



**Australian Government**

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**Australian Research Council**

**Linkage Learned Academies  
Special Projects**

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**Funding Rules for Funding commencing in**

**2005**

Australian Research Council  
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## Ethics

All research proposals should conform with the principles outlined in the Joint NHMRC/AVCC Statement and Guidelines on Research Practice (1997) (at <http://www.nhmrc.gov.au/issues/researchethics.htm>) and, as applicable, the principles outlined in the NHMRC's National Statement on Ethical Conduct in Research Involving Humans (at: <http://www.nhmrc.gov.au/publications/synopses/e35syn.htm>) and the principles outlined in the NHMRC's codes on animal research (at <http://www.nhmrc.gov.au/issues/animalethics.htm>).

## Acknowledging ARC support

The ARC expects that projects funded by the ARC will be appropriately acknowledged.

When, at any time during or after completion of a Project, the Academy or a researcher publishes material, books, articles, television or radio programs, newsletters or other literary or artistic works which relate to the Project and/or Fellowship, the Academy or researcher shall acknowledge, at a prominent place in the publication, the support of the ARC in a form acceptable to the ARC.

Advice on acceptable forms of acknowledgement and use of the logo is provided on the ARC website at [www.arc.gov.au](http://www.arc.gov.au).

## Acronyms

The following acronyms are used in ARC Funding Rules.

<b>AEST</b>	Australian Eastern Standard Time
<b>AIMS</b>	Australian Institute of Marine Science
<b>ANSTO</b>	Australian Nuclear Science and Technology Organisation
<b>APA</b>	Australian Postgraduate Award
<b>APAI</b>	Australian Postgraduate Award (Industry)
<b>APD</b>	Australian Postdoctoral Fellowship
<b>APDC</b>	Australian Postdoctoral Fellowship (CSIRO)
<b>APDI</b>	Australian Postdoctoral Fellowship (Industry)
<b>APF</b>	Australian Professorial Fellowship
<b>ARC</b>	Australian Research Council
<b>ARCIF</b>	Australian Research Council International Fellowship
<b>ARF</b>	Australian Research Fellowship
<b>AVCC</b>	Australian Vice-Chancellors' Committee
<b>CI</b>	Chief Investigator
<b>CSIRO</b>	Commonwealth Scientific and Industrial Research Organisation
<b>DSTO</b>	Defence Science and Technology Organisation
<b>EAC</b>	Expert Advisory Committee
<b>ECR</b>	Early Career Researcher
<b>GA</b>	Geoscience Australia
<b>GAMS</b>	Grant Application Management System
<b>GST</b>	Goods and Services Tax
<b>HECS</b>	Higher Education Contribution Scheme
<b>KCTR</b>	Key Centre for Teaching and Research
<b>LASP</b>	Learned Academies Special Projects
<b>LIEF</b>	Linkage Infrastructure Equipment and Facilities Program
<b>LIF</b>	Linkage Industry Fellowship
<b>NCGP</b>	National Competitive Grants Program
<b>NHMRC</b>	National Health and Medical Research Council
<b>PI</b>	Partner Investigator
<b>QEII</b>	Queen Elizabeth II Fellowship
<b>RIEF</b>	Research Infrastructure Equipment and Facilities Scheme
<b>SPIRT</b>	Strategic Partnerships with Industry – Research and Training
<b>SRC</b>	Special Research Centres
<b>URL</b>	Universal Resource Locator

Australian Research Council  
**Linkage Learned Academies Special Projects**  
Funding Rules for Funding commencing in 2005

## **1. Introduction**

This document sets out the funding rules under the *Australian Research Council Act 2001* for *Linkage Learned Academies Special Projects*, a program funded under the Australian Research Council's National Competitive Grants Program (NCGP).

The Australian Research Council (ARC) provides funding to teams or individuals for high-quality research through several application-based, competitive schemes. These schemes aim to maintain and strengthen Australia's knowledge base and research capabilities by developing an effective research and research training system.

These Funding Rules are written on the basis that it is the researcher who is the applicant. However, financial assistance from the ARC is paid to one of the Academies (see below), not to the individual researchers.

## **2. Objectives**

*Linkage Learned Academies Special Projects* (LASP) aims to support projects undertaken by the Learned Academies which:

- capitalise on their unique capabilities;
- assist programs of research undertaken by institutions; and
- may be expected to have results of broad benefit for research and scholarship in the natural and applied sciences, technological development and applied technology, the social sciences and the humanities.

The Australian Research Council is particularly interested in supporting activities in areas of demonstrable national importance.

