

Election Policy 2013

SCIENCE PRIORITIES FOR AUSTRALIA

We call on Government to work with the science sector to build a long-term, strategic vision for Australia's future.

The health and wealth of our children will depend upon Australia's scientific capacity for development, literacy and innovation.

As a nation, we have strong and internationally respected heritage of scientific discovery. We must build on that investment, by supporting scientific research and its translation into Australian discoveries, industries and social preparedness.

The Academy recommends

- strategic investment in Australian science
- commitment to improved science and maths teaching in all schools
- reinvigoration of research career structures
- strategic support for international collaboration.

Strategic support for Australian science is central to any rational vision for Australia's future.

We have been fortunate that our mineral wealth has shielded us from much of the global financial crisis faced by other countries over the past several years. From our comparatively advantageous position, we must now invest our wealth, at least to the levels of the upper end of OECD averages, to ensure we are competitive in our ability to meet the economic, social and environmental challenges of this century.

Participation in the knowledge economy by the world's seven billion people is rising quickly, and many countries have placed great emphasis on scientific research as a key mechanism to ensure future prosperity. For an economically developed nation such as Australia, the creation and use of knowledge through research is not merely one of a range of choices, but an essential foundation. The Academy believes strategic support for Australian science is central to any rational vision for Australia's future. We urge the next Australian Government to treat these proposals as national priorities, and not allow them to be ignored in the interests of annual budget pressures, short-term sector appeasement, or party political point scoring.

Strategic investment in Australian science

The long-term challenges facing Australia must be addressed by long-term commitments. Economic productivity, social resilience and sustainable development are underpinned by high educational standards, research discoveries, innovation and the adoption of novel technologies, all of which require significant and sustained investment in education and research.

CATCHING OUR COMPETITORS

Australia spends 2.2% of its gross domestic product (GDP) on research and development (R&D), putting us 13th among OECD member countries and significantly below the OECD average. Successive Australian governments have stated that undertaking high quality R&D to drive innovation is essential to increasing productivity and competitiveness.

Despite their far more difficult financial and economic circumstances, our competitors recognise that investment in science is fundamental to their ongoing

economic prosperity, growth and well-being. Most invest proportionately more than Australia, and many countries have specifically quarantined science investment during the global financial crisis.

A generational commitment is needed to stop Australia falling behind in the race to develop and harness the power of new ideas. This commitment must start with increased investment in research and development to at least the levels of comparable countries.

The Academy recommends that Australian research and development expenditure rise from 2.2% of GDP to 3% over the next five years. At least half the increase should come from the Australian Government through research funding agencies and block grants, with the remainder to come from state and territory governments, industry, philanthropic and international sources. The increase in industry contributions can be achieved through policies that reward such investment, promote collaboration and remove development impediments, particularly for small and medium sized enterprises.

ONGOING INVESTMENT IN MAJOR RESEARCH INFRASTRUCTURE

The recently released National Research Investment Plan makes clear that our national wellbeing and our ability to tackle economic, health and environmental challenges depend on strategic investment in infrastructure to underpin research and innovation. Lifecycles of investments in major national research facilities typically extend over 10–30 years. Previous schemes to support major core facilities have all but come to an end, and the absence of continuing funding is leaving Australia at a strategic disadvantage, unable to plan and operate the necessary facilities for researchers to make new discoveries. Many of our highly experienced researchers are contemplating the move to other opportunities, often in other countries.

The Academy recommends the adoption of the National Research Investment Plan and the introduction of a long-term sustainable funding model (~10 years) that supports major national research infrastructure facilities.

PUBLIC UNDERSTANDING OF SCIENCE

Community understanding and acceptance of science is essential if our society is to make informed and robust decisions about the capacity of science and technology to transform our future. We are part of an era of profound technological advancement. Global knowledge is ever expanding and our national progress will depend

in large part upon our ability to remain informed and responsive to global and domestic challenges. Effective communication of Australian and world science is required to ensure timely community benefit from investment in science.

The Academy recommends strengthening the Inspiring Australia National Science Communication Strategy.

PROVIDING A STABLE RESEARCH FUNDING ENVIRONMENT

Unplanned and frequent changes to the research budget must be avoided. Funding fluctuations, pauses, risks of pauses, and *ad hoc* short term cuts or boosts to programs reduce research efficiency and effectiveness. This 'stop-start' approach makes it difficult for the sector to plan and execute research over the medium to long term and compromises international collaboration. Further, the full costs of research should be covered. At present, much research is heavily cross-subsidised from other sources. We should adopt an approach by which the research that we decide should be undertaken is properly and fully resourced. A non-partisan approach is needed to ensure a stable funding environment in which the sector can plan with confidence.

