



THE UNIVERSITY OF
MELBOURNE



Research at Melbourne: Ensuring excellence and impact to 2025

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Preface

The University of Melbourne is one of the largest and most productive research organisations in Australia. In 2011 our expenditure on research was \$844 million. We carry out fundamental and applied research to enrich our understanding of the world, grow the store of human knowledge, respond to major social, economic and environmental challenges, and create a milieu for research-infused education at every level. Importantly, we perform exceptionally well at this endeavour, consistently leading nationally and globally in a series of competitive rankings and indicators. We are also highly regarded for the impact of our research.

But the environment for research-intensive universities is increasingly challenging. The competition for the best talent and resources is global and fierce. Onerous compliance requirements and high teaching loads compete for academics' time. As successive governments restrict spending on higher education and our local competitors win larger pieces of the pie, public funding for research is scarce.

For these reasons, in 2010 we determined it would be timely to reflect on how we go about research and research training at the University of Melbourne. We set out to devise a strategic framework for the next 10-15 years, with the aim of elevating the excellence and impact of our (already world-class) research efforts. Notwithstanding the challenges of foretelling the future, this paper sets out that framework, reached over a lengthy period of consultation and careful consideration at all levels of the University, and adopted by the University's Senior

Executive in August 2012. Over \$100 million over the next five years will be expended on implementation of this strategy across a range of new initiatives.

A key development is the Grand Challenges strategy. We outline three broad research areas for institutional focus: understanding our place and purpose; fostering health and wellbeing; and supporting sustainability and resilience. Of course, these are not prescriptive. Faculties will continue to pursue their own research strategies, and individuals will continue to direct their own studies. The Grand Challenges provide opportunities for researchers to contribute to three areas where the University has or wishes to develop critical mass, where there is a perceived social imperative, and where we will direct a portion of resources at the institutional level. The Grand Challenges philosophy will be embedded across the University particularly through our precincts and partnerships strategies as well as through our international and research training agendas. These approaches will contribute collectively to raising the quality and impact of our research.

Our people are paramount and central to this paper and to the research endeavour at Melbourne. In support of this strategy we will pursue various initiatives to ensure Melbourne is a great place to work and that researchers have the necessary support at all stages of the academic lifecycle. We will create increased opportunities for research collaboration within the University, externally and abroad. We will refine our institutional settings – our financial and physical resources, as well as our



processes and systems – with the aim of reducing impediments to research. Detailed information about these initiatives will be made available and regularly updated on the *Research at Melbourne* strategy website.

We also look to the future. We recognise the vital intertwining of the practice of research with the development of future generations of researchers and research-oriented professionals and citizens. We have a responsibility to utilise our strengths in research to enrich the experience of our students and ensure that they develop the skills and values for critical and open inquiry.

Within the requisite financial, policy and structural constraints, this paper aspires to not just incremental improvement, but to a significant advancement in the excellence and impact of our research outputs. It is a definitive statement of where we hope to be by 2025: inextricably linked with research excellence at all levels, heavily engaged in local and global problems, and making a difference to Australia and the world. I encourage you to embrace this vision.

Professor James McCluskey
Deputy Vice-Chancellor (Research)

August 2012

1. Research at Melbourne

Excellence in research is core to the University of Melbourne's mission. The University is a 'globally-engaged, comprehensive research-intensive university'¹, which has the capacity to make significant contributions to major social, economic and environmental challenges.

Our competitive edge in the Australian Higher Education sector is reflected in our global rankings, in our research income, in citations and social impact indicators. It is also demonstrated in the successes of our affiliated institutions. We recognise that our research could become even stronger and have greater impact with a more defined strategy and enhanced institutional settings.

The environment for higher education in Australia and internationally is intensely competitive. A collective understanding of how we undertake research at Melbourne remains critical if we are to be more visible globally as an institution that not only creates and advances knowledge, but also makes a tangible impact across disciplinary and sectoral boundaries.

In 2010, the University established a Research Commission to consider how we will maintain our tradition of research excellence and continue to raise the standard of our research in the shifting global environment. *Research at Melbourne* is a formal statement of the University's research and research training strategy to 2025, and is guided by the findings of the Research Commission. It has been prepared in close consultation with staff at all levels of the institution.

While the vision described in this paper points us to 2025, we are mindful that the local and global landscape for higher education will change rapidly in the next few years. Technological innovations, including e-learning, and a more globalised workforce will challenge existing structures and processes and will generate cultural transformations which are impossible to predict. The research strategy described in this paper is supported by a range of new initiatives. Many of these initiatives have begun to be implemented or will be implemented within five years of the strategy's adoption, and will serve as a critical foundation for achieving our broader aspirations for 2025. Detailed, up-to-date information about these initiatives can be found on the *Research at Melbourne* strategy website.



¹ University of Melbourne Plan, 2011-2014.

2. Why we do research

The University of Melbourne has a distinctive place in a long history of human enquiry. As a public-spirited, research-intensive institution, we are committed to nurturing scholarship, to developing new insights and promoting a wider understanding of the world in which we live. Our researchers work towards different types of discoveries, benefitting the global reserve of knowledge and contributing to major shifts in thinking. We develop future generations of researchers and we ensure that basic skills in research are essential attributes of all our graduates.

In considering our research future, our fundamental reasons for undertaking research will not change. We believe that research improves lives and contributes to the greater wellbeing of societies. Innovative technologies, scientific discoveries, cultural development, new approaches to public policy, and changes to the way we educate the next generation can transform the way we live. Research contributes to solving the world's most difficult problems – from climate change to global health to political unrest. An understanding of the human element, or the economic, cultural or social implications of these problems, is embedded across all our research.

Research challenges conventional wisdom. Through basic research the parameters of debates are shifted and paradigms are



defined (or refined), encouraging discoveries not yet known to be important to humanity. In many fields the results of these pursuits over the longer term can be groundbreaking and can reshape our culture.

Research fosters a spirit of interrogation. Through academic training, researchers are taught to question the status quo regardless of discipline. It is human nature to be curious. The exploratory nature of research, the opportunity it brings to participate in ongoing scholarly conversation, the enjoyment and fulfilment of discovery itself are all motivators for research, ultimately enriching our cultural and intellectual life.

We instil this spirit in future generations and embed this research culture in all our teaching and learning activities.

The opportunity to pursue knowledge for its own sake is arguably one of humanity's loftiest endeavours, thus rendering it a special privilege. Privilege means we have certain obligations – to justify our efforts to society, to communicate our research, and to ensure the conduct of our research is visionary, transformative, and beneficial to those who we serve. This paper seeks to capture some of the elements that will help drive these aspirations at the University of Melbourne.



3. Our research endeavour and the case for change

The University's endeavour to remain true to the search for knowledge cannot be achieved without a defined strategy, the right people, appropriate resources and a clear understanding of the environment in which we conduct research.

We have moved from an era when we measured ourselves against Australian peers to a context in which we measure ourselves against global peers. Our global peers include powerful, well-resourced research institutions.

We believe there are benefits to scale in research. Therefore, one of the ways to raise our global relevance and ranking, and to compete with global peers, is to achieve the optimal size and quality of our research activity in key strategic areas. The University has elected not to grow student numbers under *Growing Esteem*. We aspire, however, to grow our research business in a strategic way.

In the past, our research expenditure was derived from increasing teaching revenue because research overheads and infrastructure (and in some cases direct costs) were not provided by research funding agencies or through block grants. With stabilising student numbers, this approach will not be feasible in the longer term.

While the Commonwealth Government has committed to a research funding rate closer to the true cost of research, it is unlikely that the Government will increase materially the share of gross domestic product (GDP) devoted to research funding in the near future. It is therefore doubtful that we can increase our domestic public funding faster than GDP growth.

To achieve material growth in research revenue,² the University will need to consider alternative funding sources. The most obvious of these are international schemes, philanthropy, corporate or industry research funds, and business partnerships. Small offsets might arise from the growth of less expensive e-research activities, and through partnerships with other research providers.

