chassis, two sets of wheels, a motor, a gearbox and two solar panels. The kits are provided free of charge to schools through funding by the Australian Power Institute.

MAJOR PROGRAMS

Schools are also visited by power engineering students who help with building the cars, judge the races and give a presentation on careers in Power Engineering.

In 2016, 10 new schools in five states received class sets of the reusable model solar car kits, taking the total number of schools to receive solar car class sets to more than 200.

The PwC Program

STELR was one of 20 (out of 120) successful applicants to be part of the PwC 21st Century Minds Accelerator Program in 2016, becoming part of a select group of social enterprises to be guided through the Impact Academy's Impact Accelerator.

The Impact Accelerator is a tailored enterprise development program involving direct coaching, resource support and professional networks. This will assist STELR to achieve uplift in the areas of greatest need.

Impact Academy's Accelerator Program is divided into three phases:

- Phase 1: assessing the impact the enterprise is aiming to achieve and business model design;
- Phase 2: project-based learning covering the fundamental disciplines that all enterprises need to understand and embed for social and economic sustainability; and
- Phase 3: focus on each enterprise to be market ready and / or investment ready to ensure commercial growth and maximise impact.

PwC has also provided a STELR mentoring team which aims to improve STELR's long-term sustainability and creative communications services.

The iSME Project

The Southern Cross University project *Inspiring Science & Mathematics Education* is partially funded by the Australian Government Department of Education and Training through the Australian Maths and Science Partnerships Program. STELR is a partner in the project.

During the year work continued on developing modules for the iSME project, including:

- Water for the 21st Century
- Carbon Dioxide Friend or Foe
- Sustainable Housing
- Car Safety
- Future Health Technologies
- The Maths of Solar Panels
- The Maths of Sustainable Housing
- Finite Element Analysis – computerised analysis of structures
- Climate Change and Oceans

iSME resources are being trialled in 12 pilot schools and the effectiveness of the iSME modules is being independently evaluated.

MAJOR INITIATIVES

A multi-faceted program to drive awareness and adoption of technology that will shape our future

ATSE plans and manages a variety of national and divisional events each year to maintain public focus on key technology and innovation issues. We also seek to position the Academy as a strong leader in this area, to recognise and proclaim excellence and encourage young Australians to embrace STEM topics to enhance our future.

2016 Clunies Ross Awards

A crowd of nearly 400 attended ATSE's inaugural 2016 Innovation Dinner in Sydney in June 2016 where Clunies Ross Award winners in three new categories were recognised.

The dinner attracted some stellar guests, including the Hon Niall Blair, NSW Minister for Primary Industries and Minister for Lands and Water, Australian Chief Scientist Dr Alan Finkel AO FAA FTSE, NSW Chief Scientist and Engineer Professor Mary O'Kane AC FTSE, who delivered the keynote address, and three state Chief Scientists – Dr Geoff Garrett AO FTSE (Queensland), Dr Leonie Walsh FTSE (Victoria) and Dr Leanna Read FTSE (South Australia) – who presented the three Clunies Ross Awards for 2016.



Mary O'Kane delivers the Keynote Address



Geoff Garrett congratulates Maree Smith



Robin Batterham congratulates Lachlan Blackhall.



Leonie Walsh and Elaine Saunders

Two women won awards. Professor Maree Smith FTSE, from the University of Queensland, won the 2016 Clunies Ross Knowledge Commercialisation Award, presented by Dr Garrett. She is recognised internationally for her contributions to pain relief and pharmaceutical development through her pioneering breakthroughs in drug discovery and translation.

Ms Elaine Saunders, from Melbourne, won the 2016 Clunies Ross Entrepreneur of the Year Award, presented by Dr Walsh. Dr Saunders is an audiologist, innovator and an entrepreneur who has worked over the past 20 years to successfully disrupt hearing service provision in Australia, through challenging current business and pricing models, and improving technology.

Associate Professor Peter Murphy, from the University of South Australia, won the 2016 Clunies Ross Innovation Award, presented by Dr Read. He has led an industry-focused research team specialising in thin-film coating science to develop a world first plastic automotive rear view mirror.

Dinner guests saw short video productions from each of the three states presented by the state Chief Scientists and longer videos illustrating the work and achievements of the Clunies Ross Award winners.

2015 Batterham Medal

Dr Lachlan Blackhall was named the inaugural winner of the Batterham Medal, an award that recognises an early career engineer who has achieved substantial peer and industry recognition for their work in the past five years.

The medal was presented to Dr Blackhall by Professor Robin Batterham AO FEng FAA FTSE at the ATSE Oration Dinner in Melbourne in November 2015.

It recognises the contribution to engineering made by Professor Batterham, the Kernot Professor of Engineering at the University of Melbourne, and former Chief Scientist of Australia and Academy past President.

The Award will be presented annually by ATSE on behalf of the Go8 & Associates Deans of Engineering (the Group of Eight plus the universities of Newcastle and Wollongong, as well as Auckland).

Dr Blackhall graduated with honours in engineering and maths and the University Medal from The University of Sydney in 2007 and took a PhD in Control Theory at ANU. He later co-founded Reposit Power, a technology company designing advanced control systems for grid-deployed energy storage.

2016 National Technology Challenges Dialogue

A focus on agribusiness in the future was the theme of ATSE's National Technology Challenges Dialogue *Agribusiness 2030* held in Sydney in June 2016 and attended by some 150 industry experts and observers.

