

Summary of Linkage Learned Academies Special Projects for Funding to Commence in 2008

The Academy of the Social Sciences in Australia

LS0800003 Dr J Jupp; Prof MG Clyne; Dr RT Appleyard; Prof GJ Hugo; Prof CB Inglis;
Dr S-E Khoo; Prof K Kirsher; Dr GB Levey; Prof AFJ Pauwels

Approved Project Title **Integration and Multiculturalism – a Harmonious Combination**

2008: \$ 89,500

Project Summary

The main benefits to the nation and the community should be a clearer picture of social aspects of life in a culturally diverse society. The effect of continuing immigration and the policy approaches to deal with this should be clarified. Various prejudices and misconceptions should be analysed and placed in the context of Australia's role in its region and in a globalising world. A reasoned survey of public debates will be provided, analysed through the perspectives of the social science disciplines. This approach should illuminate and benefit various public policies, including migrant settlement, citizenship testing, national security, language policy and social integration. The bases for continuing social harmony will be analysed in the light of existing local experience and comparative studies from comparable societies. Hopefully a lasting basis should be laid for interdisciplinary co-operation around these issues and for the encouragement of generational change from those who have laid the foundations to those who are developing new approaches. Many of those working in these fields are now at or beyond retirement age, but there is also an active younger generation at the Doctoral level, especially in the study of specific migrant communities.

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The Australian Academy of the Humanities

LS0800001 Dr JC Byron

Approved Project Title **The Humanities in Australia Today: an appraisal of current activity and likely trends in teaching, learning and research across the humanities in Australia**

2008: \$ 75,200

2009: \$ 32,272

Project Summary

The humanities 'ecology' has never been mapped comprehensively in Australia. Both the academic workforce and the student cohort are relatively poorly understood in terms of current strengths and weaknesses and likely future trends.

A clear understanding of humanities research activity and potential in Australia is crucial to developing an informed approach to managing our national knowledge requirements in a wide range of disciplines, including ethics, history, Asian and European studies, society and culture, religious studies, archaeology and linguistics.

Detailed knowledge of humanities teaching and learning is just as important. The community relies upon the humanities sector to produce graduates competent in fields as diverse as: heritage management; understanding of foreign languages and culture; Australian history, literature and arts; and media and communications.

Current statistical collections provide a patchy and inconsistent view of the disposition of the humanities in Australia: we are unable to say with much precision how the humanities was arrayed in the recent past; and it is very difficult to make a confident prediction of the sector's profile and capabilities in the near future.

This project will analyse existing data and produce supplemental data to complete the picture, and conduct a detailed synoptic examination of the total humanities community in higher education, including students and academics.

The result will be a comprehensive picture of the current and future state of play of Australia's humanities capability, which will inform Government, industry and community responses to current and emerging national priority areas of workforce need and knowledge requirements.

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The Australian Academy of the Humanities

LS0800002 Prof CW Nettelbeck; Dr JC Byron; A/Prof M Levy; Prof MG Clyne; A/Prof CA Elder; A/Prof JT Hajek; A/Prof AE McLaren; A/Prof M Möllering; Prof G Wigglesworth

Approved Project Title **An Analysis of Retention Strategies and Technology Enhanced Learning in Beginners' Languages Other than English (LOTE) at Australian Universities**

2008: \$ 57,000

Project Summary

Language study is an important mechanism in maintaining and expanding Australia's language capacity and is, therefore, critical to achieving national objectives with respect to improvements in trade, career pathways, international mobility, research capacity, technological developments and community as well as individual engagement. A major responsibility for enhancing the nation's language ability falls on the university sector, which is uniquely positioned to tie in successful language learning with desired national outcomes. Language provision is also a major priority for Australian universities in a context of increasing internationalisation of higher education. The Australian universities need to offer the widest possible range of languages and the best possible means of learning them to an adequate level of operating proficiency. For many students, university provides the first experience of new and/or different languages. In this context, the issue of whether Australian universities are doing as well as they can in terms of beginners language provision is clearly a critical one. With reference to nationally identified priority areas for research, this project satisfies most directly criteria relating to 'Safeguarding Australia'. It benefits our understanding of the wider world, specifically by improving the nation's knowledge and expertise in languages other than English by providing the basis for improvement of language training at university level in this country. There will be ongoing benefits in terms of improved networking and communication in the beginners languages sector across Australia, and institutions may derive considerable material benefit through implementation of the project's recommendations.

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The Australian Academy of Science

LS0800007 Lambeck, K

Approved Project Title **Nanotechnology: Ensuring the Benefits and Managing the Risks**

2008: \$ 78,800

Project Summary

Nanotechnology developments have the potential for significant advances in many fields including medicine, energy efficiency improvements and environmental remediation, but many of the effects of nanomaterials on living organisms and the environment are not well understood. The medical innovations include improved drug delivery with reduced side effects, energy savings through nanocatalysis which enable chemical reactions at lower temperatures, as well as advances in solar technologies for capturing light for more efficient conversion to heat and electricity, and nanoparticles which can selectively trap and remove environmental pollutants.

