



Australian Government

Australian Research Council

ARC CENTRES OF EXCELLENCE

Centres of Excellence Funding Rules 2005

Funding Rules

for funding commencing in

2005

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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 research funded by the ARC will be appropriately acknowledged. When, at any time during or after completion of a funded program, the institution or researcher publishes material, books, articles, television or radio programs, newsletters or other literary or artistic works which relate to that program, the institution 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

Funding Rules & Funding Agreement

These Centres of Excellence Funding Rules should be read in conjunction with the Centres of Excellence draft Funding Agreement which may be found at www.arc.gov.au Applicants should note that the terms of the draft Funding Agreement may be subject to alteration prior to offers of funding being made.

Centres of Excellence Funding Rules 2005

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
BAA	Backing Australia's Ability
CI	Chief Investigator
COE	College of Experts
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
NCGP	National Competitive Grants Program
NHMRC	National Health and Medical Research Council
PI	Partner Investigator
QEII	Queen Elizabeth II Fellowship
RC-ATSI	Research Cadetship-Aboriginal and Torres Strait Islander
RIEF	Research Infrastructure Equipment and Facilities Scheme
SPIRT	Strategic Partnerships with Industry – Research and Training
SRC	Special Research Centres
URL	Universal Resource Locator

1. Introduction

The Commonwealth Government's new package of initiatives announced in May 2004 *Backing Australia's Ability – Building our Future through Science and Innovation (BAA)* will maintain the doubling of funding support for high-quality research in the National Competitive Grants Program achieved by *Backing Australia's Ability*. This continued funding includes an emphasis on raising the scale and profile of Australia's leading research teams, and encouraging greater research collaboration within Australia, all within the framework of research areas of national priority.

As part of this plan, the ARC is conducting a further selection round for ARC Centres of Excellence, under the rules contained in this document. These Centres will undertake highly innovative and internationally competitive research that addresses challenging and significant problems, and produce outcomes of economic, social and cultural benefit to Australia.

ARC Centres of Excellence will involve significant collaboration which will allow the complementary research resources of universities, publicly funded research institutes, and business to be concentrated to support research in areas of national priority. Applicants for new Centres of Excellence are expected to seek additional financial contributions from a variety of sources such as State Governments, participating institutions, business investors and similar bodies.

2. Objectives

The objectives of the ARC Centres of Excellence program are to:

- a) undertake highly innovative research at the forefront of developments within areas of national importance, with a scale and a focus leading to outstanding international and national recognition;
- b) enhance the scale and focus of research in designated National Research Priorities. In 2003, the Government designated the following areas as National Research Priorities for Commonwealth-funded research:
 - 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 AustraliaFull 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);
- c) promote research that will enhance Australia's future economic, social and cultural wellbeing;
- d) link existing Australian research strengths and build new capacity for interdisciplinary, collaborative approaches to address the most challenging and significant research problems;

- e) build Australia's human capacity in a range of research areas by attracting, from within Australia and abroad, researchers of high international standing as well as the most promising research students;
- f) provide high-quality postgraduate and postdoctoral training environments for the next generation of researchers in innovative and internationally competitive research;
- g) offer Australian researchers access to world-class infrastructure and equipment, and to key research technologies;
- h) develop relationships and build new networks with major international Centres and research programs that help achieve global competitiveness and recognition for Australian research; and
- i) establish Centres of such repute in the wider community that they will serve as points of interaction among higher education institutions, Governments, industry and the private sector generally.

3. Description - Characteristics of Centres

3.1. Focus on Research and Research Training

ARC Centres of Excellence must be established on the basis of the excellence of the proposed research program, the excellence of the participating researchers, and the potential of both to contribute to the economic, social and cultural development of Australia. ARC Centre of Excellence research portfolios must build on Australia's existing strengths and develop additional capacity to generate new knowledge. Centres will focus research on areas of national importance, and must address challenging and significant problems the resolution of which will lead to international acclaim and offer benefits to potential end-users. They must use strategic networking and linkages to build the critical mass required to make a real difference in the focal areas of their research program.

Centres must provide a world-class research environment that is attractive to leading researchers and effective in developing the careers of Australia's best young researchers and research leaders. The education and outreach programs of Centres must build understanding of, and expertise in, specific research areas at regional and national level.

3.2. Developing and Applying Research Outcomes

ARC Centres of Excellence are likely to make discoveries that have the potential for development to the point of commercial application. The ARC aims to help ensure that the value of such potential applications is captured for the national benefit. Accordingly, Centres must foster amongst their staff an awareness of sound innovation and commercialisation practice, and will encourage entrepreneurial activity in appropriate circumstances. The international connections of Centres will assist the inflow of information regarding important advances in research and commercialisation of interest to Australia.