Many aspects of agribusiness were discussed, with key contributions from a broad array of speakers, including Australia's Chief Scientist Dr Alan Finkel AO FAA FTSE, Ms Alison Watkins, Group Managing Director, Coca-Cola Amatil, and Dr John Manners, CSIRO Agriculture head.



Ros Harvey – broadband is critical.

The Dialogue covered:

- *Grasping Agricultural Biotechnology*: Which biotechnologies offer potential for better breeding, resistance to disease, drought and heat, and improved nutritional value?
- *Winning Community Support*: How can community acceptance of technology be achieved, such as for agricultural biotechnologies, finance and (foreign) investment?
- *Profiting from the Technology Revolution*: How can Australian agribusinesses make the most out of the technology revolution, and what barriers stand in the way?
- *Farming the Future*: What ambitions and visions for change will the next generation pursue? What barriers stand in their way, and how can we help them succeed?
- *Working with Climate Change*: What impacts can Australian agribusinesses expect to see from climate change over the next 15 years? How can technology help?

Agribusiness 2030 concluded that, in the face of global challenges, Australia must act immediately to secure an economically, environmentally and socially sustainable future for its agribusiness sector.

2015 AGM

The Annual General Meeting of the Academy was held on 27 November 2015 in Melbourne and was attended by 84 Fellows. The meeting heard reports from the (then) President, Dr Alan Finkel AO FAA FTSE, the Chair of the Audit and Risk Committee, Dr Susan Pond AM FTSE, the Chair of the Fellowship Committee, Dr David Cook FTSE and the CEO, Dr Margaret Hartley FTSE.

ATSE elected two new Directors, effective 1 January 2016 – Dr Bruce Godfrey FTSE, Chair of the Academy's Energy Forum and CEO of Australian Scientific Instruments, and Professor Margaret Sheil FTSE, Provost of the University of Melbourne. Their election was confirmed at the AGM.

2015 Oration Dinner

The 2015 Oration Dinner that evening attracted 180 people. They heard the 2015 Orator, Mr David Thodey FTSE speak on the topic *A brilliant future...for Australian research and innovation*. "I see many Australians who identify this future and are grasping it with both hands – to be the beneficiaries of change and not the victims of change," he said.



John Manners looks at the future.

2015 New Fellows

The Academy welcomed 26 New Fellows in 2015. Those who were able to attend gave a presentation describing their work and aspirations during the New Fellows Seminar which followed the AGM. Each Fellow attending the Oration Dinner was presented with a certificate and welcomed to the Academy. All the new Fellows attended either the New Fellows Seminar or the Oration Dinner – a great exposure to the Fellowship.

Assembly

The ATSE Assembly is made up of 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 – Assembly 15 in November 2015 and Assembly 16 in May 2016.

Assembly 15 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 of 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 2015 AGM program, two Forums held Seminars. The Education Forum Seminar was titled *Challenging Education Paradigms in Engineering and Technology*. The Infrastructure Forum Seminar was titled *Australia's priority infrastructure for the future – the new role of Infrastructure Australia*.

Assembly 16 was held in Canberra in May. It included a review of the National Innovation and Science agenda (NISA), planning for 2016 and beyond, future activities and horizon scanning. It was followed by a meeting of the Joint Chairs of the Divisions and Forums.



David Thodey delivers the 2015 Oration.



Alan Finkel welcomes Michelle Simmons to the Academy

Division Events

ATSE's seven State and Territory Divisions conduct a variety of activities to support the ATSE mission – seminars and workshops, presentations, site visits and briefings, often in conjunction with other bodies. These are increasingly aligned with ATSE's National Technology Challenges and are augmented by events to facilitate engagement and learning among the Fellows.

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 parliamentarians, 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 – most 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 concluded its successful manufacturing luncheon series and commenced its *Climate Change and its Consequences* lunches, featuring key speakers on core topics. It also held the 2015 Malcolm Chaikin Oration dinner, with the Oration *Innovation and Entrepreneurship*, delivered by Dr Peter Farrell AM FTSE.

The **Victorian Division** conducted a strong program of events, linking on occasions with the Royal Society of Victoria, the Australasian Industrial Research Group and other key policy bodies. Its program was headlined by its Annual Dinner addressed by Professor Richard Larkins AO FTSE on *The Future of Australia's Universities post Bradley and Cutler* – 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 and conducted several high-impact events, including new Fellows' evenings.

The **SA Division** continued its established manufacturing workshops, conducted for the third time in conjunction with the SA Government, with national and international expert presenters. It also continued its Parliamentary briefing program, with the SA Chief Scientist Dr Leanna Read FTSE, addressing the October 2015 event. It also continued the annual Norton Jackson New Fellows event.

The **WA Division** – presented its annual Eminent Speaker program in Perth and regional centres, featuring Ms Susan Murphy FTSE, head of the Water Corporation. ATSE worked with WA universities to present this series.

The **ACT Division** held a number of events during the year and represented ATSE at numerous functions in the national capital. A key event was the November 2015 STEM Teaching workshop held at the Australian National University, with key speakers addressing the topic.

The **Tasmanian Division** continued its collaboration with the Royal Society of Tasmania during the year, holding a public lecture on *Medial Research into Childhood Diabetes and Mature age Dementia*.

WOMEN IN TECHNOLOGY

Focusing on women in technology

ATSE is making strong progress in admitting women to its Fellowship and using their skills and experience as widely as possible in its Forums and Divisions and the specialist Working Groups and Committees that generate much of the Academy’s contribution to Australian society.