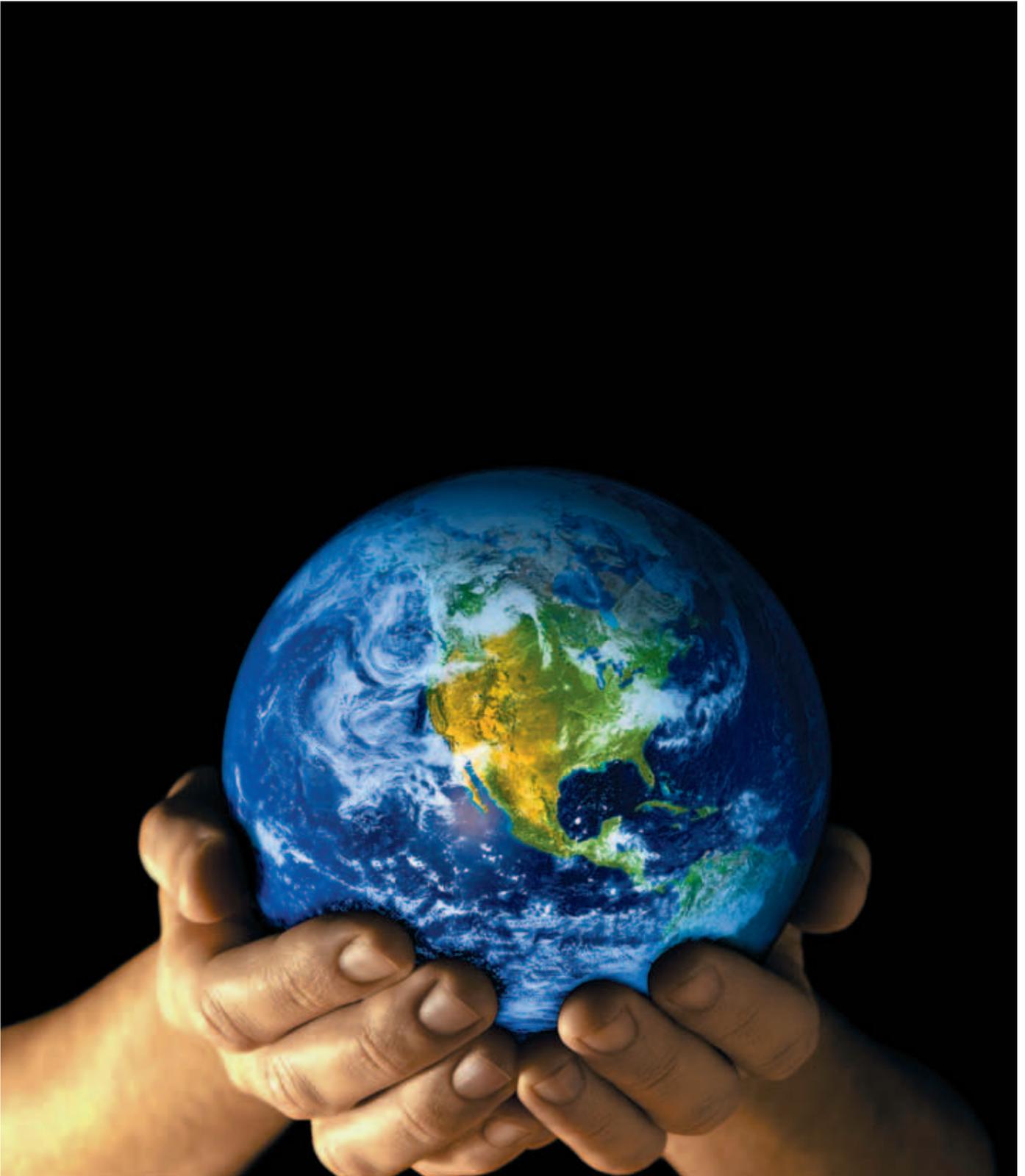
We anticipate the following from the above:

- › In 2025, the University will be a \$1 billion research enterprise. We will be bigger in terms of absolute research income and distinctly research-oriented, as reflected in the share of the total University budget spent on research. We will need to grow without compromising quality.
- › We will need to watch closely the cost versus revenue profile of our research as growth through schemes that do not provide full funding will sap the strength of the institution. This approach will guide us in choosing which funding sources to pursue, as well as how we price the work that we do.
- › As we grow, we will have a responsibility to protect and foster more than ever before the fundamental research which provides the basis for applied advances, whether scientific, technical, cultural or social. At the same time, our research future will involve more solution-driven work, research with specific applications, and a more conscious effort to integrate the work of academic researchers, industry partners, government agencies, social scientists and policy-makers.

- › We will obtain our research income from a broader range of sources, in particular from overseas, from corporate partners and from philanthropy. Many corporate entities have an increased appetite for working with universities, and our larger research base will give us a greater profile on the global stage.
- › In pursuing corporate research funding, we will need to improve both the way we manage relationships and the way we manage execution. This will involve a major cultural change around how we deliver on research. We need to be easier to work with, both to attract more partners but also to keep down costs associated with doing such work. We must become better at generating and rewarding impact as a goal of research, as well as academic quality.
- › The rising cost of specialised infrastructure means we will need to be conscious of achieving high use of all our facilities. This in turn will support a precincts approach which will bring complementary users together around major infrastructure. Precincts will also bring a range of other productivity-enhancing benefits integral to our strategy.
- › We will need to introduce appropriate measures to account for increased compliance requirements from government and other funding sources.

The *Research at Melbourne* strategy is informed by the above factors. Importantly, all of these factors can be addressed without changing radically the profile of the institution and by maintaining our commitment to deep scholarship, academic rigour and the highest ethical standards in research.

² At above GDP growth rates.



4. Our vision: Research excellence and impact

The vision for research at Melbourne emphasises above all our commitment to research excellence. Our research is shaped by many factors including the Australian Government's National Research Priorities and the nature of research funding. Most of our research, however, remains discipline-centred and is determined by individual researchers, many of whom are leaders in their chosen discipline. The following broad principles dominate our research culture:



The principles of research at Melbourne

- › Research excellence is our primary indicator of success.
- › Academic freedom is paramount. Academics determine their own research path and are supported by opportunities from divisional and institutional strategy.
- › Basic research is a critical foundation for discovery and understanding.
- › Basic and applied research can thrive simultaneously, in an interdependent manner.
- › The long-term benefit to the community is an important goal of our research.
- › Research is conducted to the highest ethical standards with integrity and openness. This value is embedded in every aspect of our work including our choice of research partners and collaborators.
- › Research is integrated with the education of all our students, enabling a constant renewal of research activity and fostering a spirit of enquiry among our students.
- › The University endeavours to remain alert to the ideas of its academic community.

These principles allow the University to operate under a highly devolved model whereby discipline-focused faculties, with their departments and schools, set their own research agendas, guided by the University's aspirations under *Growing Esteem*.

At the same time, we recognise the need to compete with our global peers and raise the quality and impact of our research.³ Our dominant investigator-driven research paradigm must therefore be *complemented* by an array of strategic opportunities through research activities which are more explicitly relevant to the public good and conceived specifically to make a difference to our local communities, Australia and the world. While we seek to remain sensitive to the ideas of the University community and open to opportunities for discovery, we choose to participate consciously in the investigation, dissemination and application of research which addresses some of the most pressing global problems.

Under the *Research at Melbourne* strategy, the University will continue to cherish and cultivate the fundamental enabling disciplines from astrophysics to philosophy. In addition to this discipline-focused and investigator-driven research, we will pursue three Grand Challenges:

- › understanding our place and purpose;
- › fostering health and wellbeing; and
- › supporting sustainability and resilience.