To maximise the national benefit from their research, ARC Centres of Excellence which are selected for funding must comply with the *National Principles of Intellectual Property Management for Publicly Funded Research* (http://www.arc.gov.au/publications/arc_pubs/01_01.pdf) and with the intellectual property statutes of all of the Institutions/Organisations involved in the Centre.

3.3. Areas of Investigation Not Supported

The ARC does not support research and training in the fields of clinical medicine, public health and dentistry. The National Health and Medical Research Council (NHMRC) has responsibility for funding research in those areas.

The ARC funds experimental and theoretical research undertaken to acquire new knowledge, as well as original research seeking to address problems that arise in specific applications. The ARC does not fund investigations that are more appropriately undertaken by way of consultancy, although researchers associated with ARC Centres of Excellence may undertake consultancies. While encouraging the commercialisation of the outcomes of research it funds, the ARC does not fund directly the development of products or other commercialisation activities.

3.4. Financial Assistance

The number of ARC Centres of Excellence to be funded will depend on the level of funding approved for each Centre, and it is anticipated that up to approximately 10 ARC Centres of Excellence may be established. In most cases, a successful Centre should expect to receive ARC funding of approximately \$1M-3M per year. However, in exceptional cases, where an outstanding case is made, ARC funding may be up to \$5M per annum. Funding will normally be offered for a period of five years, nominally commencing in July 2005. In exceptional cases funding may be offered for a longer period of up to ten years.

Prospective applicants are strongly encouraged to maximise the impact of ARC funding by obtaining commitments for additional financial contributions from a variety of sources, including: State/Territory Governments, venture capital firms, business investors, and similar bodies. Australian and international industry partners and business investors may provide in-kind resources to an ARC Centre of Excellence, and will be expected also to make cash contributions. In these Funding Rules 'applicants' are researchers who enter their names as participants on the ARC Centre of Excellence application form, except where a qualifying reference is made to another ARC funding program.

Funding for an ARC Centre of Excellence will be directed through an eligible administering higher education institution (listed at [Appendix 2](#)). Hereafter in these rules such an eligible higher education institution will be termed the Administering Institution. The ARC's financial assistance to a Centre is subject to the appropriation of moneys and the approval of expenditures under the *Australian Research Council Act 2001* (the ARC Act). Approval of expenditures under the ARC Act can be considered only in relation to years for which there are relevant budgetary funding caps in place as required by the ARC Act. The ARC will enter into a Funding Agreement with the Administering Institution that will specify *inter alia* the approved and indicative expenditures over the funding period.

In the case of exceptional performance by an ARC Centre of Excellence and subject to the availability of funding, the ARC may consider making a recommendation for financial assistance for an additional period of up to five years.

ARC Centres of Excellence may involve researchers from organisations such as Commonwealth or State agencies funded primarily for research (such as the Commonwealth Scientific and Industrial Research Organisation (CSIRO), the Australian Institute for Marine

Science (AIMS), the Australian Nuclear Science and Technology Organisation (ANSTO)), and from overseas organisations, but these researchers themselves and their employing organisations are not eligible to receive ARC financial assistance. In these Funding Rules these organisations will be referred to as Collaborating Organisations.

Centres may consist of a number of geographically separated research sites or nodes which are nevertheless fully integrated into the research program of the Centre. Centres must have a prominent identity and physical presence at all nodes, as well as high visibility on the World Wide Web, and will be required by the Funding Agreement to acknowledge the ARC's support in the name of the Centre.

The ARC will provide funding assistance for the eligible direct costs of an ARC Centre of Excellence research program, which exclude the full or partial salaries or salary loadings for the Director and for researchers who have continuing positions with the Administering Institution and the other Collaborating Institutions. Hereafter in these Funding Rules Institutions listed in Appendix 2 which are not the Administering Institution but are collaborators in a Centre of Excellence will be referred to as Collaborating Institutions. Direct costs include expenditure of salaries (and local on-costs) of people who perform research or activities that support the research, stipends for research students, items of equipment used in the research and the costs of travel, visitors and meetings related to the research. Institutions involved in the establishment and ongoing support of a Centre must have a strategic intent to establish scale and focus in the Centre's area of research. Consequently, they must meet all indirect costs, and may provide additional cash or in-kind resources. Indirect costs include payments for appropriate office accommodation, libraries, laboratories, and equipment and other organisational overheads and infrastructure costs paid by the Administering Institution and the other Collaborating Institutions.

An ARC Centre of Excellence may undertake individual research projects with institutions/organisations that are not founding Collaborating Institutions or Organisations in the Centre, provided that arrangements are made to protect the rights of all parties concerned. The requirement to enter into these arrangements is dealt with in the ARC Centre of Excellence Funding Agreement. Further information is below at 3.6 of these Funding Rules.