## **3. Description**

### **3.1 Areas not eligible for support**

Normally, financial assistance will not be provided to projects directed at specific research problems, since these are funded more appropriately through other ARC or Commonwealth Government funding programs.

### **3.2 National Research Priorities**

The Minister for Education, Science and Training has designated the following areas as national research priorities for the 2005 funding round:

- Research Priority 1: An Environmentally Sustainable Australia
- Research Priority 2: Promoting and Maintaining Good Health
- Research Priority 3: Frontier Technologies for Building and Transforming Australian Industries
- Research Priority 4: Safeguarding Australia

These areas of research will be referred to as Designated National Research Priorities. Within each Research Priority is a number of Priority Goals which are listed below:

- Research Priority 1: An Environmentally Sustainable Australia  
Priority Goals
  - PG 1 Water – a critical resource
  - PG 2 Transforming existing industries
  - PG 3 Overcoming soil loss, salinity and acidity
  - PG 4 Reducing and capturing emissions in transport and energy generation
  - PG 5 Sustainable use of Australia’s biodiversity
  - PG 6 Developing deep earth resources
  - PG 7 Responding to climate change and variability
- Research Priority 2: Promoting and Maintaining good Health  
Priority Goals
  - PG 1 A healthy start to life
  - PG 2 Ageing well, ageing productively
  - PG 3 Preventive healthcare
  - PG 4 Strengthening Australia’s social and economic fabric
- Research Priority 3: Frontier Technologies for Building and Transforming Australian Industries  
Priority Goals
  - PG 1 Breakthrough science
  - PG 2 Frontier technologies
  - PG 3 Advanced materials
  - PG 4 Smart information use
  - PG 5 Promoting an innovation culture and economy
- Research Priority 4: Safeguarding Australia  
Priority Goals
  - PG 1 Critical infrastructure
  - PG 2 Understanding our region and the world
  - PG 3 Protecting Australia from invasive diseases and pests
  - PG 4 Protecting Australia from terrorism and crime
  - PG 5 Transformational defence technologies

Full descriptions of these Designated National Research Priorities and their associated Priority Goals can be found in Appendix 1, and on the ARC web site ([www.arc.gov.au](http://www.arc.gov.au)).

## **4. Eligibility**

### **4.1. Eligible organisations**

Financial assistance under the LASP program may be provided only to the following organisations, hererinafter called the Academies:

- Australian Academy of Technological Sciences and Engineering
- Australian Academy of Science
- Australian Academy of the Humanities
- Academy of the Social Sciences in Australia
- National Academies Forum

## **5. Financial assistance**

### **5.1. Level and duration of financial assistance**

*Linkage Learned Academies Special Projects* have a maximum duration of three years for any one project, subject to parliamentary appropriations. An application must be submitted each year for ongoing projects.

### **5.2. Areas of investigation/work not supported**

*Linkage Learned Academies Special Projects* does not support the following work:

- clinical medicine and dental research and training and public health research and training that are covered by the NHMRC;
- activities leading solely to the creation or performance of a work of art, including visual art, musical compositions, drama, dance, designs and literary works, for which Commonwealth Government support is provided through the Australia Council for the Arts;
- production of teaching materials, even though some research may be involved in their production.

## **6. Cross-program funding**

Many Academy Fellows and other members of the Academies also carry out research in higher education institutions. There is no conflict in these two roles. Fellows may apply for the normal range of ARC financial assistance available to individuals (within the specified limits) even if associated with a Learned Academies Special Project.

## 7. Application process

Applications for Special Projects are subject to a two-phase application process, designed to reduce the work load of the Academies.

### 7.1. Expressions of interest

Each Academy may submit up to four expressions of interest to conduct Special Projects. Expressions of interest must be submitted to the ARC by **21 May 2004**. Expressions of interest must include:

- a clear summary of the purpose of the project and its planned outcomes;
- a summary of the ways in which the project contributes to the objectives of the *Learned Academies Special Projects* scheme;
- a brief outline of the activities involved in the project and its planned milestones; and
- an indicative budget which estimates how Government funds will be spent. It should show any other sources of funding for the project and how those funds will be spent, as well as any income which the Academy expects to be generated by the project.

An expression of interest should not exceed three A4 pages and must be in 12 point font size.