³ The definition of research impact is a serious topic of discussion worldwide. In some countries, consideration of research impact has progressed beyond discussion. Funding agencies in the United Kingdom, for example, now place greater importance on the impact of research, requiring universities to address impact in research proposals. While it is difficult to define impact, we recognise that defining impact goes beyond the traditional assessment of research (for example, the publication of results) to more tangible benefits for end-users. Benefits include the application of research to achieve social, economic, environmental or cultural outcomes and can vary considerably depending on the discipline. We note too that impact in the academic arena can be viewed also as an indicator of the intrinsic quality of the research on scholarly or academic measures, and that both forms of impact exist in a university environment.



The Grand Challenges will provide us with a narrative and purpose beyond individual scholarship. They will offer members of our research community the opportunity to contribute some of their efforts to an institution-level strategy, and will be an integral part of our endeavour to elevate the quality and impact of our research in the next 10-15 years. The Grand Challenges will help to guide allocation of University resources and the recruitment of future academics.

To deliver this strategy, we will rely on three drivers which are central to achieving a 'globally-engaged, comprehensive research-intensive university'⁴: our people, our research collaborations and our settings.

We will also continue to uphold a fundamental aspiration of *Growing Esteem* – that the University will be better equipped to meet the expectations of staff, students and the wider community if research activities are aligned closely with the University's other critical activities. These activities include strategies for enriching learning and teaching through research, recruiting and retaining the best staff and students, internationalisation, corporate and research partnerships, as well as budget and infrastructure policies that support research. Our research strategy will continue to require coordination across all these areas.

Finally, invention and innovation will remain at the heart of all the University's research activities. Invention (or knowledge creation), innovation (loosely defined as new or fresh ideas that create value) and the commercialisation of important discoveries are critical drivers of economic growth and powerful contributors to physical, environmental and social wellbeing. Australia stands out amongst its global peers as an underperformer on several metrics of research and development, especially as these relate to business activity.⁵ As this country's leading research-intensive university, we recognise that we have an important role to play in countering this trend by aspiring to greater levels of collaboration and impact, and by fostering the next generation of researchers, innovators and entrepreneurs.

The University will continue to pursue an aggressive innovation agenda by encouraging research collaborations and innovations in industries, technologies, public policy and services informed by all our outstanding research, and in particular the Grand Challenges.



Figure 1

Research at Melbourne, the University's research strategy, addresses the fundamental and applied issues relevant to discipline-focused and investigator-driven research in addition to our institutional pursuit of a number of Grand Challenges.

4 University of Melbourne Plan, 2011-2014.

5 Chapter 4, *Innovation System Report 2011*, Department of Innovation, Industry, Science and Research: <http://www.innovation.gov.au/Innovation/Policy/AustralianInnovationSystemReport/AISR2011/chapter-4-links-and-collaboration/innovation-involves-everyone/index.html>

5. The Grand Challenges

The University of Melbourne will focus on three Grand Challenges:

- ▶ understanding our place and purpose;
- ▶ fostering health and wellbeing; and
- ▶ supporting sustainability and resilience.

This focus will boost the quality and impact of our research performance, bolstering our efforts to improve all dimensions of the human condition through our research.

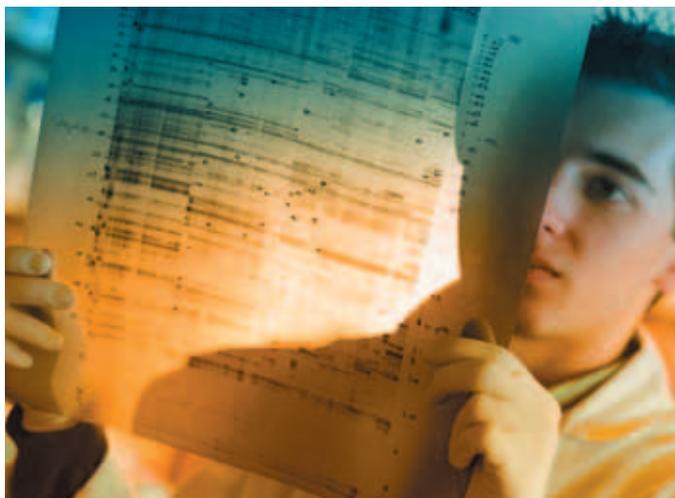
The University has extensive research capabilities in each of these broad areas but seeks to build further this capacity through the allocation of appropriate resources. We recognise that the three challenges represent some of the most difficult problems facing our world in the next century. These problems require interdisciplinary solutions which depend upon strong and mature expertise in relevant disciplines. By leveraging discipline research agendas set in faculties and departments, and by combining this disciplinary depth with the breadth required to address these multifaceted problems, the University will be better placed to anticipate new trends and drive discoveries that will help to improve and enrich local and global communities. An institutional focus on the Grand Challenges will enable us to better articulate and share the breadth of our capabilities with our partners and our peers as we grow as an institution.

The Grand Challenges do not imply the abandonment of deep, discipline-based scholarship at the highest level. They are necessarily underpinned by the enabling disciplines, from astrophysics to chemistry, and mathematics to philosophy. This approach assumes that all our researchers should have the *opportunity* to engage in a whole-of-University research endeavour, drawing on their discipline-specific research to meet a wider agenda. The Grand Challenges will be reflected in some of our decision-making, in resource allocation and the way we recruit staff at a whole-of-University level. Importantly, the Grand Challenges will be embedded across the University through our precincts and partnerships strategies as well as through our international and graduate research training agendas.



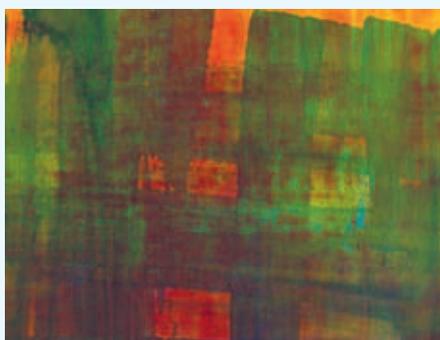
Figure 2 The Grand Challenges





The Grand Challenges...

- ▶ draw on the deep disciplinary expertise and scholarship of our researchers;
- ▶ are a whole-of-University endeavour; they overlap and involve a degree of interdependence, and converge to improve the human condition;
- ▶ do not map to faculties, departments, schools or other academic structures but touch on many different academic disciplines across the University and the wider community;
- ▶ are outward-looking and are best met by engaging with external partners and collaborators;
- ▶ are global in their reach but have an Australian and local dimension; and
- ▶ are broad in definition, reflecting our desire to make a significant impact and to involve the full breadth of the research community.



The Grand Challenges are well aligned with national priorities and nationally competitive funding agencies, and resemble the aspirations of many other universities. Melbourne's approach is distinctive because it:

- ▶ tackles the challenges in an environment committed to fundamental research of the highest calibre and to converting excellence into impact;
- ▶ engages a generation of new graduate researchers and informs our undergraduate teaching, thus fostering a workforce of the future trained to tackle global problems;
- ▶ cuts across all our disciplines to harness the breadth and depth of the institution;
- ▶ creates precincts of critical mass, or 'research neighbourhoods' with their own character and vitality;
- ▶ engages other organisations drawn from industry, government, the community and other universities; and
- ▶ builds strong international partnerships with emerging economies to complement our existing networks with research communities in the United States, the United Kingdom, Europe and parts of Asia.

The three Grand Challenges are described below. For detailed and up-to-date information about new initiatives in support of the Grand Challenges philosophy, refer to the *Research at Melbourne* strategy website.