This progress has accelerated markedly since the introduction of the Gender Equity Policy 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 universities.

Women’s participation in ATSE initiatives and bodies during the year showed encouraging progress. 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.

The most visible change has been the gender representation on the ATSE Board, with participation rising to 50 per cent for the past three years (Figure 1). Similarly, ATSE Board Committees and the Assembly now have female membership of more than 30 per cent (Figure 2).

ATSE is proud that women play leading roles in its Forums and Division Committees. The Forums’ Leadership Groups in 2015-2016 reflected increased gender focus, with women elected as Chairs of the Education Forum, Health Technology Forum, Industry and Innovation Forum, Minerals Resources Forum and the International

Strategy Group – and as Deputy Chairs of the Agriculture Forum, Infrastructure Forum, Mineral Resources Forum and the Water Forum.

Women played an increased role in Division affairs, with the Queensland and West Australian Divisions led by a woman Chair and most Division Committees being comprised of 20 per cent or more women.

ATSE’s Gender Equity Working Group is 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 joined the Academy of Science to launch the Science in Australia Gender Equity (SAGE) pilot program to trial the successful UK Athena SWAN gender equity accreditation program. Forty organisations are participating in the pilot – including universities, medical research institutes and the CSIRO. The SAGE pilot was launched at Parliament House, Canberra, in September 2015.

Fig 1 ATSE Board Members

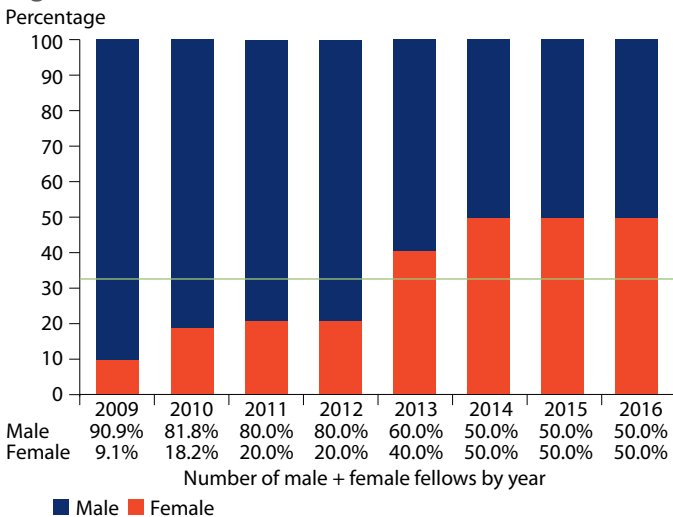
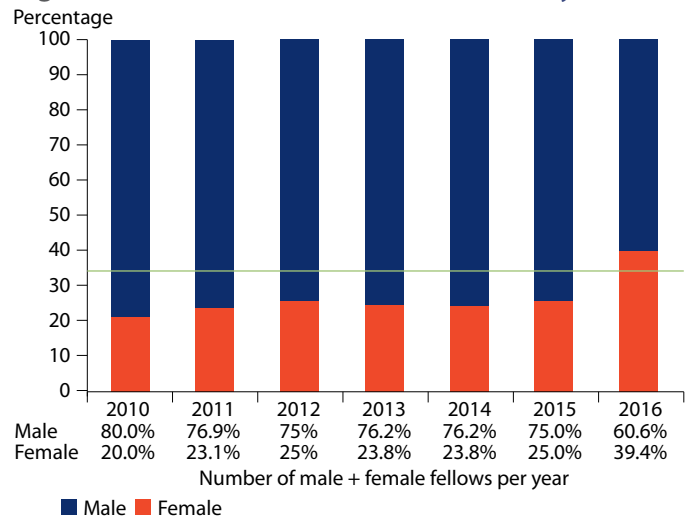


Fig 2 ATSE Board Committees & Assembly



*Susan Pond
addresses the SAGE
launch*



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.

The Athena SWAN charter began a decade ago with just 10 universities but has grown today to include as a member nearly every science and technology education and research institution in the UK.

At the first national SAGE Symposium in Sydney in June 2016, SAGE announced the appointment of former Sex Discrimination Commissioner, Ms Elizabeth Broderick AO as Chair of its Expert Advisory Group, which will Champion the SAGE initiative and provide expert strategic and gender equity advice to the Program to ensure a successful implementation and evaluation of the SAGE Pilot program.

The Symposium was addressed by ATSE President Dr Alan Finkel AO FAA FTSE, ATSE Gender Equity Working Group Chair Dr Mark Toner FTSE, Advisory Group Member Dr Susan Pond AM FTSE and NSW Chief Scientist and Engineer Professor Mary O’Kane AC FTSE.



Mark Toner and Susan Pond at the SAGE Symposium



Mary O’Kane addresses the SAGE Symposium

THE FELLOWSHIP

Academy fellows are leaders in technology

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 2015-16 these included:

AUSTRALIA DAY HONOURS 2016

Professor Chennupati Jagadish AC FAA FTSE from the Department of Electronic Materials Engineering at the Australian National University, was named a Companion of the Order of Australia for eminent service to physics and engineering, particularly in the field of nanotechnology, to education as a

leading academic, researcher, author and mentor, and through executive roles with national and international scientific advisory institutions.

Emeritus Professor Mary O'Kane AC FTSE the NSW Chief Scientist and Engineer, was named a Companion of the Order of Australia for eminent service to science and engineering, as a contributor to national policy development and governance, to the promotion of technology research and future energy supply, to higher education, and as a role model for young scientists.