### 7.2. Full application

The ARC will select some expressions of interest for further development. For these, the following information will be required in a Full Application submitted to the ARC by **16 July 2004**:

- a detailed statement of the purpose of the project, its methodology and its planned outcomes;
- a description of the ways in which the project contributes to the objectives of the *Learned Academies Special Projects* scheme, and builds on previous work undertaken by the Academy/Forum or its fellows;
- the name of the project leader, and details of the staff and resources involved in the project, including staff and resources to be used in institutions other than the host Academy/Forum;
- the curricula vitae of key personnel involved in the project, not exceeding one page per person, including name, qualifications and current appointment, employment history, relevant experience and other relevant information;
- a detailed timeline of the activities involved in the project and its planned milestones;
- an indication of the intellectual property issues which may arise from the project and the intention of the Academy/Forum with respect to the publication of findings; and
- a detailed budget which indicates how Government funds will be spent. It should show any other sources of funding for the project and how those funds will be spent as well as any income which the Academy/Forum expects to be generated by the project. Each activity should be assigned a priority ranking according to whether that activity is considered essential, desirable or beneficial to a successful outcome of the

project, and should be justified. Funding for direct costs of administration (eg travel costs, external meeting costs, publication costs) related to the conduct of the project may be requested (and must be fully justified); general administrative overheads must be met by the host Academy/Forum.

### **7.3. How to complete and submit applications**

All expressions of interest and full applications must be signed by the Secretary (or similar officer) the relevant Academy. An original and one identical paper copy only are required. Applications should be sent

by mail, to

LASP Program Coordinator  
Disciplines and Programs  
Australian Research Council  
GPO Box 2702  
CANBERRA ACT 2601

by courier, to

LASP Program Coordinator  
Disciplines and Programs  
Australian Research Council  
Geoscience Australia Building  
Cnr Hindmarsh Drive and  
Jerrabomberra Avenue  
SYMONSTON ACT 2609

## **8. Selection and approval process**

### **8.1. Selection criteria**

Expressions of Interest and Full Application for LASP financial assistance are assessed against the following criteria:

- the extent to which the proposal satisfies the objectives of the Scheme, as described in Section 2 of these funding rules;
- the merit of the proposal in relation to goals and potential outcomes, the project plan and budget justification;
- the relevance of the proposal to issues of national significance and importance;
- the relevance of the proposal to National Research Priorities; and
- the level of cash and in-kind support from sources other than the ARC.

### **8.2. Assessment and selection procedure**

Assessment of Expressions of Interest is undertaken by ARC staff who may consult with members of the ARC's Expert Advisory Committees. Assessment of Full Applications is undertaken by a Selection Committee, consisting of members of the ARC's Expert Advisory

Committees (EACs), which may seek advice from appropriately qualified persons. The Selection Committee:

- Assesses Full Applications and recommends financial assistance; and
- prepares recommendations that are submitted to the ARC for Board and, subject to its approval, then to the Minister for approval.

Expressions of interest that are not selected to be developed as Full Applications will not be recommended for financial assistance. Full applications are assessed competitively, and may or may not be recommended for financial assistance.

The ARC has procedures for managing institutional and personal conflicts of interest experienced by Committee members, and for enabling members to withdraw from considering particular applications in the assessment process.

The ARC reserves the right to negotiate amendments to Full Applications where it believes the project outcomes will be improved by such changes. The Academy is not obliged to accept amendments, but the ARC may decline to recommend funding assistance if amendments are not made.

### **8.3. Ministerial approval**

A recommendation from the ARC Board is sent to the Minister for consideration. The Minister determines which applications will be offered financial assistance. The Minister's decision is final (subject to an appeal process).

### **8.4. Offer of financial assistance**

The successful academy will be notified in a letter of offer, that will indicate the financial assistance to be provided and will include the Funding Agreement.

## **9. Appeals process**

Appeals will be considered only against process issues and not against Committee decisions or comments. Appeals must be made on the appeals form available on the ARC website ([www.arc.gov.au](http://www.arc.gov.au)).

The form must be lodged through the academy secretariat and be received, **within 28 days** of the date on the letter notifying the outcome of applications, to:

The Appeals Officer  
Australian Research Council  
GPO Box 2702  
CANBERRA ACT 2601

## **10. Administration of awards**

### **10.1. Funding Agreement**

Successful applicants should familiarise themselves with the Funding Agreement. They must accept the terms of the Funding Agreement and the academy and the ARC must sign the Funding Agreement before funds can be paid.

Projects must commence as required by the Funding Agreement. Failure to do so will result in termination of financial assistance.

Academies should note that the Funding Agreement covers the post-award management, including reporting requirements and financial management. The draft Funding Agreement can be viewed on the ARC website ([www.arc.gov.au](http://www.arc.gov.au)).

#### **10.1.1. Varying the Funding Agreement**

Requests to vary the Funding Agreement must be forwarded in writing by the academy's secretariat to the ARC. Forms are available for variation requests on the ARC website at [www.arc.gov.au](http://www.arc.gov.au).