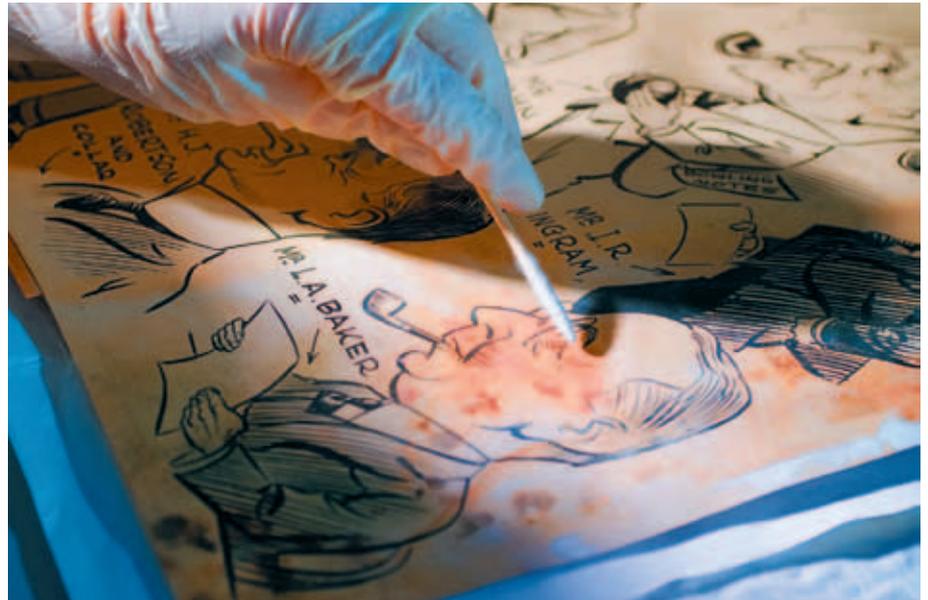
Understanding our place and purpose

Today, one in every four Australians is overseas-born. Our country boasts over 270 ancestries, including some of the oldest living Indigenous cultures in the world.⁶ This diversity continues to impact on our economy, our social institutions and our understanding of ourselves as a nation.

External factors also continue to have an influence on our identity and social institutions. At the end of 2010, the Office of the United Nations High Commissioner for Refugees estimated that 43.3 million people worldwide had been forcibly displaced due to conflict and persecution.⁷ This was the highest number in more than 15 years, demonstrating the ongoing relevance of forced displacement and statelessness to national and international agendas.

By the middle of this century, the Asian Development Bank's projections show that Asia will account for more than half of the globe's economic output. The growing force of the Asia-Pacific region in the world will have significant implications for Australia. Our historical ties with the United Kingdom, Europe and the United States must accommodate these changes in geographical and political outlook.

The Place and Purpose Grand Challenge centres on understanding all aspects of our national identity, with a focus on Australia's 'place' in the Asia-Pacific region and the world, and on our 'purpose' or mission to improve all dimensions of the human condition through our research. This Grand Challenge includes the investigation of multiculturalism, economic innovation and development, social equity, communal wellbeing, political systems and enfranchisement, global efforts to improve the lives of people in developing countries, fostering creativity to enrich lives,



and building our knowledge of the present, recent and distant past. The University seeks to engage as a thought-leader and to contribute actively to public dialogue in these areas.

While the University has one of the largest cohorts of academics focused on Asia, and some of this country's most effective Asia institutes, much of this expertise is dispersed and consequently we do not derive the prominence we should from our range of Asia-related research activities. To help redress this, we will put in place a process to give Asia-related research at Melbourne a much greater profile through coherence and leadership. In particular, we will seek to develop research relevant to the accelerated modernisation of much of Asia, as well as specialist capabilities in Asian language, culture and history. In this regard, we recognise that much of our existing research in areas such as business, urban futures, energy and resource management is as relevant to Asia as it is to anywhere in the world. Hence, we will seek to embed an Asian dimension in relevant research that already cuts across many areas within the

University at the same time as profiling the more specialist Asian research activities.

An important piece of our social equity agenda is improving the quality of Indigenous research and increasing the number of Indigenous researchers. The University is a centre for comprehensive Indigenous studies as well as a place of study, work and collaboration for Indigenous scholars. Our focus on Indigenous studies intersects with the other Grand Challenges. It provides a lens through which to develop knowledge in relation to Indigenous wellbeing and society. By boosting our critical mass in Indigenous studies, we have the chance to expand significantly our understanding of the challenges and opportunities confronting Indigenous peoples in Australia and the Asia-Pacific region, and to explore these issues in the broadest sense. A contemporary example is the interaction of Indigenous communities with the mineral resources sector. From land rights to employment, Indigenous issues in this area have ramifications for individuals, local cultures and the nation. In a region where first peoples and social

⁶ Australian Government Department of Immigration and Citizenship, *The People of Australia: Australia's Multicultural Policy*, 2011. http://www.immi.gov.au/media/publications/multicultural/pdf_doc/people-of-australia-multicultural-policy-booklet.pdf

⁷ UNHCR *Statistical Yearbook*, 2010.

equity are at the forefront of debate, the University has much to contribute. At the same time, other Indigenous cultures are informing the scholarship and community debate on Indigenous Australia's future and history. With this in mind, the University will make a targeted effort to increase the impact of research carried out in Indigenous studies, and to recruit and retain Indigenous researchers.

The Place and Purpose Grand Challenge has creative arts, humanities and social sciences research at its core because it is concerned fundamentally with philosophical, social and cultural issues. The traditional model of scholarship in these areas, however, is characterised by a greater prevalence of individual research in contrast to the large teams of researchers more commonly seen in the science, medicine and technology disciplines. The research problems associated with the Place and Purpose Grand Challenge and with our other Grand Challenges (to which the arts and humanities are also inexorably linked) will realise their potential through more integrated, collaborative kinds of activity. Hence, the University will provide opportunities for researchers from the creative arts, humanities and social sciences to step outside their usual research frameworks. This will be managed by testing flexible, team-based arrangements and networks which are effective for the relevant disciplines.

We will also encourage greater University engagement in policy development, and we will support initiatives such as the Melbourne School of Government to help transmit our policy research into the public arena. The University will endeavour to cultivate collaborations in the Asian region more broadly, and promote engagement of the humanities, the social sciences and the performing arts in the digital world.



Fostering health and wellbeing

During the twentieth century, chronic diseases surpassed infectious diseases and injuries as Australia's dominant health concerns.⁸ Deaths due to dementia and Alzheimer's disease have more than doubled over the past 10 years, accounting for 6.3 per cent of all deaths in 2010 compared to 2.9 per cent in 2001.⁹ Cardiovascular disease is still the leading cause of death in Australia, accounting for 33 per cent of all deaths in 2009.¹⁰ It is estimated that 1 in 2 Australians will be diagnosed with cancer by the age of 85.¹¹ The community cost and the burden of these diseases are enormous.

At the same time, Australians are living longer than ever before. The number of people over the age of 85 is expected to rise from 0.4 million in 2010 to 1.8 million (5.1 per cent of the total population) by 2050.¹² The economic and social implications of this increase will be pronounced. For example, Commonwealth Government spending on aged care alone is expected to increase from 0.8 per cent of GDP in 2010 to 1.8 per cent of GDP by 2050.¹³

With nearly half our research expenditure focused on some aspect of health and wellbeing, the University is deeply involved in addressing this Grand Challenge. We are a major player in the Parkville biomedical precinct, which accommodates more than 10,000 researchers who deliver around \$1.3 billion annually in research to improve health outcomes. We have an outstanding distributed network of clinical departments based in teaching hospitals at Parkville, Eastern Hill, the Austin, the Western and Northern Hospitals, a rural health network and a general practice network. We are

tackling a broad range of issues relevant to the health of the nation, including the delivery of and access to health care, equity issues, the balance between basic science and translational science, integration of the sector, the growing economic burden of health care, and the role of the creative arts, the humanities, and the social sciences in enabling wellbeing. We are well-placed to generate and apply new knowledge in health, from basic science to translational research to clinical practice and policy.

The preamble to the 1946 constitution of the World Health Organization notes that, 'health is a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity'.¹⁴ We recognise that research outside the traditional boundaries of biomedicine is vital to the University's capacity to meet this Grand Challenge. It is important to understand, for example, how literature, film and television shape our attitudes to healthy living; how the design of urban areas can affect patterns of physical activity; the therapeutic benefits of music and the visual arts; healthcare communication in multicultural and multi-faith societies; the legal frameworks needed for strong public health policy; the ethical underpinnings of research focused on stem cell biology and genetic information; the links between animal health and welfare and human health and welfare; and the history and philosophy of health and wellbeing. The University is undertaking significant interdisciplinary research in these areas.