3.5. Appointment and Responsibilities of the Director

A Director must be appointed to lead the ARC Centre of Excellence. The Director and the principal researchers in the Centre will be in a unique position to develop and carry through an excellent program of research, attracting outstanding researchers from within Australia and from overseas.

The Director, in consultation with the Advisory Board, will be responsible for implementing the strategies of the Centre and managing the research program. The Director must coordinate the Centre's research effort and reporting structures across the Administering Institution and the Collaborating Institutions/Organisations and nodes involved in the Centre. The Director must also be responsible, in consultation with the Advisory Board, for managing the Centre's intellectual property in accordance with the policies of the Administering Institution and the Collaborating Institutions/Organisations and with the *National Principles of Intellectual Property Management for Publicly Funded Research* (refer also to 8.3 of these Funding Rules).

It is expected that proposals for an ARC Centre of Excellence will have been generated under the leadership of an Interim Director who will normally be the first-named Chief Investigator in the application. For some proposed Centres, the Director's role may be primarily one of research management and coordination, and the Director's track record will be judged accordingly. In most cases, the Interim Director will become the Centre Director if the application is successful. Should the Interim Director not become the Director, or should the Director's position fall vacant, the ARC must be consulted before the appointment of the new Director. A Centre Director may be appointed only with the approval of the ARC.

3.6. Governance

Normally, an ARC Centre of Excellence's administrative operations will be established within the academic, administrative and financial governance structures of the Administering Institution, although the ARC may approve the establishment of a separate legal entity if this is appropriate. A Centre may be located at a single site, or comprise networked nodes, or operate as a "virtual Centre", or adopt any other approach to research management, provided that it meets the objectives and selection criteria and is not contrary to the Funding Agreement.

Governance arrangements for an ARC Centre of Excellence must ensure fair access to resources for all eligible participants, make provision for entry and exit of Collaborating Institutions/Organisations, and provide sound management of background and developed intellectual property. The ARC requires that understandings reached between the Administering Institution and the other Collaborating Institutions/Organisations for the operation of a Centre be formalised by written agreement, and may request copies or other evidence of such agreement. The matters which must be covered by these aforementioned written agreements are specified in the Funding Agreement between the ARC and the Administering Institution.

All ARC Centres of Excellence must have an Advisory Board that provides broad representation from the research and end-user communities. Within the governance structures of the Administering Institution, the Board will offer advice to the Director and the Administering Institution and the other Collaborating Institutions/Organisations regarding the research focus of the Centre, its structure and general operating principles, and intellectual property and commercialisation management.

3.7. ARC Centre Fellowships and Awards

Postdoctoral researchers employed using the ARC funding assistance to the Centre will be critical to achieving the intended research outcomes. The ARC will acknowledge the most outstanding of these postdoctoral researchers through the award of prestigious *ARC Centre Fellowships (ACFs)*. ACFs can be awarded only after ARC Centres of Excellence have commenced operation. Centre Directors will be advised of a process to submit nominations of selected members of the research-only staff funded from the Centres' ARC funding assistance, for consideration and possible endorsement by the ARC as ACFs. ARC Centre Fellowships will only be awarded to outstanding candidates - the ARC will assess nominations for ARC Centre Fellowships via a rigorous peer-review process using the same criteria and standards which apply in the ARC's existing Fellowship programs.

ARC Centres of Excellence will have flexibility in the salaries offered to ARC Centre Fellows, based on the minimum levels of the ARC notional salary rates for Fellowships (Appendix 2 of the *Discovery – Projects Guidelines for applicants for funding commencing in 2005* at www.arc.gov.au). ARC funding for ACF salaries will be paid from the ARC Centre of Excellence budget.

Holders of ARC Postdoctoral Fellowships, ARC Research or QEII Fellowships, or ARC Professorial Fellowships are not eligible to hold ARC Centre Fellowships, but are eligible to be associated as researchers with the Centres.

In recognition of the importance of building the level of knowledge and expertise in Australia's population through postgraduate training in research areas of national importance, ARC Centres of Excellence will be able to offer *ARC Centre Postgraduate Awards (APA-Cs)*. Centres will advise the ARC of APA-C recipients. Centres may set APA-C stipends at a level above the standard stipend for Australian Postgraduate Awards. ARC funding for APA-C stipends will be paid from the approved ARC Centre of Excellence budget.

3.8. Associated Federation Fellowships

ARC Federation Fellowships are prestigious awards designed to provide internationally competitive salaries that will support and encourage outstanding Australian and international researchers to work in Australia. Federation Fellows with expertise in the Centres' research areas will play key roles in establishing the Australian research agenda in these areas and may be in a position to support and promote the work of Centres, mentor staff and students, and help build international links.