#### **10.1.2. Varying the Funding Approval**

Requests to vary the Funding Approval must be forwarded in writing by the Academy to the ARC. The Funding Approval may be varied where:

- The academy's involvement with the research program ends;
- the research program changes so that it is no longer consistent with the description in the Funding Approval; or
- the person named in the Funding Approval as the person leading the research program ceases to lead the program.

#### **10.1.3. Reports**

Academies are required to submit reports concerning funded projects to the ARC, in the format and by the due dates detailed in the Funding Agreement.

## **11. Other matters**

### **11.1. Applicable law**

The ARC is required to comply with the requirements of the *Privacy Act 1988* and the *Freedom of Information Act 1982*. Information about the *Privacy Act* is available at <http://www.privacy.gov.au/act/index.html>

### **11.2. Confidentiality and publicity**

Information contained in applications is regarded as confidential unless otherwise stated and, subject to the need to provide applications to assessors, and statutory requirements for the ARC

to provide information to Parliament and other organisations, applications will be received and treated as confidential.

Notwithstanding the previous paragraph, The ARC may publicise and report an offer or award of financial assistance, including information about the proposed research, the name and institution of any applicant, the title and summary descriptions of the project and its intended outcomes, and the level of funding from the ARC and any other organisation involved in the project.

### **11.3. Intellectual property**

Applicants must agree to comply with the National Principles of Intellectual Property Management for Publicly Funded Research (available at [www.arc.gov.au](http://www.arc.gov.au)) and act in accordance with any intellectual property policies of the applicant's institution.

### **11.4. Incomplete or misleading information**

It is a serious offence to provide false or misleading information to the Commonwealth. If an application is incomplete or contains information that is considered misleading, it may be excluded from any further consideration.

If the ARC believes that omissions or inclusion of misleading information are intentional, or if there is evidence of malpractice, the ARC will refer the matter for investigation with a view to prosecution under Commonwealth criminal law. The Commonwealth Government is committed to protecting its revenue, expenditure and property from any attempt, by members of the public, contractors, sub-contractors, agents, intermediaries or its own employees, to gain financial or other benefits by deceit.

Examples of malpractice include, but are not restricted to:

- providing fictitious track records; or
- falsifying claims in publications records (such as describing a paper as accepted for publication when it has only been submitted).

### **11.5. Insurance and liabilities**

Institutions are subject to the liability, indemnity and insurance provisions of the Funding Agreement. The draft Funding Agreement can be viewed on the ARC website ([www.arc.gov.au](http://www.arc.gov.au)).

### **11.6. Contact points**

Enquiries about Linkage Learned Academies Special Projects may be addressed to:

LASP Program Coordinator  
Disciplines and Programs  
Australian Research Council  
GPO Box 2702  
CANBERRA ACT 2601

Email: [ncgp@arc.gov.au](mailto:ncgp@arc.gov.au)  
Phone: 02 6284 6600  
Fax: 02 6284 6638  
Web [www.arc.gov.au](http://www.arc.gov.au)

## **Appendix 1. Descriptions of Designated National Research Priorities and associated Priority Goals**

### **Research Priority 1: An Environmentally Sustainable Australia**

*Transforming the way we utilise our land, water, mineral and energy resources through a better understanding of human and environmental systems and the use of new technologies*

Natural resources have traditionally fuelled our national and regional economies. They have the potential to generate further wealth and employment opportunities in the future. But our natural resources and biodiversity must be used on a sustainable basis so that the benefits continue to be enjoyed by future generations.

Australia faces significant environmental challenges:

- Efficient and sustainable water use is a critically important issue for our economic and social development;
- Significant land degradation issues, such as salinity, need to be arrested to underpin our agricultural production systems;
- Climate change can be expected to have complex, long-term consequences for the environment, for our agricultural and marine production systems and for communities; and
- The cleanliness and efficiency of our energy production systems should be enhanced.

There is substantial effort underway to develop more efficient water utilisation practices, to protect our rivers and groundwater resources, and to protect and remediate our fragile soils.

Our agricultural and mining industries are being transformed through the adoption of new technologies, and the development of new types of foods.

This will help to revitalise our regional communities and generate substantial export earnings for the nation over the coming decades.

The Government is committed to meeting the greenhouse gas emissions target set for Australia at Kyoto.

Australia is well placed to take an international lead in developing new and improved energy technologies and in capturing and 'sequestering' carbon dioxide.

Other opportunities lie in managing and using our unique, rich land- and marine-based biodiversity, and in developing our deep earth resources.