Professor Marilyn Anderson AO FAA FTSE Chief Scientific Officer and Director of Hexima Ltd and La Trobe University professor, was named an Officer of the Order, for distinguished service to science, and to higher education, particularly to biochemistry and molecular biology, as an academic and researcher, and to professional associations.

Mr Drew Clarke AO PSM FTSE The Prime Minister's Chief of Staff and former Secretary of the Department of Broadband, Communications and the Digital Economy, became an Officer of the Order, for distinguished service to public administration, to communications and energy policy initiatives and reform, and to the spatial information industry.

Dr Craig Mudge AO FTSE a CSIRO computing expert who spent 10 years in Silicon Valley and is internationally known for his broad computing expertise, became an Officer of the Order, for distinguished service to science, particularly through pioneering initiatives in the information technology sector, as a researcher and author, and as a mentor of young scientists.

Dr John Wright AM FTSE a former Academy Director and inaugural Director of the CSIRO Energy Transformed Flagship Program, was named a Member of the Order for significant service to science and engineering, particularly to

renewable energy technology, and to professional organisations.

QUEEN'S BIRTHDAY HONOURS 2016

Professor Brian Anderson AC FRS FAA FTSE from the Australian National University College of Engineering and Computer Science, was named a Companion of the Order of Australia for eminent service to information and communications technology, to engineering and to higher education, as an academic, researcher and author, to professional scientific associations, and as a mentor of young scientists.

Professor David Solomon AC FRS FAA FTSE co-inventor of the plastic banknote first circulated in Australia 1988, and since exported to 34 countries, was named a Companion of the Order of Australia for eminent service to science as an academic, researcher and author in the field of polymer chemistry and plastics, to the development and commercialisation of processes and materials, and to professional scientific institutions.

Dr Andrew Cuthbertson AO FTSE a former molecular biology researcher and CSL R&D director since 2000, was named an Officer of the Order for distinguished service to medical science, particularly through the development and delivery of innovative biotherapies to assist public health, and to professional research organisations.

Dr T J Higgins AO FAA FTSE a leading researcher in plant gene technology, was named an Officer of the Order for distinguished service to agricultural biotechnology as a biologist and researcher, particularly in the area of plant nutritional value and resistance to pests and disease, and to professional scientific organisations.

Professor Doug Hilton AO FAA FTSE President of the Association of Australian Medical Research Institutes and one of 20 inaugural Male Champions

THE FELLOWSHIP

of Change, was named an Officer of the Order for distinguished service to medical research and education, particularly in the field of haematology, as a molecular biologist and author, to gender equity, and as a mentor of young scientists.

The late **Professor Mike Raupach AO FAA FTSE** an eminent climate scientist, was appointed an Officer of the Order posthumously for distinguished service to science in Australia and internationally as a leader and researcher into climate change and land systems, and to professional organisations.

AWARDS AND APPOINTMENTS 2015-16

Professor David Abramson FTSE from the University of Queensland, became a Fellow of The Institute of Electrical and Electronics Engineers (IEEE), recognised for “contributions to software tools for high performance, parallel, and distributed computing”.

Former WA Chief Scientist **Professor Lyn Beazley AO FTSE** WA Australian of the Year 2015, became an Ambassador for the Australian of the Year program.

Professor David Boger FRS FAA FTSE was made a Fellow of the Society of Rheology.

Professor Suresh Bhargava FTSE Deputy Pro Vice Chancellor (International Research) and the Director of the Centre for Advanced Materials and Industrial Chemistry at RMIT University, was awarded the Chemeca Medal and the Khwarizmi International Award.

Professor Hugh Bradlow FTSE Chief Scientist of Telstra, was named President-elect of ATSE.

Emeritus Professor Mark Bush FTSE was been appointed to the Board of the Mineral Resources Institute of WA.

ARC Laureate Fellow Professor Mark Cassidy FTSE was named 2015 WA Scientist of the Year. Professor Cassidy is Director of the Centre for Offshore Foundations at The University of Western Australia and Deputy Director of the ARC Centre of Excellence for Geotechnical Science and Engineering.

Dr Greg Constable FTSE a 2006 Clunies Ross Award winner, was named the International Cotton Advisory Committee (ICAC) Cotton Researcher of the Year for 2015.

Professor Edwina Cornish AO FTSE Provost and Senior Vice-President of Monash University, was appointed as a member of the CSIRO Board and named a member of the Expert Working Group to advise Government on the future direction of national research infrastructure.

Dr Wendy Craik FTSE former Productivity Commissioner and Deputy Chancellor of the University of SA, was appointed chair of the Climate Change Authority and Chair of a review of the Intergovernmental Agreement on Biosecurity.

Professor Calum Drummond FTSE won the 2015 Victoria Prize for Science and Innovation in the Physical Sciences Category and the 2015 HG Smith Memorial Medal from the Royal Australian Chemical Institute – and joined the Board of the Innovative Manufacturing CRC.

Dr Andrew Cuthbertson FTSE Chief Scientific Office and R&D Director, CSL Limited, named a member of the Expert Working Group to advise Government on the future direction of national research infrastructure.

Professor Hugh Durant-Whyte FRS FAA FTSE Director of the Centre for Translational Data Science at the University of Sydney, joined the Board of the NSW Government’s Data Analytics Centre.

Professor Benjamin Eggleton FAA FTSE Director of CUDOS at the University of Sydney, was named a Fellow of the Academy of Science.