Applicants for Federation Fellowships are invited to describe in their Fellowship application any proposed association with applications for ARC Centres of Excellence. A similar description *may* be included in an application for the associated Centres, in Part F3, but is not mandatory (to protect the confidentiality of Fellowship applicants). These descriptions will form part of the application material that is assessed.

Even when they are associated with ARC Centres of Excellence, Federation Fellows' salaries must be met from the Federation Fellowship program, not from Centre funding. Federation Fellowship matching funding may *not* be offered from anticipated Centre funding or from resources put forward as a matching component in other applications for Commonwealth funding, including ARC Centres of Excellence.

4. Eligibility

4.1. General

Appendix 2 lists the higher education Institutions eligible to administer ARC Centre of Excellence funding.

Researchers may apply for an ARC Centre of Excellence only through the Administering Institution. There are two distinct and mutually exclusive roles for applicants, determined primarily by the source of salary:

- Chief Investigators are people employed by an Institution listed in Appendix 2, including ARC Fellows employed at those Institutions. People who do not have a substantive position or paid employment elsewhere but who hold an honorary adjunct, or equivalent, appointment at an Institution listed in Appendix 2 may be a Chief Investigator; and
- Partner Investigators are people who are not eligible to be Chief Investigators in this program.

Applicants may be Chief Investigators or Partner Investigators on any number of applications for ARC Centres of Excellence.

The first-named Chief Investigator normally will be the Interim Director for the ARC Centre of Excellence and will be employed by the Administering Institution. The Centre Director must be a Chief Investigator, and is expected to work exclusively on the activities of the Centre. If a Director is unable to meet this undertaking, the application will not be considered.

Holders of ARC Postdoctoral Fellowships, ARC Research Fellowships, QEII Fellowships or Australian Professorial Fellowships are eligible to be associated as researchers in Centres of Excellence.

Researchers employed by Australian research organisations outside the higher education sector that are funded primarily for research from State/Territory or Commonwealth Government sources are eligible to participate as Partner Investigators in ARC Centres of Excellence, but they are excluded from receiving ARC funds. Researchers employed by research organisations outside Australia are eligible to participate as Partner Investigators in ARC Centres of Excellence, but are excluded from receiving ARC funds. Researchers from overseas organisations must bring significant contributions to the work of the Centre.

Chief Investigators and Partner Investigators must have permission from their employer to participate in the ARC Centre of Excellence.

Applications that can be more appropriately supported by other funding sources may not be considered.

4.2. Holders of Current ARC Grants

Researchers are eligible to apply as Chief Investigators regardless of the kind or number of current ARC grants that they hold. They are required to reveal all associations with current ARC and other Commonwealth grants and grant applications.

The ARC does not duplicate funding assistance for research that has been already funded by the ARC or other bodies. Accordingly, Chief Investigators named on successful applications may either retain their current ARC grants, or will be required to relinquish them, according to the following rules:

ARC Fellowships, Federation Fellowships, and any Fellowship component(s) of a Discovery-Project or a Linkage-Project grant:

These may be retained.

ARC Centres, ARC Special Research Centres, Discovery-Project grants and Linkage-Project grants (excluding the Fellowship funding defined above) in areas that would be duplicated, or could reasonably be expected to be duplicated, within the research program of the ARC Centre of Excellence:

Chief Investigators may not continue to hold such grants. Normally, grant holders will nominate to relinquish the grant, and the ARC will take into account the indicative funding for these grants when determining the level of funding offered to the Centre. In some cases, the ARC may permit at its discretion the current grant to be transferred to other co-Investigators who are not associated with the new Centre.

ARC Centres, ARC Special Research Centres, Discovery-Project grants and Linkage-Project grants in areas that would not be duplicated in the research program of the ARC Centre of Excellence:

Chief Investigators may retain such grants. The potential impact on the Chief Investigators' time commitments to the Centre will be taken into account.

Researchers who are not Chief Investigators in this scheme and who are, or who become, associated with the ARC Centre of Excellence may retain any current ARC grant. The ARC expects that the Progress and Final Reports submitted by researchers in this category will refer to the relationship between their grant project and the Centre's research program, and may take steps to terminate the grant if there is evidence of poor coordination or undesirable duplication.

4.3. Cross-Program and Cross-Scheme Eligibility

The research program of the ARC Centre of Excellence must be carried out principally by researchers appointed or seconded to the Centre, or who have a formal association with the Centre.

Applicants should note the current eligibility criteria for access to other ARC funding schemes, as expressed in the Funding Rules for those schemes. The ARC reserves the right to change these criteria in future funding rounds. Funding Rules for all ARC schemes may be found on the ARC web site at www.arc.gov.au

The ARC will place no restriction on researchers associated with the Centre who wish to apply for research funding from sources other than those provided by the ARC.