Australia has a strong record of achievement in research in fields in the natural sciences, such as agriculture, natural resource management, climate change, horticulture, forestry, mining, energy, and marine sciences, as well as in the social sciences and humanities.

We must build on these strengths to improve our competitive advantages while enhancing our understanding of natural systems and the interplay of human activities.

In particular, there needs to be an increased understanding of the contributions of human behaviour to environmental and climate change, and on appropriate adaptive responses and strategies.

To understand and manage these complex interactions better will require significant collaboration within the research community and with other stakeholders.

Priority goals for research fall in the seven areas of water utilisation, transforming resource-based industries, overcoming land degradation, developing cleaner, more efficient fuels and energy sources, managing biodiversity, deep earth resources and responding to climate change and variability.

## Priority Goals

- **Water – a critical resource**

*Sustainable ways of improving water productivity, using less water in agriculture and other industries, providing increased protection of rivers and groundwater and the re-use of urban and industrial waste waters.*

Australia is one of the driest continents and is dependent upon access to freshwater supplies for economic and social development. It has a complex geological structure, a highly variable climate, unique ecosystems, flora and fauna and a distinctive indigenous and settler history. Enhancing our understanding of the links between these factors and water availability will result in a better understanding of sustainable water management practices.

- **Transforming existing industries**

*New technologies for resource-based industries to deliver substantial increases in national wealth while minimising environmental impacts on land and sea.*

Resource-based industries underpin much of Australia's prosperity and have the potential to do so in the future. For example, Australia remains highly prospective for minerals discoveries and highly attractive for the development of new era foods from agricultural and marine sources. Our competitive advantage and national well being will depend on research and on the development and adoption of new technologies.

- **Overcoming soil loss, salinity and acidity**

*Identifying causes and solutions to land degradation using a multidisciplinary approach to restore land surfaces.*

The Australian landscape is fragile: soil salinity, acidity, and nutrient levels pose significant, long term challenges for agriculture and the environment. Research is helping to find solutions to these problems. For example, the National Land and Water Resources Audit shows the extent of salinity, soil erosion and soil acidification in the Australian environment and illustrates Australia's leading edge in national mapping of critical resource data. Further multidisciplinary effort is required to develop sustainable land management practices that are appropriate for Australian conditions and mitigate major land degradation processes and increase biodiversity.

- **Reducing and capturing emissions in transport and energy generation**  
*Alternative transport technologies and clean combustion and efficient new power generation systems and capture and sequestration of carbon dioxide.*  
 Australia is well positioned to produce world class solutions to reduce and capture greenhouse gas emissions and the Government is committed to meeting the emissions target set for Australia at Kyoto. We are also well placed to develop alternative energy technologies and ecologically sustainable transport and power generation systems.
- **Sustainable use of Australia's biodiversity**  
*Managing and protecting Australia's terrestrial and marine biodiversity both for its own value and to develop long term use of ecosystem goods and services ranging from fisheries to ecotourism.*  
 Australia has a unique and rich flora and fauna. Many of our complex ecosystems – on which our agricultural, fisheries and tourism industries depend - have adapted to events such as drought and fire, and have been shaped by indigenous and settler management practices. There is a need for a more comprehensive understanding of these natural systems and the interplay with human activities, and the effects of management and protection measures.
- **Developing deep earth resources**  
*Smart high-technology exploration methodologies, including imaging and mapping the deep earth and ocean floors, and novel efficient ways of commodity extraction and processing (examples include minerals, oil and gas) while minimising negative ecological and social impacts.*  
 Many of Australia's known mineral assets may be nearly exhausted within the next decade. New land-based deposits are believed to be buried deeper in the crust and the deep marine areas surrounding Australia are also largely unexplored. New technologies, such as remote sensing, indicate scientists are on the brink of being able to 'see' inside the earth and identify deeply buried deposits.
- **Responding to climate change and variability**  
*Increasing our understanding of the impact of climate change and variability at the regional level across Australia, and addressing the consequences of these factors on the environment and on communities.*  
 Australia already has a highly variable climate, and climate change can be expected to have further significant impacts. It is important to enhance our understanding of the consequences of climate change and variability at the regional level across Australia, and the implications for the environment and for communities. It is also important to explore beneficial adaptation strategies to climate change and variability to ensure ongoing social, economic and environmental well being.

## **Research Priority 2: Promoting and Maintaining Good Health**

### *Promoting good health and well being for all Australians*

Average life expectancies have increased markedly in recent decades. Australians also expect to lead longer and healthier lives in the future, and to remain productive and independent over an extended period.

Enabling individuals and families to make choices that lead to healthy, productive and fulfilling lives will yield economic and social benefits and add materially to national well being.