The University's longstanding research and clinical partnerships with some of the country's outstanding health care providers are helping deliver our bold agenda in improving health and wellbeing. Melbourne is a partner in a number of Australia's premier clinical and research facilities including the Bio 21 Institute, the Melbourne Brain Centre, the Peter Doherty Institute for



Infection and Immunity, the Royal Children's Hospital and the Victorian Comprehensive Cancer Centre (VCCC). Along with IBM and the State of Victoria, the University is a collaborator in the Victorian Life Sciences Computation Initiative, a supercomputer facility which will help to improve diagnostics and refine treatments for major diseases.

A fundamental objective in the next five years will be integrating the Parkville biomedical precinct with associated health precincts to reinforce it as one of the world's top biomedical research hubs. To achieve this goal, we must ensure the success of the Peter Doherty Institute, the Melbourne Brain Centre, and the VCCC through strategic recruitment of

8 Australian Government Department of Health and Ageing. *National Chronic Disease Strategy*. Canberra: DoHA, 2006.

9 Australian Bureau of Statistics: <http://www.abs.gov.au/ausstats/abs@.nsf/Products/6BAD463E482C6970CA2579C6000F6AF7?opendocume> (20 March 2012)

10 Australian Bureau of Statistics (ABS), *Causes of Death Australia*, 2009

11 Australian Institute of Health and Welfare 2010, *Australia's Health 2010*, page 142.

12 Australian Government, *Caring for Older Australians: Productivity Commission Inquiry into Aged Care*, Volume 1 (2011), xxvi.

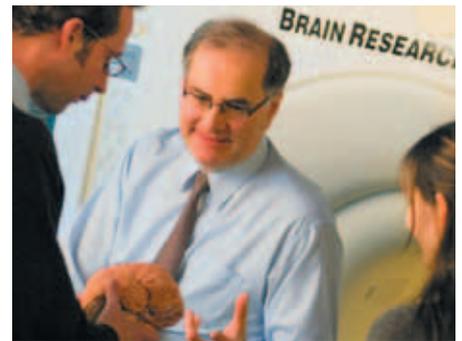
13 *The 2010 Intergenerational Report (IGR)* (Australian Government 2010d).

14 *World Health Organization Constitution*, 1946, <http://www.who.int/governance/eb/constitution/en/>



shift in our research excellence in health and wellbeing, with prevention as a key dimension. In particular, we will address areas such as health systems analysis, population mental health research, translational medicine, health services research capability (linking to our strength in cancer) and growth of our nascent program in non-communicable diseases. To this effect, we will merge the School of Population Health and the Nossal Institute for Global Health to drive the scale necessary for visibility and excellence in these areas.

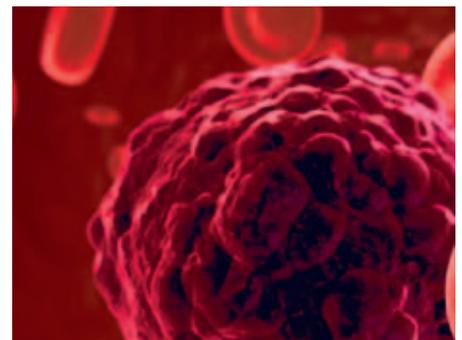
This strategy aligns with plans to develop academic health research centres with our affiliates, linking basic research with translational research, with emphasis on enhanced patient outcomes. The University will endeavour to strengthen its partnerships with medical research institutes and major hospitals, addressing both the precinct concept and academic health science centre models, and building on new teaching, training and research developments at the Western and Northern Hospitals in particular. We will also develop an initiative integrating research expertise in genetics and society, and programs to improve Indigenous and rural health.



outstanding researchers, implementing arrangements for shared infrastructure, and by consolidating the systems driving research collaborations. There is further work to be done to strengthen the eight health research domains identified by our Faculty of Medicine, Dentistry and Health Sciences, and to link these domains to other components of the health and wellbeing agenda across the University.

Our capability in population and global health is impressive but analysis of the top schools of public health around the world suggests we need to achieve further scale and breadth to be among the top internationally. To meet this aspiration, we will grow this capability to drive a major

As a comprehensive University, we are in an ideal position to contribute to the 'convergence revolution' of biomedical and health research, bringing together the life sciences, engineering and the physical sciences. We have a special opportunity to apply the principles of convergence as we move into an era of personalised medicine, enabling patients to receive precise treatments for their diseases based on personal genetic profiles. The related ethical, moral and behavioural issues are substantial and will greatly influence strategies for disease prevention and for achieving overall wellness at the individual and population level.



Supporting sustainability and resilience

One of the greatest challenges of the twenty-first century is the endeavour to secure global prosperity without placing excessive demand on the Earth's natural resources and without jeopardising the climate system. Climate change, water and food security, sustainable energy and designing resilient cities and regions are critical issues.

The International Panel on Climate Change projections indicate that if carbon emissions are allowed to rise at their current pace, the world will likely face a 2-4.5 °C temperature rise by 2100, with a 3 °C increase most likely.¹⁵ Australia is already experiencing a greater prevalence of heat waves, fires, floods, landslides, droughts and storm surges exacerbated by warming climates.

Our river systems are under serious threat. Water shortages in southern Australia affect our role as a national and global food producer, the sustainability of urban and rural communities, and the ecosystems we depend upon. Rising populations also pose major challenges. By 2050, three quarters of the world will live in cities or densely-populated urban environments, and Australia's population could reach 36 million.¹⁶ We face challenges around designing functional cities and systems to support increasing populations in concentrated areas. Smarter, integrated



water management systems and sustainable infrastructure are urgently needed. These challenges affect many parts of the world and many solutions will be as equally relevant to the Asian region as here in Australia.

While many of these problems require technical solutions, they also involve changed attitudes and consideration of economic implications, living patterns and behaviours. Contributions from the creative arts, the humanities and social science disciplines are vital if we are to design and implement solutions effectively. These disciplines can provide the expertise to address themes such as the physical and social functioning of cities, connecting physical phenomena with lessons from our past, and the role of the creative arts and music in re-building communities after a natural disaster.

The University is deeply engaged in this Grand Challenge. Our estimated research capacity in fields relevant to sustainability and resilience includes over 1,300

researchers and approximately \$218 million in research expenditure. We recognise that cross-disciplinary and cross-sectoral understandings are needed to enable innovation across energy, water, carbon management and related domains. In line with this principle, we are poised to implement a transformation in the way we conduct research in this area through a combination of mechanisms and initiatives.

As we look towards 2025, we will promote sustainability and resilience as a major part

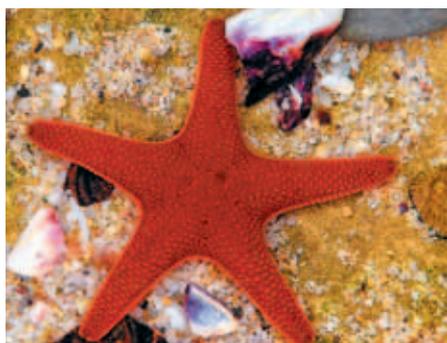


¹⁵ <http://www.un.org/wcm/content/site/climatechange/pages/gateway/the-science>

¹⁶ *The 2010 Intergenerational Report (IGR)* (Australian Government 2010d).

of our research strategy. We will build on our existing capabilities to develop a research precinct focused on this challenge in South Carlton. The precinct will shift our model of conducting research at Melbourne. It will place an emphasis on fostering research collaborations between academia and major industry partners, government departments and community organisations to drive projects that focus on energy efficiency, carbon and water management, climate change mitigation, sustainable cities and regions, and disaster management.