Dr Bronwyn Evans FTSE CEO of Standards Australia and Chair of the Industry Growth Centre for Medical Technologies and Pharmaceuticals, was named Deputy Chair of The Warren Centre at the University of Sydney.

Professor Lindsay Falvey FTSE was elected chair of the Board of the International Livestock Research Institute.

Emeritus Professor Geoffrey Fincher FAA FTSE former Director of the ARC Centre of Excellence for Plant Cell Walls at the University of Adelaide, was elected a Fellow of the Academy of Science.

Dr Alan Finkel AO FAA FTSE retired as ATSE President and Monash University Chancellor to take up the role of Australia’s Chief Scientist. He was also chosen to receive the 2015 Mountbatten Medal from the Institution of Engineering and Technology. He chairs the Expert Working Group to advise Government on the future direction of national research infrastructure. He was named a Fellow of the Academy of Science.

Dr Cathy Foley PSM FTSE CSIRO Deputy Director and Science Director Manufacturing, won a 2015 Clunies Ross Award, was awarded the Australian Institute of Physics’ Outstanding Service to Physics Award for 2015 and received an IEEE Council on Superconductivity Award, for continuing and significant contributions to the field of applied superconductivity (small scale applications).

Professor Simon Foote FAA FTSE Director of the John Curtin School of Medical Research at the

Australian National University, was elected a Fellow of the Academy of Science.

Professor Ian Frazer AC FAA FTSE was appointed chair of the Government’s \$20 billion Medical Research Future Fund advisory board.

Dr Bruce Godfrey FTSE Chair of the Academy’s Energy Forum and CEO of Australian Scientific Instruments, was elected a Director of ATSE.

Ms Denise Goldsworthy FTSE Chair of ATSE’s Mineral Resources Forum, was appointed to the Board of the Mineral Resources Institute of WA and Arrium Limited.

Dr Alexander Gosling AM FTSE joined the Board of the Innovative Manufacturing CRC.

Dr Ian Gould AM FTSE relinquished his role as Chancellor of the University of SA.

Professor Peter Gray FTSE was elected Interim President of ATSE.

Professor Martin Green FRS FAA FTSE won the Academy of Science’s 2016 Ian Wark Medal and Lecture for his world-record breaking work improving solar efficiency.

Professor Stewart Greenhalgh FTSE from the Institute of Geophysics at ETH Zurich, won the 2016 Conrad Schlumberger award from the European Association of Geoscientists and Engineers.

Professor Min Gu FAA FTSE became Associate Deputy Vice Chancellor for Research Innovation and Entrepreneurship at RMIT. Professor Gu was also awarded the 2015 Boas Medal by the Australian Institute of Physics.

Dr Vanessa Guthrie FTSE was named Chair the Minerals Council of Australia.

Professor Bronwyn Harch FTSE was appointed Executive Director of the Institute for Future Environments (IFE) at the Queensland University of Technology.

Professor Doug Hilton FAA FTSE President of the Association of Australian Medical Research Institutes, was appointed to the Government’s \$20 billion Medical Research Future Fund advisory board.

Professor Peter Høj FTSE University of Queensland Vice Chancellor, was appointed to the Government’s \$20 billion Medical Research Future Fund advisory board.

Professor Andrew Holmes AM FRS FAA FTSE President of AAS, was elected a Fellow of the US National Academy of Inventors.

Professor Buddhima Indraratna FTSE of the University of Wollongong, received the Railway

Technical Society of Australia's RTSA Individual Award for 'outstanding contribution' to the railway industry.

Professor Chennupati Jagadish FAA FTSE, from the Australian National University, won the IEEE Photonics Society (IPS) 2015 Engineering Achievement Award, was elected a Fellow of the US National Academy of Inventors, won the 2016 Nick Holonyak Jr Award, made by the Optical Society in the US and retired as Academy of Science's Secretary Physical Sciences and Deputy President.

Laureate Professor Graeme Jameson AO FREng FTSE, Director of the Centre for Multiphase Processes at the University of Newcastle, won the inaugural \$250,000 Prime Minister's Prize for Innovation.

Mr Jonathon Jutsen FTSE Chair of the Australian Alliance to Save Energy, was appointed to the Board of the Australian Renewable Energy Agency (ARENA).

Dr Marlene Kanga AM FTSE Chair, R&D Incentives Committee, was elected President of the World Federation of Engineering Organisations (2017-2019).

Mr Dick Kell AM FTSE was appointed chair of The Warren Centre at the University of Sydney.

Professor Robin King FTSE former Education Forum Chair, was elected an Honorary Fellow of Engineers Australia.

Dr Peter Lilly FTSE was appointed a director of the Mining Equipment, Technology and Services (METS) Growth Centre, known as METS Ignite, and reappointed chair of the Minerals Research Institute of Western Australia.

Ms Catherine Livingstone AO FTSE Retiring Chair of Telstra, was named Chancellor of the University of Technology Sydney from December 2016 and joined the board of The Commonwealth Bank.

Professor Max Lu FTSE Provost and Senior Vice President, University of Queensland, was appointed Vice Chancellor of the University of Surrey.

Professor Tanya Monro FAA FTSE shared a 2015 Eureka Prize for interdisciplinary research and joined the Board of CSIRO.

Sir Eric Neal FTSE former SA Governor, head of Boral and widely respected company Director, was awarded Engineers Australia's highest award, the Peter Nicol Russell Memorial Medal.