This research project will examine nanotechnology research trends and priorities in Australia in developing new applications, and how regulatory authorities are addressing community concerns about the safeguards in place for the introduction of a new technology. The research will take into consideration international research into new products and safeguards, and build on the findings of recent Australian studies, such as the report of April 2006 by the National Academies Forum into *Environmental, Social, Legal and Ethical Aspects of the Development of Nanotechnologies in Australia*, and studies by health authorities. The project will develop appropriate criteria for assessment of nanotechnology risks on a case by case basis for different applications to ensure public confidence that the health, safety and environmental aspects are being addressed. This work is designed to take into consideration the more recent work on nanoparticles since the earlier reports were speculative rather than evidence-based.

Nanotechnology is an emerging science and will return economic and community benefits to the early adopters who can achieve this within expertly developed safety guidelines. The March 2005 report to the Prime Minister's Science, Engineering and Innovation Council states that "nanotechnology could, over the next decade, be as significant as the impact of electricity or the microchip. Global sales could total US\$2.6 trillion – as much as ICT and ten times more than biotechnology revenues".

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The Australian Academy of Technological Sciences and Engineering

LS0800004 Prof WJ Tegart; Prof PJ Hudson; Prof TW Turney

Approved Project Title **Improvements to Human Health and Performance in Australia through Application of Converging Technologies**

2008: \$ 81,500

2009: \$ 13,500

Project Summary

While health and health care is usually characterized in terms of illness, an equally valid approach is to consider it in terms of prevention of illness, or wellness. The economic impacts of both are extremely large. Thus in Australia health care costs 9.5% of GDP and is predicted to be 15% by 2050. This translates to 17.7 % of government revenue with continued growth to mid-century. The health sector continues to seek new technologies and approaches which are needed to reduce costs and to improve human health and performance.

Thus new approaches to wellness which include nutrition, clean environment and quality of life can arise from developments in nutrigenic foods, smart packaging, air and water treatment, health monitoring and lifestyle management, minimizing physical and mental degeneration (five out of ten disabilities are mental ones) and improvements to the human/machine interface. This could involve smart materials, membranes, biosensors, biomonitoring, nanoimaging techniques, neuronal chips, smart wearable systems for biosensing and actuation, biomaterials for repairs, ambient intelligence concepts e.g. smart integrated systems, advanced sensors and robotics.

Similarly new approaches to illness which include diagnostics and health care delivery can arise from developments in prognosis and prevention, individually targeted therapies, point-of-care testing and monitoring. This could involve nanobiochips, in-vivo imaging, innovative biocompatible materials, genomics-based therapy, nanomedicine, bioinformatics, system design with neural networks, biomonitoring, biobatteries.

The project will bring together a group of experts in a range of disciplines covering nanotechnology, biotechnology, information technology and neuroscience in a unique opportunity to shape the future path of health care and human performance in Australia. In particular, developments in nanotechnology which provide the ability to engineer matter at the nanoscale, comparable to the size of cells, will be a powerful driver of change for approaches to illness and wellness when linked to biotechnology, information technology and neuroscience.

Summary of Linkage Learned Academies Special Projects for Funding to Commence in 2008

The National Academies Forum

LS0800005 Mr P Laver; Dr JC Byron; Prof K Lambeck; Prof S Richardson

Approved Project Title **Understanding the Formation of Attitudes to Nuclear Power in Australia**

2008: \$ 99,000

2009: \$ 34,500

Project Summary

The debate on nuclear power was a polarising issue through 2007. This project will provide vital ground-clearing work at the national level so that, should that issue, or a similarly complex issue, be reactivated in the future, a more mature and profound debate may proceed. Such a service will benefit the many communities that are becoming engaged in the discussion about nuclear issues. They include the Federal Government, some conservationists, many energy-source industries, and all those concerned about the world's future response to climate change.

This project will clarify the political, scientific, environmental, and social contexts in which decisions on nuclear energy may be made in the future. It will not, though, seek to participate in the decision-making process: rather, it will provide the essential basis that informs good policy.

Since the project will involve all four learned academies in Australia, its successful implementation will teach an invaluable lesson in the benefits of multi-disciplinary work. It will bring together the research and analysis of historians, political analysts, physicists, environmentalists, legal analysts, economists, cultural critics, and anthropologists – to mention only the most obvious experts for this issue.

Web publication of all papers involved in the project will make the outcomes of its activities accessible throughout Australia and the world. A book publication will also result from the project.