In alignment with a whole-of-University approach, the public policy and social implications of the research will provide researchers at our regional campuses and in fields such as – law, education, design and urban development, psychology, business and economics, and population health – with rich opportunities to contribute to this agenda.

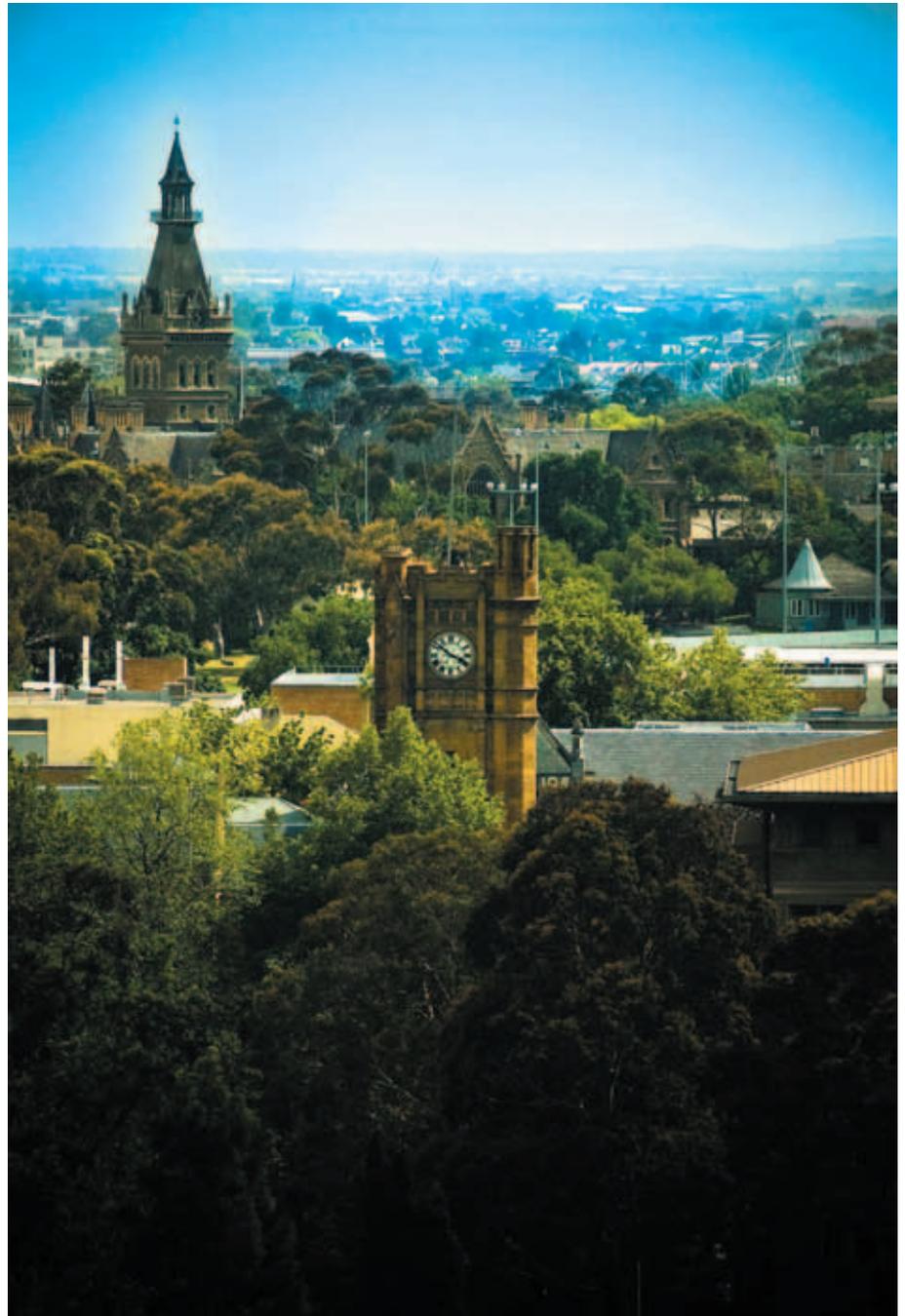


6. Achieving the vision: The path to 2025

The University's focus on the three Grand Challenges responds to the reality of a rapidly changing global environment, where research universities must continually rethink the way they conduct research if they are serious about improving research excellence and helping to solve the world's problems. Both the complex collaborations needed to find solutions to specific challenges and the discipline-specific inquiries of our individual investigators will require support. Greater structural agility and appropriate resources for our researchers will be critical to achieving our ambitious aims. Our people will require the best support possible.

This section outlines the principles and values we will apply in organising ourselves for research at Melbourne. They are broadly categorised in the following sections: our people, our research collaborations, and our settings.

In support of these principles and the *Research at Melbourne* strategy the University will implement a range of new initiatives. These initiatives are relevant to *all* our researchers not only those actively involved in the Grand Challenges. Detailed and up-to-date information about these initiatives can be found on the *Research at Melbourne* strategy website.





Our people: Attracting, supporting and developing excellent people

The University of Melbourne's success as a leading teaching and research organisation is predicated on the notion that our people are our differentiator. We strive to create and maintain a work environment which attracts and retains the best research workforce, including graduate researchers and professional staff who provide essential contributions to research.

Cultivating research excellence

We cannot realise any of the ambitions set out in this paper without the very best researchers. In order to attract and retain the best researchers, we must offer an internationally competitive research experience. Melbourne should be a place where the best researchers choose to work.

To achieve this, we must ensure our researchers feel supported and valued, with effective relocation services for international recruits and consistent mechanisms for paying fellowship salary gaps.

We must recruit outstanding researchers in alignment with our research strategy, complement or fill gaps in our institutional capability, and remain agile enough to take advantage of opportunities that may emerge. Increasingly, our advancement agenda must support the goals of the *Research at Melbourne* strategy through the inclusion of chairs and senior research positions in fundraising activities.

We must offer, too, a set of high-quality career development programs and mentoring at all levels. All our academics and research staff should feel they can pursue fulfilling careers and engage effectively with our research community regardless of circumstance. Any bias in employment-related interactions must be rigorously identified and addressed, to ensure all our researchers, including women and Indigenous researchers are valued equally. We will take into consideration performance relative to opportunity.

The University's policies and programs for recruitment, confirmation, promotion and performance development must align with our strategic priorities and support excellent research. Working with faculties and divisions to ensure their consistent application across the University and at all levels of employment will strengthen our research workforce.

Training future research leaders

Training the next generation of researchers for the academy and the global research workforce is central to the University's mission. Most of our graduate researchers are at the beginning of their careers yet they are often among our most promising researchers and make significant contributions to the University's research reputation and outcomes. We have an obligation therefore to create a workforce culture and research environment which acknowledges the critical role our graduate researchers play as members of the academic community and the wider research workforce.

By 2025, the University aims to be on an equal footing with the best research training universities in the world. We will be a highly desirable destination for outstanding students globally, and we will be producing excellent, well-rounded graduate researchers who are prepared for a diversity of research careers and who are in demand within Australia and internationally.

Organising our research training offerings into thematic programs will go some way to achieving these objectives. We must offer Australia's highest quality research training experience supported by outstanding infrastructure, supervision and mentoring, coursework, international experience and professional development opportunities such as university teaching, leadership training and career planning. We must prepare our graduate researchers for employment with leading research, business and government organisations.

For these reasons, our focus is on increasing the excellence of our graduate researcher cohort and on maximising the quality of the research training experience while maintaining our research training load with modest growth where appropriate. We aim to balance our role as a major research training university with the goal of attracting high-performing graduate researchers and achieving strong completion rates. These factors, combined, will improve research outputs such as increased publications and timely completions, promoting the University as a globally-competitive provider of research training within an excellence-driven research environment.

Linking teaching and research

The teaching-research nexus is an integral part of the University's research culture and what it means to be a research-intensive university. At Melbourne, we place great importance on developing students' research skills, on exposing all our students to research-active practitioners, and on providing research experiences with an increasing level of autonomy and self-direction.