Dr Mary O'Kane FTSE NSW Chief Scientist and Engineer, joined the Board of the Innovative Manufacturing CRC and the NSW Government's Data Analytics Centre.

Dr Ian Oppermann FTSE was named CEO and Chief Data Scientist of the NSW Government's data analytics centre.

Dr Adi Paterson FTSE, CEO, ANSTO was named a member of the Expert Working Group to advise Government on the future direction of national research infrastructure.

Professor Harry Poulos AM FAA FTSE a world leading authority on foundation engineering, was named a 'GeoLegend' by the US Geo Institute (a part of the American Society of Civil Engineers).

Professor Ian Rae FTSE former Academy Technical Director and later President of the Royal Australian Chemical Institute (RACI) has been awarded RACI's Leighton Memorial Medal.

Dr Deborah Rathjen FTSE Chief Executive of Bionomics, was appointed to the Government's \$20 billion Medical Research Future Fund advisory board.

Professor Karen Reynolds FTSE Director, Medical Devices Research Institute, Flinders University, was appointed to the Government's \$20 billion Medical Research Future Fund advisory board.

Dr Chris Roberts FTSE former CEO of Cochlear, was named 2015 Professional Engineer of the Year by Engineers Australia and appointed to the Board of the Federal Government's Innovation and Science Australia (ISA).

Professor Alan Robson AO FTSE was re-appointed to the new Higher Education Standards Panel.

Professor Göran Roos FTSE was elected a Fellow of The Royal Swedish Academy of Engineering Sciences (IVA).

Professor Margaret Sheil FTSE Provost of the University of Melbourne, was elected a Director of ATSE.

Dr Richard Sheldrake AM FTSE ATSE NSW Division Chair and former Director-General of the NSW Department of Primary Industries, was appointed to a review of the Intergovernmental Agreement on Biosecurity.

Professor Kadambot Siddique AM FTSE Professor of Agriculture and Chair and Director, University of WA Institute of Agriculture, was elected a Foreign Fellow of the Indian National Academy of Agricultural Sciences and International Fellow of the Indian Society of Plants Physiology – and named FAO Special Ambassador for Pulses 2016.

Professor Craig Simmons FTSE who leads the National Centre for Groundwater Research and Training at Flinders University, was named South Australia's Scientist of the Year and appointed a member of the US National Academies of Sciences, Engineering, and Medicine Roundtable on Unconventional Hydrocarbon Development.

Professor Michelle Simmons FAA FTSE ARC Laureate Fellow and Director of the ARC Centre of Excellence for Quantum Computation and Communication Technology at UNSW, was named a Fellow of the American Association for the Advancement of Science and was

awarded a Foresight Institute Feynman Prize in Nanotechnology.

Professor Scott Sloan FRS FAA FTSE Founding Director ARC Centre of Excellence for Geotechnical Science and Engineering, University of Newcastle, was named the 2015 NSW Scientist of the Year and joined the Academy of Science's Council.

Professor David Tanner FRS FAA FTSE was made a Fellow of the Society of Rheology.

Former Telstra CEO and 2015 Academy Orator, **Mr David Thodey FTSE**, was appointed Chair of the Board of CSIRO.

Mr Martin Thomas AM FTSE former ATSE Energy Forum Chair and 2006 UMPNER Panel member, won the 2015 AGM Michell Medal, awarded by the Mechanical College of Engineers Australia, and was awarded the Australian Nuclear Association's 2015 ANA Annual Award.

Emeritus Professor Jim Williams AM FAA FTSE became the Academy of Science's Secretary Physical Sciences and Deputy President.

Dr Meryl Williams FTSE was awarded the 2015 Crawford Fund Medal, recognising her nearly 40 years in Australian and international fisheries, aquaculture, aquatic resource conservation and agricultural research and development.

Dr Beth Woods FTSE has been promoted to Director-General of the Queensland Department of Agriculture and Fisheries.

Dr Katherine Woodthorpe FTSE was appointed to the Board of the Australian Renewable Energy Agency (ARENA).

VALE TO OUR FELLOWS 2015-2016

Professor Bob Bilger FAA FTSE died in Sydney on 1 October 2015, aged 80.

Dr Thomas Callcott AM FTSE died in Newcastle on 23 November 2014, aged 90.

Mr John Gough AO OBE FTSE died in Melbourne on 24 July 2015, aged 86.

Dr Peter Jones FTSE died in Sydney on 26 August 2016, aged 83.

Professor Peter Joubert AM FTSE died in Melbourne on 13 July 2015, aged 90.

Mr Donald Mentz AM FTSE died in Townsville on 30 October 2015, aged 82.

Emeritus Professor Colin Pearson OBE AM died in Moruya on 17 April 2016, aged 75.

Foreign Fellow **Dr Bob White FTSE** died in the United States on 14 October 2015, aged 92.

Mr Kenneth Woolley AM FTSE died in Sydney on 25 November 2015, aged 82.

Sir Sydney Schubert Kt FTSE died in Brisbane on 2 August 2015, aged 87.