5. How to Apply

5.1. Applications

The Application is the prime source of information available to the selection advisory committee. Applicants will aim to communicate their vision and action plan for the ARC Centre of Excellence in a convincing way, submitting mature research plans ready for implementation. The application must contain all the information necessary for assessment of the project without the need for further written or oral explanation, or reference to additional documentation, unless requested by the ARC. All details in the application, particularly concerning all grants applied for and all successful grants, must be current.

Before completing an application form applicants are advised to read the ARC Centres of Excellence draft Funding Agreement which imposes certain requirements and obligations on funding support recipients. The draft Funding Agreement can be found on the ARC web site at www.arc.gov.au

All applications must be written in English and must comply strictly with the format and submission requirements specified below. Applications will be ruled ineligible if the ARC determines that any failure to comply with these requirements may confer an unfair advantage.

5.1.1. Application form and instructions to applicants

An application for an ARC Centre of Excellence is organised into six Parts:

- Part A Administrative summary
- Part B Personnel
- Part C Budget
- Part D Research Support
- Part E Collaborating Organisation Details
- Part F Description of the Centre and Participants' Roles

An application comprises two components:

1. Application form Parts A, B, C, D and E are completed in the Grant Application Management System (GAMS) and provided to the ARC in both electronic and paper versions.
2. Additional text Part F is completed outside GAMS and provided to the ARC as a paper copy behind the associated Application Form. This part includes a case for a centre addressing the selection criteria (maximum 14 pages), a justification of the budget (maximum 3 pages) and track record statements for participants (1 or 2 pages per person).

All pages of additional text should be in black type, use a single column and 12-point font on white A4 paper, and be printed on one side only and unbound, with at least 2 cm margins on each side. As applications are scanned electronically, applicants must use one of the following legible font types: Arial, Courier, Palatino, Times New Roman and Helvetica. Variants such as mathematical typesetting languages may also be used. References may be reproduced in 10-point font. Colour graphs or colour photographs may be included but they will be reproduced in black and white. Applications must not exceed the stipulated page length in any part.

A separate document, *ARC Centres of Excellence Instructions to Applicants for Funding Commencing in 2005*, will be available from www.arc.gov.au to assist in preparing applications.

5.1.2. Using GAMS

Applicants will prepare their application form in GAMS and provide it electronically to the Research Office of the Administering Institution by that institution's closing date. Research Offices have access to GAMS and will allocate GAMS UserIDs and passwords to enable applicants *at their institution* to access the system and create application forms. Applicants who are unable to obtain a GAMS UserID from a Research Office should contact the ARC at gamsids@arc.gov.au

5.1.3. Number of hard copies

An original and one identical hard copy are required. The application must be clipped with NAL clips, not stapled. The completed application form should be printed from GAMS and submitted with the additional text attached. All pages must be numbered consecutively (see *ARC Centres of Excellence Instructions to Applicants for Funding Commencing in 2005*).

5.1.4. Closing date

Paper applications for ARC Centres of Excellence must be received by the ARC, and the application form completed using GAMS must be submitted to the ARC, by the closing date. The closing date will be announced by the ARC on the ARC web site at www.arc.gov.au at the same time as the announcement of the opening of Centres of Excellence applications. Applications may be withdrawn but may not be changed after submission. Additions, deletions and modifications to the application will not be accepted after submission. Applicants must inform the ARC as soon as possible of any material changes in the information provided in an application, e.g. the outcome of an application for funding. Applications received after the closing date will not be accepted.

5.1.5. Submission

Applications must be submitted by the Administering Institution, not by individual researchers. Administering Institutions should submit the electronic application form in GAMS using the web, and also despatch the full paper application:

By **mail** to:

OR

By **courier** to:

Executive Director
ARC Centres of Excellence
Australian Research Council
GPO Box 2702
CANBERRA ACT 2601

Executive Director
ARC Centres of Excellence
Australian Research Council
Geosciences Australia Building
Cr Hindmarsh Drive and Jerrabomberra Avenue
SYMONSTON ACT 2609

6. Assessment Process

6.1. Selection Criteria

To ensure that the objectives of the ARC Centres of Excellence program are met, full applications will be assessed in the areas numbered (A)-(H) below. The Case for the Centre (Part F1) should be structured to address the assessment areas in the order listed (maximum

14 pages). The items listed within each assessment area are provided to guide applicants' focus on the specific assessment area, and do not need to be addressed individually.