Over the course of their studies, our undergraduate students are encouraged to gain a progressively greater understanding of methods of inquiry in relevant disciplines through exposure to contemporary research developments and research methodologies in their fields of study. For our graduate researchers, the teaching-research nexus provides opportunities to develop university teaching skills. As future research leaders, our graduate researchers must develop the core skills to communicate the context, rationale, approach and findings of research to peers, students and the public. A renewal of activities in this area is essential to reinforce the relevance of the nexus to the next generation of researchers and graduates.

Our research collaborations: Building stronger local and global networks

Like people, research collaborations are integral to the research endeavour. Their importance is evident in multi-authored research publications, research grants and sponsored research. Research collaborations, whether small or large, provide benefits for our researchers and their research partners.

For the University's researchers, the advantages of collaborations include exposure to different perspectives that are critical to the interdisciplinary research models necessary to address the Grand Challenges. Research collaborations bring much needed skills, complementary resources and infrastructure. Where such collaborations are with industry partners, they provide access to industry-specific expertise and the scope for additional or diversified funding sources. There is strong evidence, too, that collaborations, particularly with international researchers, bring global esteem and visibility. This attracts more talent and resources for research. It brings benefits for our learning and teaching and advancement agenda, ensuring the University of Melbourne has a global reputation for being a great place to study and support research. As the benefits of strong research collaborations accrue they self-perpetuate in a virtuous cycle (see Figure 3). For our external research partners – including industry, government, community groups – research collaborations enable access to leading research which can be directed to business-specific challenges. The reputation gained from partnering with universities is highly valued. Importantly, research collaborations also provide external partners with access to the next generation of employees and business leaders.

In short, research collaborations present a significant opportunity to improve the quality, scale and impact of our research, increasing the likelihood of major advances.

Researcher-to-researcher collaborations

The vast majority of research collaborations at the University are, and will continue to be, investigator-driven. These 'researcher-to-researcher' collaborations form the backbone of our academic networks and are integral to the global business of research. Researchers at the University of Melbourne are already engaged in myriad national and international collaborations often built on personal relationships that spawn whole genealogies of researcher lineages and history. These are important and will continue to be supported through existing mechanisms. Our aim is to provide new opportunities, fill gaps in our academic and geographic links, and help ensure our collaborations are attuned to our strategic goals.

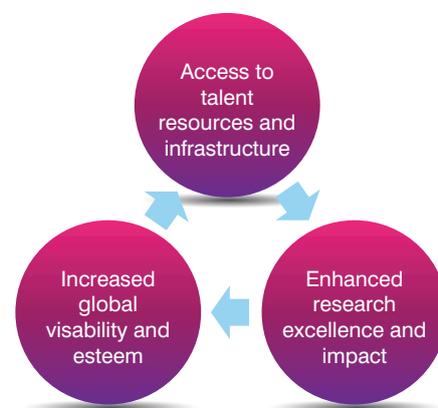
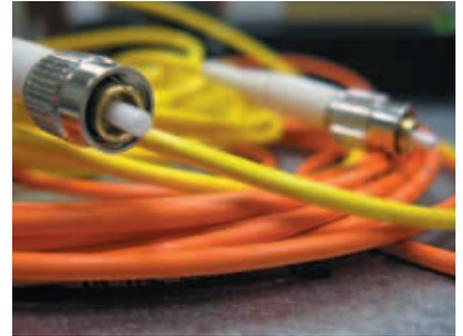


Figure 3



Embedding a collaborative culture within the University is vital, if we are serious about fostering national and international collaborations. The University's interdisciplinary research institutes are integral to our strategy as are programs that enable collaborations with external partners. The research institutes are particularly important in enriching the experience of our early career researchers.

Internationally, our existing collaborations are predominantly with colleagues in North America, Europe and the United Kingdom. We will continue to encourage joint research with well-placed European and North American scholars, recognising that publications co-authored with researchers from these regions are cited more frequently and are likely to have greater impact. We would also like to build links at individual-team- and faculty-levels in countries and regions that are strategically important and, in some cases, where we are currently not very active. We will focus on the following countries or regions through the *Research at Melbourne* strategy: China, India and South America (specifically Brazil and Chile). These countries have been selected because of their rapid economic development, geo-political importance in their regions, and their relevance to Australia.

The University is dedicated to nurturing our strong existing ties with Europe. Notably, we wish to develop our relationships in Germany, whose robust economy, European leadership, existing links with the University, and commitment to renewable energy and environmental sustainability make it a natural locus of opportunity.



These strategic choices do not preclude vigorous and enthusiastic collaboration with other countries or regions where specific imperatives make these a logical choice for many researchers and disciplines. Importantly, all international collaborations will be built on a foundation of research excellence. While we will foster links with the focus countries and regions at individual-team- and faculty-levels, these links may also involve institution-level collaborations, where appropriate.

Institution-level research collaborations

Institution-level research collaborations (sometimes referred to as whole-of-University collaborations) provide significant scope to augment the many individual-level collaborations that occur. They provide the opportunity for the University and partner institutions to work together to address research problems with a shared vision and on a larger scale. Whether they are local, corporate or international partnerships, the potential mutual benefits of these partnerships are significant. A long-term view must be taken, however, with significant effort required to manage such relationships. In order to support current and future institution-level research collaborations, we will ensure a co-ordinated and strategic approach across the University's divisions and faculties.

Creating physical environments that foster collaboration: research precincts

To foster productive research collaborations, a key starting point is the development of strong clusters of research activity which bring together people and infrastructure in productive ecosystems. The choices we make about building critical mass in a particular field can exert a strong 'gravitational pull', attracting researchers to join our academic community. They can attract complementary organisations, both from the public and private sector, and lead to clustered networks of specialised personnel with strong shared interests. With appropriate settings, these clusters can become 'research precincts' – a powerful means of harnessing collaborations and boosting innovation effectiveness.

With sufficient scale, research precincts can generate unexpected research opportunities as close working relationships help to build trust and create new insights. Precincts offer a way to reach across and beyond organisational boundaries to generate far greater impact on challenging problems than the University could achieve alone. They can have a physical centre and be linked to nodes in different geographical locations.

By 2025, research precincts will assume a more central role in the University's research strategy. They will be a critical part of Melbourne's efforts to address the Grand Challenges, and will help to boost our research capabilities to a standard of excellence and impact valued by our local community, our national and international peers, governments and industry.

Enabling collaboration and supporting our researchers

In addition to creating physical environments that foster collaboration, we seek to create a cultural environment that enables collaboration and offers appropriate support for our research community. In order to become a partner of choice with organisations from industry, government, community groups and institutions within and outside the sector, we recognise the need to ensure our institution is penetrable to our own researchers and individuals or institutions who wish to collaborate with our researchers. We must also support our researchers so that they may gain the greatest value from both internal and external research collaborations.

Melbourne's processes for managing grants, contracts, intellectual property and other research governance matters are rigorous. These processes are carried out with careful oversight of the University's reputation and in the best interests of researchers, but can appear overly complicated to both external members of our research community and our own researchers.

We will make significant improvements to the way we support our researchers and the way we interact with research clients to ensure we remain a highly-respected organisation with which to do business.

Our settings: Advancing our strategy with appropriate physical, financial and knowledge resources

Cutting-edge researchers and thriving collaborations require access to appropriate resources. These resources include a range of financial, physical and knowledge support systems, which can be referred to collectively as our institutional settings. The choices the University makes about these settings are critical to research success.

We recognise that adjustments are required from time-to-time to ensure that researchers are supported by the most suitable settings. Revised principles for organising and managing our research infrastructure, for aligning our budget model with research, for ensuring the right governance arrangements through Academic Board, for communicating our research identities, and for measuring our research performance will form the basis of ongoing efforts to optimise the systems underpinning research excellence and impact.