The Academy recommends

- **provision by Government of a stable research funding environment**
- **reversing the recent \$3.8 billion spending cuts and deferrals from the university sector**
- **strategic increments in funding for the Australian Research Council and National Health and Medical Research Council on a 10-year time scale**
- **continued investment in the successful Cooperative Research Centres scheme**
- **properly resourcing both the direct and indirect research costs to all public sector research grants, whether to universities, medical research institutes or other publicly funded research organisations such as CSIRO.**

Commitment to improved science and maths teaching in all schools

Australia now ranks in the bottom half of OECD countries per capita (20th out of 30) on the number of university graduates emerging with a science or engineering degree. This relatively low level of participation is causing significant skills shortages and makes Australia a less attractive nation in which to invest and do business.

As the 2012 Chief Scientist's report *Health of Australian Science* makes clear, teachers hold a unique and central position in influencing students' interest in and attitudes towards science. Unfortunately, Australia has moved backwards in terms of the proportion of high school students studying maths and science over the past two decades. A range of recent positive and relatively low-cost instruments, including the Academy's primary and secondary school science education programs (*Primary Connections* and *Science by Doing*), are now becoming available and will improve training and support for science and maths teachers. Significant new investment is required to roll out these programs widely so that they can help deliver a skilled workforce and improved scientific literacy within the community.

The Academy recommends

- **continuing support for the development of the national roll-out of proven programs that increase participation and performance in maths and science**
- **significantly increasing support for teacher training to improve quality, specifically for maths, science and technology teaching**
- **establishing enhanced career pathways to promote recruitment and retention of science and maths PhD graduates into teaching.**

Reinvigoration of research career structures

We must attract and retain as many skilled scientists and mathematicians into our workforce as possible. This challenge must be seen in an international context; in many research fields, Australia is only one of several major players and scientists readily move to countries offering the best career research opportunities. There is growing international competition for talent and we must ensure we are attractive as a research destination for the best and brightest Australian and overseas researchers.

CAREER PATHWAYS FOR PHD GRADUATES

The number of PhD students registered for research in Australia has increased by almost 70% over the past 10 years. In 2011 6,757 PhDs were awarded in Australia. This increase has boosted Australia's ability to carry out high quality research. About 80% of our PhD graduates will not become long-term academic researchers. Every PhD student should be exposed to a wide range of career paths in industry, government and education, and provided with appropriate professional development training in skills needed by employers outside of academia.

ONGOING RESEARCH CAREER DEVELOPMENT

The ARC Future Fellowship scheme has been an example of a very successful program, helping Australia retain its brightest and best researchers and attract back researchers who moved overseas to pursue career opportunities. To ensure we remain competitive in attracting and retaining the world's best researchers to work on Australia's research priorities, this scheme should be continued as an ongoing program. We must also ensure that we have the right number and balance of fellowships available for researchers at early, mid and senior career levels.

The Academy recommends

- support and training be provided during PhD and postdoctoral training to significantly broaden career options for graduates
- continuation of the successful ARC Future Fellowship scheme
- review of ARC and NHMRC 'career fellowship schemes' with a view to expanding the number of fellowships and rebalancing the number of fellowships at different career stages (early, mid-career, established).

Strategic support for international collaboration, particularly with Asia

Termination in 2011 of the productive 10-year International Scientific Linkages program reduced strategic support for international collaborations that invigorate our national research effort. Without strategic national coordination, we are unable to integrate our research activities with the 96% of high-citation research that occurs overseas.

Australia has a closing window of opportunity. Our intellectual and scientific capital gives us a competitive advantage — international scientists, particularly in Asia, want to collaborate with us. Without strategic engagement we will be significantly less competitive on the international stage in 10 years' time given global research investment trajectories, growth in student education in developing countries, and increasing international competition for collaboration, as argued in the Academy's 2011 position paper, *Australian science in a changing world: innovation requires global engagement*.

International education is Australia's largest non-resource export earner, currently worth \$15 billion per annum, supporting 100,000 jobs. International students study at Australian universities because of our research-based reputation. We must invest in Australia's capacity to collaborate internationally to enhance the appeal of our international education services. Australia is currently a competitive, collaborative top 20 country in science — we must take a strategic approach to international scientific collaboration to grow to a country with a significant status in international science education.

The Academy proposes a strategic effort to enhance Australia's international science collaboration capability. An integrated international science program should be urgently established, with a time frame of 10 years and a commitment of \$25 million per annum.

Reduced administrative burdens to improve research productivity

Recent research has calculated that university academics in Australia are spending an average of 16.1 hours per week on activities other than research and teaching. This is time largely made up of bureaucratic and administrative tasks, which include preparing and reviewing grant applications and complying with ever-proliferating reporting and regulatory requirements. Recent estimates put regulatory compliance and reporting costs at \$280 million per annum for the university sector alone. Through smarter governance and research management we can improve research efficiency by letting researchers research.

The Academy proposes that a commitment is made to reduce administrative and regulatory burdens to enable researchers' efforts to be redirected back to research. A target administrative load for researchers of the order of 10% of total time should be considered (noting that teaching, for many researchers, is expected to occupy a substantial amount of time). The roles of regulatory agencies should be streamlined. A thorough review of state and federal regulatory agency burden upon researchers should be undertaken to assess overlap, duplication, confusion and obsolescence in current and planned regulatory requirements.