Key People

The Academy operates through its key Fellow bodies and an Executive Office in Melbourne. 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)

Professor Hugh Bradlow FTSE, *President and Chair*

Professor Snow Barlow FTSE, *Victorian Division*

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, Mineral Resources Forum*

Dr Alexander Gosling AM FTSE, *Chair, Victorian Division*

Mr John Grace FTSE, *Chair, Clunies Ross Awards Committee*

Dr Margaret Hartley FTSE, *CEO*

Mr Michael Heard FTSE, *Chair, SA 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 John Williams FTSE, *Chair, Water Forum*

Dr Paul Greenfield AO FTSE, *Observer*

Professor Margaret Sheil FTSE, *Observer*

Dr Vaughan Beck FTSE, *Observer*

Dr John Bell FTSE, *Observer*

Mr Peter Laver AM FTSE, *Observer*

Professor Mike Manton FTSE, *Observer*

DIVISIONAL SECRETARIES 2015-16 (AT PUBLICATION)

ACT

Dr Danny Llewellyn FTSE
danny.llewellyn@csiro.au

NSW

Dr Brien Spies FTSE
brspies@bigpond.net.au

Queensland

Dr Rowan Gilmore FTSE
Rowan.gilmore@emsolutions.com.au

SA

Dr John Radcliffe AM FTSE
John.Radcliffe@csiro.au

Tasmania

Professor Jocelyn McPhie FTSE
j.mcphie@utas.edu.au

Victoria

Dr Ian Sare FTSE
iandmsare@bigpond.com

WA

Professor Mark Cassidy FTSE
Mark.cassidy@uwa.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, *International Innovation Programs Manager*

Mrs Lynn Pagoda, *Company Secretary and Governance Manager*

Ms Pennie Stoyles, *STELR Program Manager*

Ms Jane Crappsley, *Digital Manager*

Ms Janine Rayner, *Senior Research and Policy Officer*

Dr Carolyn O'Brien, *Senior International Relations and Policy Officer*

Mr Dominic Banfield, *Research and Policy Officer*

Dr Milla Mihailova, *Research and Policy Officer*

Ms Robyn Lawford, *Policy and Projects Administration Officer*

Ms Chris Mann, *Data Integrity Officer*

Ms Maria Pridham, *Finance Officer*

Mrs Elvira Copur, *Membership, STELR and Clunies Ross Administration Officer*

Ms Katja Wilmot, *Events Coordinator and Division Support*

Ms Tracey Dunn, *Administration Support Officer*

THE ATSE BOARD

Leading the Academy activities

ATSE Directors at 30 June 2016 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.

THE ATSE BOARD

**Dr Bruce Godfrey FTSE**

Dr Godfrey is CEO of Australian Scientific Instruments Pty Ltd and a Director of Wyld Group Pty Ltd. His career has focused on the advancement and commercialisation of technologies (particularly new energy technologies ranging from solar cells to fuel cells to low emission coal utilisation), investment readiness of products and companies, and innovation policy and programs.

Dr Godfrey has strong governance experience acquired from a broad range of executive and non-executive Board and Committee roles, including audit and risk management. He has served on a number of AusIndustry and other government agency innovation funding and advisory committees, including most recently as Chair of the Australian Renewable Energy Agency's Advisory Panel until mid-2014. He currently is a Member of AusIndustry's R&D Tax Incentive Committee.

He chairs the ATSE Energy Forum and is a Member of the Academy's Audit & Risk Committee.

**Professor Peter Gray FTSE – President**

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.

THE ATSE BOARD



Dr Margaret Hartley FTSE – CEO

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.



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.



Professor Margaret Sheil FTSE

Professor Sheil was appointed Provost at the University of Melbourne in 2012. In that role she is the Chief Academic Officer and Standing Deputy to the Vice Chancellor.

Professor Sheil has been a researcher in the field of chemistry, held senior roles at the University of Wollongong and was the Chief Executive Officer of the Australian Research Council (2007-2012). Professor Sheil is a Director of the Australian Nuclear Science and Technology Organisation (ANSTO) and Trinity College, University of Melbourne. She is a member of the Advisory Council of the CSIRO Science Industry Endowment Fund (SIEF), the Clunies Ross Awards Committee of ATSE and the Advisory Board of the Australia Indonesia Centre. She has previously been a member of the Advisory Board for Coursera; and a member of the Prime Minister's Science, Innovation and Engineering Council, the National Research Infrastructure Council and the Cooperative Research Centres Committee.

Professor Sheil and holds a Bachelor of Science and a PhD in Physical Chemistry from The University of New South Wales and was presented with the Science and Technology Alumni Award from UNSW in 2016.

*Research Engagement for Australia:
Implementing the ATSE metrics for research
engagement. A report of a study by the
Australian Academy of Technology and Engineering
(ATSE)*

FINANCIAL SUMMARY

2015-16 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 510 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.

FINANCIAL SUMMARY

Principal activities

In 2015-16 ATSE formed a partnership with The Australian Academy of Science to run the SAGE (Science in Australia Gender Equity) pilot to implement the Athena SWAN Charter into Australian universities, research institutes and other publicly funded research agencies.

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.

During the year the Academy transferred ownership of the Wonder of Science program to The University of Queensland Diamantina Institute and ceased being the sole member of the Crawford Fund Ltd. The Audit & Risk Committee (AARC) undertook a review based on Australian Accounting Standards Board Standard AASB 10 and recommended the Board to consider deconsolidation of Financial Statement given the administrative cost effectiveness for both ATSE and Crawford Fund Ltd. The Board agreed to the deconsolidation in March 2015 and the deconsolidation occurred on 4 August 2015.

There have been no other significant changes in the principal activities of the Academy from the prior year.

Operating result

The operating result for the Academy showed total revenue of \$5,433,497. This was a 10 per cent increase compared to the previous year (\$4,920,889).