Australians expect that their children and grandchildren should have a healthy start to life.

Developing strategies to promote the healthy development of young Australians, and addressing the causes and reducing the impact of the genetic, social and environmental factors which diminish their life potential will be critical.

A revolution is also underway at the other end of the life cycle. Australia, like many other developed nations, is undergoing a major demographic shift involving significant growth in the aged population.

To meet this challenge, it will be important to promote healthy ageing by developing better social and medical strategies to ensure that older Australians enjoy healthy and productive lives.

Informed insights into the causes of disease and of mental and physical degeneration will contribute to the achievement of this goal.

All Australians stand to benefit from preventive healthcare through the adoption of healthier attitudes, habits and lifestyles.

Evidence-based preventive interventions may help reduce the incidence and severity of many diseases, including major health problems such as cardiovascular and neurodegenerative diseases, mental ill-health, obesity, diabetes, asthma and chronic inflammatory conditions. These could include interventions that reduce exposure to contamination of the physical environment (eg air pollution).

Improvements in the health and well being of the young, of older Australians and in preventive healthcare will be underpinned by research.

However, while Australia has an enviable record in health and medical research, the research effort is spread across the many universities, hospitals and health and medical research institutes, resulting in critical mass only in limited areas of research.

There is also a need to draw on multidisciplinary approaches that include research contributions from the social sciences and humanities.

This priority is designed to promote health and prevent disease through a more focused and collaborative effort.

Priority goals for research fall in the four areas of a healthy start to life, ageing well, ageing productively, preventive healthcare and strengthening Australia's social and economic fabric.

## Priority Goals

- **A healthy start to life**  
*Counteracting the impact of genetic, social and environmental factors which predispose infants and children to ill health and reduce their well being and life potential.*  
Human health in the developing foetus and in early childhood is critical to the future well being of the adult. Research shows that health and well being in early childhood is predictive of later positive outcomes, and that health in middle and late childhood is also crucial. This goal supports the Government's National Agenda for Early Childhood initiative.
- **Ageing well, ageing productively**  
*Developing better social, medical and population health strategies to improve the mental and physical capacities of ageing people.*  
Australia's population is ageing, with a significant projected increase in the number of people aged over 65 and over 85. While Australia is relatively well placed compared with many OECD nations, major shifts in cultural expectations and attitudes about ageing are necessary to respond constructively, at both an individual and population level. A healthy aged population will contribute actively to the life of the nation through participation in the labour market or through voluntary work. This goal supports the Government's National Strategy for an Ageing Australia.
- **Preventive healthcare**  
*New ethical, evidence-based strategies to promote health and prevent disease through the adoption of healthier lifestyles and diet, and the development of health-promoting products.*  
Preventive healthcare research will improve the prediction and prevention of disease and injury for all Australians through the adoption of healthier behaviours, lifestyles and environments. Research will generate an improvement in the design, delivery and uptake of programmes such as exercise-based rehabilitation. There are several major disease targets amenable to immediate study, such as cardiovascular health, neurodegenerative diseases, mental ill-health, obesity, diabetes, asthma and chronic inflammatory conditions. Research on prevention will emphasise interdisciplinary approaches, including research on ethics, drawing on contributions from the social sciences and humanities, as well as from the health and medical sciences. It will also focus on developing new health promoting foods and nutraceuticals. This goal supports the Government's Focus on Prevention initiative.
- **Strengthening Australia's social and economic fabric**  
*Understanding and strengthening key elements of Australia's social and economic fabric to help families and individuals live healthy, productive, and fulfilling lives.*  
Living in today's society involves a complex web of choices, yet many of the traditional support structures are weaker than they have been in the past. Enabling people to make choices that lead to positive pathways to self reliance and supportive family structures is more important than ever. The interactions between the social safety net, social and economic participation, financial incentives and community and private sources of

support are critical in helping people maximise their potential and achieve good, healthy, lifetime outcomes. In the decade ahead, it will be vital to understand and support the drivers for workforce participation and the broader social and economic trends influencing Australian families and communities. This goal supports the Government's welfare reform and participation agendas. Research in this area will emphasise interdisciplinary approaches, drawing on contributions from the economic, behavioural and social sciences.

### **Research Priority 3: Frontier Technologies for Building and Transforming Australian Industries**

*Stimulating the growth of world-class Australian industries using innovative technologies developed from cutting-edge research*

Progress and wealth often derive from the unforeseen application of new discoveries. Australia must be at the leading edge if it is to stay abreast of international developments and take advantage of opportunities.