Research infrastructure

Committed researchers need the right tools to address important questions. Retention and recruitment of outstanding researchers relies in part on the ability of the University to offer access to world-class research infrastructure. Infrastructure is more than collections of equipment. It includes skilled professionals, such as information technology and informatics specialists with relevant domain knowledge, and technical support staff.

The shift over the last 10-15 years towards large-scale systems approaches to research has had significant implications for research infrastructure. The development of pervasive information infrastructures is making major impacts on research approaches in many disciplines and on the way we access information resources. Increasingly sophisticated instrumentation has become obligatory in many domains, as seen in ground-breaking life science and materials research. Moreover, advances in information technology, including the ability to effectively digitise documents and other artefacts, now permit the ready exchange of data across international borders. The University must not only obtain such infrastructure under growing competitive pressures, but must also ensure its efficiency and effectiveness by developing sustainable business models and acquiring the technical expertise to capitalise fully on its capabilities. Strategic investment in Melbourne's research infrastructure is of critical importance.

Research infrastructure at Melbourne is excellent but it is imperative to further improve the management of our capabilities and the planning of our investments. As we look to 2025, we will aim to increase coordination and shared investment in research infrastructure. Investment in this context involves finding the right balance between University-level and divisional involvement in partnership with faculties.

A budget model that supports and promotes research

The University's budget model operates on the basis of distributing income to divisions as earned and then charging divisions back for a range of chancellery and common services. To optimise our research success, our budget model should be synchronised to enable research activity at the highest level. This includes regular scrutiny of the model to ensure we are minimising impediments to research, or eliminating drivers of unintended behaviours that are prejudicial to research activity.

A public-facing university

Communicating publically the multiple research identities and strengths of the University is important to building the University of Melbourne's international research reputation. As the University establishes its precincts, Grand Challenges, research institutes, and new research programs, virtual online identities will be created for them based on a foundation of available information on our research and researchers. To build on this foundation, University-level effort is required to ensure that public information about research and research training is collected once, and then syndicated and packaged in as many different contexts as possible.

By 2025, the University should be able to point to a digital legacy of online information that showcases not only our current research and researchers, but also the contributions of researchers who have passed through the institution. Strategies to preserve and communicate this legacy will need to be developed.

It will also be imperative to disseminate information about our research successes in strategic ways to bolster our research reputation. At the same time, as part of a leading research-intensive university, our researchers have a responsibility to promote research at all levels, including through public debates and external peer reviews.

Research performance measures

The University strives to create an environment that supports research excellence and this includes understanding research performance such that quality can be improved continuously. In a large, complex organisation like ours, this often means building our information systems so that data can be analysed and reported in flexible ways, from the individual researcher up to the whole-of-University level. It also means generating better (and more effectively collected) data to promote informed decision-making. Therefore, it becomes paramount that we concentrate our efforts on measuring what we hold to be important in terms of quality, excellence, scholarship and outcomes. Much of our research falls conveniently within faculty boundaries, but this will change in the future, emphasising the need for flexible systems that capture information about our research and research training.

Increasingly, there is a global interest in the demonstration and evaluation of the impact of research. This is a complex and at times controversial endeavour. The University will keep abreast of developments in impact evaluation, across the academy and government, in order to be prepared for and to help lead future developments.

We must also ensure that all aspects of what is broadly referred to as 'compliance' reporting remain robust. This includes, for example, reporting to government on our research income and publications as part of the Higher Education Research Data Collection (HERDC). We must be mindful of our role as a leading, research-intensive university in the National Innovation System, making participation in the Excellence in Research for Australia (ERA) initiative a priority.



7. Aligning *Research at Melbourne* with the University's strategic framework

Growing Esteem 2010 articulates the University's aspiration to be a globally engaged, comprehensive research-intensive university in a position to respond to global challenges. The *Research at Melbourne* strategy conveys a 10-15 year plan and program of tasks that the University must accomplish to realise this vision.

Our divisional structure and business planning processes mean that with few exceptions, execution of the *Research at Melbourne* strategy and day-to-day research management will continue to occur at faculty, school and department level. At the same time, the role of the Deputy Vice-Chancellor (Research) is to survey the strategic research landscape across all faculty divisions and oversee the quality and impact of individual faculty research activity. The Deputy Vice-Chancellor (Research), supported by Melbourne Research, is responsible for driving cross-faculty research initiatives and new strategic ventures in conjunction with faculties and departments.

In a large, complex university, this framework can create ambiguity about ownership of initiatives and responsibilities. The *Research at Melbourne* strategy describes a whole-of-University approach to achieving research excellence and impact. It seeks to raise the visibility of the University's deep scholarship and relevance to the outside world by setting objectives supported through the deployment of central resources. While

embracing new opportunities, the strategy will ensure that the most important and successful elements of our research endeavour continue to flourish and will be implemented in close collaboration with faculties, schools, institutes, departments and our academic community.



8. Evaluation framework for *Research at Melbourne*

Our success in executing *Research at Melbourne* will rely in part on an appropriate framework for measuring implementation of the strategy. 10-15 years is a long time, however, and new priorities are likely to emerge over this period. At the same time, we have a number of existing mechanisms for assessing our research performance more broadly (see section titled 'Research performance measures'). These are in addition to the proposed development of key metrics for priority research initiatives including the Grand Challenges, research precincts and infrastructure, and University-level partnerships.

To maximise opportunities and minimise duplication of process (such as the annual business planning cycle and divisional strategic performance reviews), we will take a 'light touch' approach to evaluating implementation of the strategy outlined in this paper. Up-to-date information on reporting and evaluation will be available on the *Research at Melbourne* strategy website.



9. Research at Melbourne by 2025

› By 2025...

- › our brand and identity will be linked inextricably with research excellence at all levels, and with impact and engagement with local and global problems;
- › the University will be a one billion dollar research enterprise;
- › we will have cemented by 2025 our position well within the top 50 research-intensive universities in the world, as reflected in the Shanghai Jiao Tong ranking and other indices, and we will have achieved the following overarching goals;
 - › our Grand Challenges philosophy will be fully embedded and will be informing institutional planning, our research activities, precincts and collaboration. Our interdisciplinary and cross-sectoral research and innovation in these areas will be recognised for its relevance and impact. At the same time, our discipline-specific, investigator-driven research will be thriving and will provide a critical basis for discovery both within and outside the Grand Challenges;
 - › we will have the reputation of being a highly desirable place to work, and one where all our people – graduate researchers, professional staff and researchers at all levels – are given the opportunity to fulfil their potential;
 - › Advancement funding will have created more endowed Chairs and senior fellowships, increasing the University's research output and excellence;
 - › Melbourne's graduate researchers will be well-rounded, prepared for diverse careers and in demand globally. Every graduate researcher will have the opportunity to enjoy an international and teaching experience and will be supported through to the timely completion of their candidature;
- › graduates of all programs will be recognised for their research literacy;
- › the University will be renowned for the international flavour of its whole endeavour and will be engaging on numerous levels with Germany, China, India, South America (specifically Brazil and Chile), in addition to its existing strong links with the United Kingdom, the United States, Europe and other regions;
- › the South Carlton and Southbank precincts will be well established, complementing the Parkville biomedical precinct. These precincts will be contributing collectively to Australia's long-term prosperity by providing solutions to twenty-first century problems around health, sustainability, and innovations in the social sciences, humanities, technological and creative disciplines;
- › our partnerships with external organisations will be generating joint initiatives and significant advances in the health sector, in industry, in community and cultural life, and in government policy. Our partnerships will be enhancing research and enlarging our research capabilities;
- › we will have a set of measurements that allow us to monitor not just the business parameters of our activity, but also the academic measures such as research quality and the quality of the research higher degree experience and outcomes, with discipline-specific consideration; and
- › outstanding research infrastructure, budget, governance and support systems will be helping to drive excellent research and minimising impediments to research excellence.



Research at Melbourne...

unimelb.edu.au/research