Selection will be based on comparative and competitive assessment of the proposed Centres' capacities to deliver outcomes which address the objectives of this scheme. Applicants are therefore encouraged to write the Case for a Centre (Part F1) in the form of a strategic plan, including their targets for performance in each assessment area, as listed below:

- A. Research program
- i) The creative and innovative nature of the proposed research program, and its capacity to lead to a significant advancement of knowledge in areas of national importance;
 - ii) The degree to which the application enhances the concentration and coordination of research in the particular field(s) of research; and
 - iii) The adequacy of the conceptual framework, design, methods and analyses and their integration into the aims of the research programs.
- B. Investigators
- i) The applicants' track records, relative to opportunity, relevant to the proposed Centre's research area, as indicators of their potential to contribute to the Centre's research program;
 - ii) The Director's capacity for leadership, vision, management and strategic planning; and
 - iii) The commitment of Chief and Partner Investigators to the research program.
- C. Research training and professional education
- i) The potential contribution of the Centre to research training at the Honours, Postgraduate and Postdoctoral level; and
 - ii) The potential value of the education and outreach programs in professional and technical training.
- D. National benefit
- i) The extent to which the Centre would expand Australia's knowledge base and research capability;
 - ii) The potential for the research to contribute to the National Research Priorities;
 - iii) The capacity for the research program to enhance innovation in Australia; and
 - iv) The potential of the research to result in economic, cultural, environmental or social benefits for Australia.
- E. International, national and regional links and networks
- i) The potential standing of the proposed Centre relative to major international Centres in the general field(s) of research;
 - ii) The potential for development and enhancement of effective international interactions and linkages;
 - iii) The planned links with Australian researchers in universities and other research organisations working in the proposed fields of research; and
 - iv) The commitment and mechanisms proposed to provide a national and regional intellectual focus for the planned field(s) of research.

- F. End-user links
- i) The participation of end-users in research planning and Centre governance;
 - ii) Where applicable, the adequacy of plans and strategies for facilitation of technology transfer, including fostering a culture of innovation; and
 - iii) The adequacy of organisational arrangements and plans relating to ownership of intellectual property and/or utilisation or commercialisation of research.
- G. Organisational support
- i) The commitment of the Collaborating Institutions/Organisations to provide basic infrastructure, including provision of space, equipment, administrative and technical staff support, telecommunications and computing facilities, library and other key resources, over the funding period;
 - ii) The fit or complementarity of the proposed Centre with the Collaborating Institutions'/Organisations' overall research strengths and directions; and
 - iii) The provision of funding to support the Director and key investigators to execute their research leadership roles.
- H. Governance
- i) The adequacy of the proposed management arrangements and responsibilities, including the organisational structure of the proposed Centre, its reporting arrangements both internally and externally, its financial systems, and its business and strategic plans which should include milestones for achievement of objectives; and
 - ii) The relevance of the performance measures listed in the application to the Centre's objectives and their pertinence for assessing the Centre's performance.

6.2. Proposed Budget

Applicants must submit in Part C a proposed budget. An explanation of the budget must be submitted as Additional Text in Part F2 (3 pages). The explanation may include a list of people who, or positions which, will be associated with the Centre, and whose salaries are offered as in-kind contributions, or as part of the indirect costs, or will be funded from the Centre's cash income. The budget will include the following elements:

Cash Receipts

- (a) Requested ARC funding
- (b) Cash contributions from each of the Administering Institution and the other Collaborating Institutions/Organisations

Expenditure against Cash Receipts

- (a) Personnel
- (b) Teaching relief
- (c) Equipment
- (d) Maintenance
- (e) Travel
- (f) Other

In-kind contributions

- (g) Personnel
- (h) Other

Indirect costs

In preparing the proposed budget applicants must take into account those things for which funding may not be used as detailed in 3.3 and elsewhere in these Funding Rules. Large-scale capital items, such as buildings, will not be funded.

6.3. Track Records

The relevant track records of people who will be associated with the ARC Centre of Excellence are part of the selection criteria. Track records of key Centre staff, including the Interim Director, Chief Investigators and Partner Investigators, *must* be provided (maximum 2 pages per person). Track Records of other people who will be associated with the Centre *may* be provided to illustrate the scope and level of commitment to the Centre (maximum 1 page per person). Track records are assessed relative to opportunity and people who have had interrupted research careers may describe the circumstances in Part F3.

Track records are provided as Additional Text in Part F3. Each track record should commence with the following information, in order:

- Name (Last name, First name, Title);
- Qualifications (Degree and year of award for each award);
- Current appointment (Institution/Organisation & year of appointment; Level and year of appointment to level);
- Relevant employment history; and
- Publication list (up to 6 most significant from past 5 years; up to 4 additional career-best; the number of books, peer-reviewed research publications, and un-reviewed research publications over the past 5 years).