Our national capabilities in emerging sciences and their underpinning disciplines determine our capacity to develop and implement new technologies. Australia has a strong base of expertise, skills and technological capacities in the fundamental sciences and key technologies.

Our strengths are in a wide range of areas such as biotechnology, material sciences, information and communications technology (ICT), photonics, nanotechnology and sensor technology.

ICT is currently the critical enabling technology and is a major contributor to national productivity and growth.

But breakthrough science underpins technological advancements in many areas and Australia needs to foster an environment that stimulates creativity and innovation.

Applications for frontier technologies are potentially very large. Australia has the capacity to exploit niche markets for new products and services.

Australia also has an enviable track record as an innovator and developer of advanced materials and must grasp the opportunity to stay ahead.

Smart information use involving improved data management, intelligent transport systems and digital media to develop creative applications for digital technologies provides huge opportunities to improve the performance of key Australian industries.

Australia needs to invest in this research area as it is fundamental to our future competitiveness and well being.

This priority will help to strengthen the capacity of Australian researchers to participate in new areas of research, enhance Australia's international scientific reputation, stimulate local expertise, and help create vibrant new industries.

A better understanding of the conditions that are conducive to innovation will ensure that Australia's investment in research will maximise the benefits for Australia.

Enhanced research effort will also be achieved through initiatives that develop a critical mass of researchers in key areas.

Priority goals for research fall in the five areas of breakthrough science, frontier technologies, advanced materials, smart information use, and promoting an innovation culture and economy.

## Priority Goals

- **Breakthrough science**

*Better understanding of the fundamental processes that will advance knowledge and facilitate the development of technological innovations.*

Breakthrough science underpins technological innovation across a range of industries critical to maintaining Australia's position as a developed country. Some examples include bio-, cultural- and geo-informatics, nano-assembly and quantum computing. Technological advances are often unexpected and a strong foundation in mathematics and the fundamental sciences will provide an environment that fosters creativity and innovation. Early participation in leading edge areas of research will enable Australian researchers to benefit more fully from international developments.

- **Frontier technologies**

*Enhanced capacity in frontier technologies to power world-class industries of the future and build on Australia's strengths in research and innovation (examples include nanotechnology, biotechnology, ICT, photonics, genomics/phenomics, and complex systems).*

The potential applications of frontier technologies across a range of industries in Australia are vast. Australia has significant capacity to exploit niche markets for new products and services emerging from frontier technologies. Australia has world-class research expertise in many such areas. Some examples include nanotechnology, biotechnology, ICT, photonics, genomics and phenomics. Also important are advanced frameworks such as complex systems in which these technologies are applied. Future directions in this priority area need to target the cutting-edge science critical for each emerging technology.

- **Advanced materials**

*Advanced materials for applications in construction, communications, transport, agriculture and medicine (examples include ceramics, organics, biomaterials, smart material and fabrics, composites, polymers and light metals).*

The development of advanced materials will underpin growth in many areas of industrial and economic activity in Australia. Australia has substantial infrastructure in this area and an enviable track record as an innovator and developer of advanced materials. The era of advanced materials is just beginning, in spite of the tremendous progress in recent years. Substantial scientific and technological challenges remain ahead, including the development of more sophisticated and specialised materials. Some examples include ceramics, organics, biomaterials, smart materials and fabrics, composites, polymers, and light metals.

- **Smart information use**

*Improved data management for existing and new business applications and creative applications for digital technologies (examples include e-finance, interactive systems, multi-platform media, creative industries, digital media creative design, content generation and imaging).*

ICT applications are providing huge opportunities to deliver new systems, products, business solutions, and to make more efficient use of infrastructure. Examples include e-finance, multi-media, content generation and imaging. Improved data management is central to the future competitiveness of key industries such as agriculture, biotechnology, finance, banking, education, transport, government, and health and 'info-tainment'. The ability of organisations to operate virtually and collaborate across huge distances in Australia and internationally hinges on our capabilities in this area. The media and creative industries are among the fastest growing sectors of the new economy. Research is needed to exploit the huge potential in the digital media industry.

- **Promoting an innovation culture and economy**

*Maximising Australia's creative and technological capability by understanding the factors conducive to innovation and its acceptance.*

Understanding the factors that lead to highly creative and innovative ideas and concepts, and the conditions that lead to their introduction, transfer and uptake is critical for any nation that aspires to lead the world in breakthrough science, frontier technologies, and in other forms of innovation. Promoting an innovation culture and economy requires research with a focus on developing and fostering human talent, societal and cultural values favourable to creativity and innovation, and structures and processes for encouraging and managing innovation.

