



Australian Government

Australian Research Council

Special Research Initiatives

**Funding Rules for Funding commencing in
2005**

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Acronyms

The following acronyms are used in ARC Funding Rules.

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

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1. Introduction

This document sets out the Funding Rules for Strategic Research Initiatives (SRI), a scheme funded under the Australian Research Council's National Competitive Grants Program (NCGP), which comply with the requirements of the *Australian Research Council Act 2001* (the Funding Rules).

Applicants should read and understand the entire Funding Rules and the ARC's standard Funding Agreement [which is available at www.arc.gov.au] before submitting an application to the ARC. Applicants are responsible for ensuring that their applications are complete and accurate.

The ARC takes a proactive role in identifying specific initiatives to be undertaken in this scheme. Initiatives may be identified by the ARC in consultation with institutions, professional organisations and peak bodies representing higher education communities. Initiatives may result from ARC Discipline Cluster Reviews or other discipline research strategies, from reviews of National Competitive Grants Program (NCGP) outcomes in a particular field or from other reviews or reports of a similar nature. The ARC expects that some initiatives will be identified by ARC Expert Advisory Committees in the course of their work on other NCGP schemes. In providing advice to government on Australian research, the ARC may identify initiatives to be funded under SRI.

Because of its proactive role in identifying initiatives and the diverse nature of the initiatives to be funded under SRI, the ARC may invite applications from one or more parties (who may include researchers, consultants and facilitators).

Applications for SRI funding may be submitted only when invited by the ARC.

2. Fundamental principles and requirements

2.1. Ethics and Research Practices

The National Health and Medical Research Council (NHMRC) website, <http://www.nhmrc.gov.au>, provides a series of publications which outline the principles of ethical conduct in research. All research proposals should conform with the principles outlined in:

- a. the Joint NHMRC/AVCC Statement and Guidelines on Research Practice (1997)
- b. as applicable, the NHMRC's National Statement on Ethical Conduct in Research Involving Humans, and
- c. as applicable, the principles outlined in the NHMRC's codes on animal research.

2.2. Duplication

The ARC will not duplicate financial assistance for research already funded by the Commonwealth.

2.3. Conflict of Interest

All applicants associated with ARC funding proposals have an obligation to disclose affiliations with or financial involvement in any organisation with a direct interest in the subject matter or outputs of the researchers. Researchers have an obligation to disclose at the time of applying for an ARC grant, or reporting on it, any conflict of interest which has the potential to influence their research and investigations, publication and media reports, or grant applications.

2.4. Acknowledging ARC support

The ARC requires that research funded by the ARC will be appropriately acknowledged. When, at any time during or after completion of a project, the organisation or researcher publishes or produces material such as books, articles, newsletters or other literary or artistic works which relate to the project and/or Fellowship, the organisation or researcher shall acknowledge, at a prominent place in the publication, the support of the ARC in a form acceptable to the ARC. Similar efforts should be made to acknowledge ARC support when participating in television and radio programs, and when interviewed by the print media.

Advice on acceptable forms of acknowledgement and use of the logo is provided on the ARC website at www.arc.gov.au.

3. Objectives

Special Research Initiatives (SRI) aims to support activities which:

- a. encourage greater collaboration among Australian researchers;
- b. encourage the development of international research linkages;
- c. encourage the co-operative development of high-quality research capacity in emerging areas; and/or
- d. enhance the scale and focus of research in Priority Areas.

4. Description

4.1. Types of initiative supported

Funding under the scheme is available to support activities related to high-quality research endeavour in all fields, including the social sciences and humanities as well as the natural sciences and engineering, supported under the NCGP.

Specifically, SRI funding supports:

- a. co-operative activities among researchers;
- b. co-operative development of national and international linkages;
- c. co-operative development of innovative research areas;

- d. rapid response to contingencies, e.g. field work at an erupting volcano; and
- e. other activities which the ARC judges to be consistent with the scheme's objectives.

Activities, to be specified in any call for proposal under this scheme, may include, but are not restricted to, one-off conferences, workshops, seminars and development of networks, where the purpose is to initiate collaboration that would not otherwise occur and, where appropriate, the dissemination of the outcomes of the collaborative activities funded under the scheme.

5. National Research Priorities

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

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

Within each Research Priority is a number of Priority Goals which are listed below:

5.1. 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

5.2. 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

5.3. 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

5.4. 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 National Research Priorities and their associated Priority Goals can be found in Appendix 1 and on the ARC web site (www.arc.gov.au).

6. Eligibility

The eligibility of organisations for funding purposes under the *Special Research Initiatives* scheme will be specified in any call for proposals issued by the ARC.

7. Funding

Funding may be provided for short- or long-term activities. The nature and duration of activities to be funded will be specified in any call for proposals issued by the ARC.

8. Cross-program funding

The ARC will not duplicate financial assistance for research already funded by the Commonwealth. The ARC reserves the right to determine if a proposed research project duplicates research already being funded. It may declare ineligible, or reduce funding to, any such proposal.

The ARC may liaise with other funding agencies to discuss any overlap between applications in order to avoid duplication of funding.