Applicants (Interim Director, Chief Investigators, Partner Investigators) must provide a description of their expertise and proposed roles and contributions to the ARC Centre of Excellence, up to 2 pages maximum per person, including the information listed above.

Researchers and other people who intend to be associated with the Centre may provide a brief description of their expertise and proposed roles and contributions to the Centre, up to 1 page maximum per person, including the information listed above.

6.4. ARC Centres of Excellence Selection Advisory Committee

A Selection Advisory Committee will be appointed by the ARC to evaluate the full applications according to the selection criteria. The ARC and the Selection Advisory Committee may:

- determine the eligibility of an application;
- assign assessors to review the applications;

- prepare a short-list of applications, invite short-listed applicants to attend structured interviews, and use information revealed in these interviews in their evaluation;
- rank each application relative to the others on the basis of the application, assessors' advice, and their expertise;
- assess and recommend applications for funding; and
- prepare funding recommendations that are submitted to the ARC Board for endorsement and then to the Minister for approval.

The ARC has procedures for declaring conflicts of interest and for Committee members to withdraw from considering particular applications.

6.5. Short-listing and Interviews

The ARC and the Selection Advisory Committee may short-list applications and invite some applicants to attend interviews. Interviews may be held in Canberra, or in one of the Administering Institution or the other Collaborating Institutions/Organisations, or at a place nominated by the ARC. The ARC will endeavour to provide as much notice as possible of an invitation to attend an interview, but may schedule interviews with as little as three working days' notice. The ARC will determine the structure of interviews and will not fund participation in interviews.

6.6. Exclusion

Exclusion of ineligible applications by the ARC may take place at any time during the selection process. Applications which contravene the Funding Rules in any material way may be excluded. Grounds for exclusion include, but are not limited to:

- failing to submit the application through the appropriate Research Office for certification;
- not meeting the eligibility criteria;
- providing incomplete, inaccurate or misleading information; or
- designating all or part of the application as Commercial-in-Confidence.

6.7. Appeals Process

Appeals will be considered only against process issues and not against scholarly judgement, committee decisions or assessor ratings and comments. Appeals must be made on the appeals form available from the ARC's website (www.arc.gov.au).

The form must be lodged through the Administering Institution's Research Office and be received by the ARC **within 28 days** of the date on the letter notifying the outcome of applications. Appeals are to be addressed to:

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

7. Administration of Financial Assistance

7.1. Offer of Financial Assistance

The successful Administering Institution will be notified in a letter of offer that will indicate the funding to be provided and will include any special conditions.

A Centre may not begin to operate, nor may funds be expended, until:

a) the ARC Funding Agreement is executed; and
b) the Administering Institution and all Collaborating Institutions/Organisations have entered into a written Centre Agreement. The Agreement must cover the role of each of the Administering Institution and the other Collaborating Institutions/Organisations in the project including:

- contributions by the Administering Institution/Collaborating Institutions/Organisations;
- payment of salaries for ARC Fellows;
- intellectual property arrangements; and
- an undertaking by the Administering Institution and the other Collaborating Institutions/Organisations to abide by the Funding Agreement.

The Administering Institution must retain the Agreement for the lifetime of the Centre, and forward a copy to the ARC on request.

7.2. Naming the Centre

The ARC will determine the name for each Centre on the advice of the successful applicants. Unless agreed otherwise by the ARC, the Funding Agreement will specify that the name of the Centre must commence “ARC Centre of Excellence for...”.

7.3. Funding Agreement

Successful applicants should familiarise themselves with the Funding Agreement, a sample of which will be published on the ARC web site at www.arc.gov.au. The Administering Institution must accept and sign the Funding Agreement before grant payments can be made. The Funding Agreement will include agreed performance indicators.

Projects must commence as required by the Funding Agreement. Failure to do so may result in termination of funding.

Administering Institutions should note that the Funding Agreement specifies conditions for management of Centre funding assistance, including reporting requirements and financial management.

7.3.1. Varying the Funding Agreement

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

7.3.2. Varying the Funding Approval

Requests to vary any element of the Funding Approval must be forwarded in writing by the Administering Institution, to the ARC. The circumstances in which the Funding Approval may be varied are:

- the Administering Institution's involvement with the Centre ends or substantially changes;
- the Centre's research program changes so that it is no longer consistent with the description in the Funding Approval;
- the person named in the funding approval as the Centre Director ceases to lead the Centre (*refer also to section 3.5*);
- any of the other Collaborating Institutions/Organisations involved in the Centre's research program end or substantially change their involvement with the Centre.