The two major sources of income were government grants and contracts (49.6 per cent) and sponsorship income (21.3 per cent).

The surplus for the year was \$35,126 compared to \$434,162 the previous year. The investment income and realised gains on investment reduced by some \$259,000 and, with the contribution to SAGE of \$100,000, was the most significant factor in the reduced surplus.

The financial position remained strong, with total current assets of \$6,491,761 and total current liabilities of \$3,877,865.

The asset-to-current-liability ratio was 1.7 per cent (a healthy financial position is reflected in a ratio greater than 1.0 per cent).

2015-16 donations

The Academy received donations during the year totalling \$146,084. It gratefully acknowledges the generosity of the donors.

Individuals

Mr Morrish Besley AC FTSE
 Dr Mark Bradley
 Mr Dick Carter FTSE
 Dr David Cook FTSE
 Dr John Floyd AM FTSE
 Dr Richard Hannink FTSE
 Dr Margaret Hartley FTSE
 Dr Jay Hetzel FTSE
 Dr Carmel Hillyard FTSE
 Professor Andrew Holmes AM FRS FAA FTSE
 Dr Geoffrey Knights AM FTSE
 Dr Robert La Nauze FTSE
 Mr John Laurie AC FTSE
 Mr Peter Laver AM FTSE
 Dr Oliver Mayo FAA FTSE
 Sir Rupert Myers KBE AO FAA FTSE
 Professor Alison Ord FTSE
 Dr Tony Radford AO
 Dr John Ralph AC FAA FTSE
 Ms Kylie Schafer
 Dr Denis Wade AM FTSE
 Professor Paul Wood FTSE
 Dr John Zillman AO FAA FTSE

Philanthropic

Alan & Elizabeth Finkel Foundation
 ASCA Education Foundation Company Limited
 ATSE NSW Division
 Cochlear Foundation Limited
 Good 2 Give
 University of South Australia

ABRIDGED AUDITED ACCOUNTS

Statement of Profit or Loss and other Comprehensive Income

For the Year Ended 30 June 2016

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

	2016	2015
	\$	\$
Revenue	5,433,497	4,920,889
Expenses		
Learned Fund	(1,736,381)	(1,655,239)
Endowment Fund	(578,051)	(329,108)
Technical Projects	(1,788,706)	(390,951)
International Science and Technology	(413,901)	(768,611)
STELR	(824,354)	(748,112)
ATSE Clunies Ross	(56,978)	(594,706)
Crawford Fund Limited	-	-
	(5,398,371)	(4,486,727)
Surplus for the year	35,126	434,162
Other comprehensive income		
Items that may be reclassified subsequently to profit or loss:		
Fair value gain/(loss) on available-for-sale financial assets	(425,321)	(100,762)
Other comprehensive income for the year	(425,321)	(100,762)
Total comprehensive income for the year	(390,195)	333,400

ABRIDGED AUDITED ACCOUNTS

Statement of Financial Position

As at 30 June 2016

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

	2016	2015
	\$	\$
Assets		
Current Assets		
Cash and cash equivalents	5,276,812	5,305,730
Trade and other receivables	203,258	997,487
Financial assets	950,000	1,050,000
Other assets	61,694	77,323
Total Current Assets	6,491,764	7,430,540
Non-current Assets		
Financial assets	5,319,727	5,789,886
Plant and equipment	109,508	127,490
Intangible assets	125,691	214,606
Total Non-current Assets	5,554,926	6,131,982
Total Assets	12,046,690	13,562,522
Liabilities		
Current Liabilities		
Trade and other payables	409,247	318,912
Income in advance	3,193,208	4,389,767
Provisions	275,410	267,097
Total Current Liabilities	3,877,865	4,975,776
Non-Current Liabilities		
Provisions	10,497	38,223
Total Non-Current Liabilities	10,497	38,223
Total Liabilities	3,888,362	5,013,999
Net Assets	8,158,328	8,548,523
Equity		
Reserves	(29,558)	395,763
Retained surplus	8,187,886	8,152,760
Total Equity	8,158,328	8,548,523

ABRIDGED AUDITED ACCOUNTS

Statement of Changes In Equity For the Year Ended 30 June 2016

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

	Retained Surplus	Financial Assets Reserve	Total
	\$	\$	\$
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
Balance at 1 July 2015	8,152,760	395,763	8,548,523
Comprehensive income			
Surplus for the year	35,126	-	35,126
Other comprehensive income for the year: net fair value gains on available-for-sale financial assets	-	(425,321)	(425,321)
Total comprehensive income for the year	35,126	(425,321)	(390,195)
Balance at 30 June 2016	8,187,886	(29,558)	8,158,328

ATSE TODAY

Academy Fellows are leaders in technology, engineering and collaboration

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.

Our strategies and policies

ATSE advocates for a future in which technological sciences and engineering and innovation contribute significantly to Australia's social, economic and environmental wellbeing.

The Academy is empowered in its mission by more than 800 Fellows drawn from industry, academia, research institutes and government, who represent the brightest and the best in technology, science and engineering in Australia.

Through engagement by our Fellows, the Academy provides robust, independent and trusted evidence-based advice on technology issues of national importance.

We do this via varied activities, including policy submissions, workshops, symposia, conferences parliamentary briefings, international exchanges and visits and the publication of scientific and technical reports.

The Academy promotes science and maths education via programs focusing on enquiry-based learning, teaching quality and career promotion. ATSE fosters national and international collaboration and encourages technology transfer for economic, social and environmental benefit.



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