9. Application process

Applications may be submitted only when invited by the ARC.

10. Applications

The ARC may identify and promote activities suitable for funding, and call for applications from relevant groups or individuals. Applications should include:

- a. an outline of the activity or activities being proposed;
- b. a statement on how these activities will meet the Program's objectives as stated in Section 3;
- c. where applicable, how the application falls within one of the National Research Priority Areas indicated in Section 5;
- d. an indication of the funding sought, relative to the total cost of the proposed activity;
- e. financial and in-kind contributions from participating institutions and from other sources.

At the time of inviting applications the ARC will set, and advise prospective applicants about, the relevant timeframes for the:

- a. closure of applications;
- b. assessment process; and
- c. notification to applicants of the outcome of the assessment process.

11. How to complete and submit applications

When applications are invited they must be submitted on the application form. At the time of calling for SRI applications the ARC will advise whether or not the on-line application form in the ARC's Grants Application Management System (GAMS) must be used. The ARC will also advise about the requirements for signed paper copies.

All proposals and applications must be signed by the Chief Investigator and Deputy Vice-Chancellor (Research) or delegate, or equivalent in other administering organisations.

Applications should be sent:

by mail, to

Special Research Initiatives Scheme Coordinator
Australian Research Council
GPO Box 2702
CANBERRA ACT 2601

by courier, to

Special Research Initiatives Scheme Coordinator
Australian Research Council
Geoscience Australia Building
cnr Hindmarsh Drive and
Jerrabomberra Avenue
SYMONSTON ACT 2609

12. Selection and approval process

12.1. Assessment and selection

Applications will be assessed by the ARC using the following criteria:

- a. the likelihood that the activity will meet the Program's objectives as indicated in Section 3 and the specific initiatives as stated in Section 4.1;
- b. the quality of collaboration involved;
- c. financial and in-kind contributions to be made by the participating organisations and, where appropriate, funding from other sources; and
- d. the expected results of the activity.

Applications will be assessed by the ARC. The ARC reserves the right to recommend applications for funding and to recommend the funding to be offered to successful applicants. The ARC reserves the right not to recommend any application for funding should no suitable application be forthcoming.

12.2. Recommendations

A recommendation from the ARC Board is sent to the Minister for consideration. The Minister determines if the application will be offered funding. The Minister's decision is final.

12.3. Offer of funding

The successful administering organisation will be notified in a letter of offer that will indicate the funding to be provided and will include the Funding Agreement.

12.4. Appeals

Appeals will be considered only against process issues and not against committee recommendations or assessor ratings and comments.

Appeals must be made on the appeals form available from the ARC website (www.arc.gov.au). The form must be lodged through the administering organisation's Research Office and be received within 28 days of the date on the letter notifying the outcome of applications, by:

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

13. Administration of funding

13.1. Funding Agreement

Funding assistance may not be expended before the Funding Agreement is signed by the organisation and the ARC, and until such time the ARC will not recognise the project as having begun.

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

Projects must commence as required by the Funding Agreement.

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

13.2. Varying the Funding Agreement

Requests to vary the Funding Agreement must be forwarded in writing by the organisation's Research Office to the ARC. Forms are available for variation requests on the ARC website (www.arc.gov.au).

13.3. Varying the Funding Approval

Requests to vary the Funding Approval must be forwarded in writing by the administering organisation's Research Office to the ARC.

The Funding Approval may be varied by varying the amount of financial assistance, the duration of financial assistance, the name of the person leading the research program and the name of the organisation receiving financial assistance.

The Funding Approval may be varied where:

- a. the organisation's involvement with the research program ends or substantially changes;
- b. the research program changes so that it is no longer consistent with the description in the Funding Approval;
- c. the person named in the funding approval as the person leading the research program ceases to lead the program;
- d. association with any of the collaborating partner organisations involved in the research program ends, or the collaborating partner organisation(s) substantially changes its involvement with the program.

13.4. Reports

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

14. Other matters

14.1. Applicable law

The ARC is required to comply with the requirements of the *Privacy Act 1988* and the *Freedom of Information Act 1982*.

14.2. Confidentiality

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 above, the ARC may publicise and report offers or awards of funding, including information about the proposed research, the name and institution of any applicant, the identity of the administering Institution and any other institution or organisation involved in the project, the title and summary descriptions of the project and its intended outcomes, and the level and nature of financial assistance from the ARC.

14.3. Project Titles

If the ARC judges that a project title and description do not adequately reflect the objectives and outcomes sought, the ARC reserves the right to change the project title and description.

14.4. 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) and act in accordance with any intellectual property policies of the applicant's institution.

14.5. Incomplete or misleading information

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

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 Australian 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:

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

14.6. 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).

14.7. Contact points

For further information, the institution's Research Office should be contacted in the first instance.

Enquiries about SRI may be addressed to:

Special Research Initiatives Scheme Coordinator
Australian Research Council
GPO Box 2702
CANBERRA ACT 2601
Email: ncgp@arc.gov.au
Phone: 02 6284 6600
Fax: 02 6284 6638
Web: 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 ‘infotainment’. 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.