7.4. Reviews

There will be a full review of the performance of a Centre in the third year of its operation. The third-year review will examine the extent to which the Centre has met its previously stated aims and objectives, the progress against the Centre's performance targets, the quality of outcomes to date, the management and governance of the Centre and the extent to which it has met its agreed objectives. Satisfactory progress in these areas is a condition for the Centre to receive further ARC funding.

Centre reviews may be held at any time, and particularly in special circumstances such as a change of Director or withdrawal of a major Collaborating Institution or Organisation. Persons undertaking reviews for the ARC are to be given full access to all accounts, records, documents and premises relevant to the research being funded by the ARC.

Applicants should be aware of provisions of Part 8 of the *Financial Management and Accountability Act 1997*, which provide the Auditor General or an authorised person with the right to have, at all reasonable times, access to information, documents and records.

7.5. Financial Management — Payments

Subject to Government appropriations, payment of funds will be made to institutions in regular instalments, in accordance with approved payment arrangements made under the ARC Act. Funds must be used only for approved purposes - otherwise they must be returned in accordance with the provisions of the ARC Act.

8. Other Matters

8.1. Applicable law

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

Section 14 of the Privacy Act contains the Information Privacy Principles (IPPs) which prescribe the rules for handling personal information. The ARC must abide by the IPPs and

the Privacy Act when handling personal information collected for the purposes of Centres of Excellence. In brief, this requires that:

- personal information is collected in accordance with IPPs 1-3;
- suitable storage arrangements, including appropriate filing procedures, are in place;
- suitable security arrangements exist for all records containing personal information;
- access to a person's own personal information held by the organisation is made available to the person at no charge;
- records are accurate, up-to-date, complete and not misleading;
- where a record is found to be inaccurate, the correction is made;
- where a person requests that a record be amended because it is inaccurate but the record is found to be accurate, the details of the request for amendment are noted on the record;
 - the personal information is to be used only for the purposes for which it was collected, or for other purposes where expressly allowed by IPP 10; and
 - personal information is disclosed only in accordance with IPP 11.

Complaints about breaches of privacy and requests for advice about privacy should be referred to the ARC contact listed at the end of these Funding Rules. Privacy complaints can be made directly to the Privacy Commissioner, but the Privacy Commissioner prefers that the ARC be given an opportunity to deal with the complaint in the first instance. Information about the *Privacy Act 1988* is available at <http://www.privacy.gov.au/act/index.html>

All documents created or held by the ARC with regard to Centres of Excellence are subject to the *Freedom of Information Act 1982* ("FOI Act"). Unless a document falls under an exemption provision, it may be made available to the general public if requested under the FOI Act.

All FOI requests are to be referred to the ARC Contact listed at the end of these Funding Rules. Decisions regarding requests for access will be made by the authorised FOI decision-maker in accordance with the requirements of the FOI Act.

8.2. Confidentiality

The ARC's assessment and selection procedures require that it provides information contained in applications to assessors. The ARC may also be subject to statutory requirements to provide information to Parliament and other organisations. Subject to the above requirements, information contained in applications will be received and treated as confidential by the ARC.

Notwithstanding the above, the ARC may publicise and report offers or awards of funding, including information about the proposed research, the name and institution/organisation 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.

8.3. Intellectual Property

Applicants must agree to comply with the intellectual property statute of the Administering Institution and with the *National Principles of Intellectual Property Management for Publicly Funded Research* (available at www.arc.gov.au).

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

8.5. Insurance and liabilities

The Administering Institution and the other Collaborating Institutions/Organisations are all subject to the liability, indemnity and insurance provisions of the Funding Agreement.

8.6. Contact Points

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

Enquiries about ARC Centres of Excellence may be addressed to:

Executive Director
ARC Centres of Excellence
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 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.

APPENDIX 2: Eligible Higher Education Institutions

New South Wales

Charles Sturt University
Macquarie University
Southern Cross University
The University of New England
The University of New South Wales
The University of Newcastle
The University of Sydney
University of Technology, Sydney
University of Western Sydney
University of Wollongong

Victoria

Deakin University
La Trobe University
Monash University
RMIT University
Swinburne University of Technology
The University of Melbourne
University of Ballarat
Victoria University

Queensland

Central Queensland University
Griffith University
James Cook University
Queensland University of Technology
The University of the Sunshine Coast
The University of Queensland
University of Southern Queensland
Bond University

Western Australia

Curtin University of Technology
Edith Cowan University
Murdoch University
The University of Notre Dame Australia
The University of Western Australia

South Australia

The Flinders University of South Australia
The University of Adelaide
University of South Australia

Tasmania

University of Tasmania
Australian Maritime College

Northern Territory

Batchelor Institute of Indigenous Tertiary
Education
Charles Darwin University

Australian Capital Territory

The Australian National University
University of Canberra

Multi-State

Australian Catholic University