#### **Research Priority 4: Safeguarding Australia**

*Safeguarding Australia from terrorism, crime, invasive diseases and pests, strengthening our understanding of Australia's place in the region and the world, and securing our infrastructure, particularly with respect to our digital systems.*

The importance of security and safety to Australia has been underscored by recent events.

Australia has to be capable of anticipating and tackling critical threats to society, strategic areas of the national economy and the environment.

The threats can potentially come from within and outside Australia.

The world is now characterised by the widespread and rapid movements of people, digitally coded data, goods and services, and exotic biological agents.

Critical infrastructure in Australia is increasingly dependent on digital technology for its management and integration.

Information protection and the integrity of security systems are now more important than ever before.

It is also necessary to protect the status of Australia as a nation free of many of the diseases affecting primary production around the world.

Terrorism has emerged as a very real global threat and crime is taking a significant toll on Australian society and economy.

Maintaining the operational advantage of Australia's defence forces through superior capabilities is also fundamental to our national security.

Enhancing our nation's understanding of social, political and cultural issues will help Australia to engage with our neighbours and the wider global community and to respond to emerging issues.

Leading edge research in Australia is already yielding high dividends and as a national research priority will improve the effectiveness of that contribution.

Stronger research capabilities will ensure that solutions are tailored to Australia's unique circumstances, reflecting its geographic features and small population.

Greater collaboration within the research community and with other stakeholders will allow us to better understand and manage potential threats to Australia.

Harnessing the knowledge and capabilities across Australia offers us the best chance of developing innovative and rapid solutions to serious threats.

Australia's international relations and its regional influence will be strengthened through new collaborative approaches and new science and technologies that enhance security and safety.

The heightened interest in personal and electronic security across the world also provides opportunities for Australian solutions.

Priority goals for research fall in the five areas of critical infrastructure, understanding our region and the world, protecting Australia from invasive diseases and pests, protecting Australia from terrorism and crime, and transformational defence technologies.

Priority goals

- **Critical infrastructure**

*Protecting Australia's critical infrastructure including our financial, energy, communications, and transport systems.*

Protecting our critical infrastructure is important to national security and to the social and economic well being of Australia. An important aspect of this priority goal is e-security which is an enabler of e-commerce. Maintaining a critical mass of research in e-security will be essential in providing Australia with the tools to protect our way of life.

- **Understanding our region and the world**

*Enhancing Australia's capacity to interpret and engage with its regional and global environment through a greater understanding of languages, societies, politics and cultures.*

Social, cultural and religious issues are of growing significance due to the insecurities of globalisation and the increasing role of non-state players in the security environment. Australia's capacity to interpret and engage with its regional and global environment will be substantially improved by enhancing its research base in apposite languages, societies and cultures. An approach that enhances Australia's capacity to interpret itself to the rest of the world is also needed.

- Protecting Australia from invasive diseases and pests**  
*Counteract the impact of invasive species through the application of new technologies and by integrating approaches across agencies and jurisdictions.*  
 Australia is free of many of the pests and diseases affecting primary production around the world. This status needs to be protected as the introduction of exotic species has the potential to adversely affect our exports and the environment. Australia already has strong skills and expertise in this area of research and further work will offer immediate benefits to the community. A greater level of coordination of our research effort will mean that Australia can more effectively develop innovative and rapid solutions to serious threats.
- Protecting Australia from terrorism and crime**  
*By promoting a healthy and diverse research and development system that anticipates threats and supports core competencies in modern and rapid identification techniques.*  
 Protecting Australia from terrorism is now more important than ever before in light of recent events and our involvement in the ‘war on terror’. The new threat requires a more sophisticated response which should harness Australia’s research capabilities, and which will focus on all phases of counter-terrorism; prevention, preparedness, detection, response and recovery. Crime takes a significant toll on Australian society and economy. The June 2000 report from the Prime Minister’s Science, Engineering and Innovation Council estimated that crime costs Australia at least \$18 billion per annum. Personal identification, information protection and the integrity of security systems are fundamental towards ensuring the national security of Australia. An effective solution will include building on Australia’s existing strengths in rapid detection using new analytical technologies and managing significant data collections.
- Transformational defence technologies**  
*Transform military operations for the defence of Australia by providing superior technologies, better information and improved ways of operation.*  
 Australia has a small defence force to protect a large continent and a substantial maritime region of responsibility. Its operational advantage has been maintained through a superior capability which is dependent on leveraging innovative technologies. Although some benefits can be gained from overseas research, Australia has to conduct its own research to address uniquely Australian demands. A systems approach which harnesses the research capabilities of all stakeholders is essential to the successful development and introduction of innovative technologies.