

# MACQUARIE UNIVERSITY RESEARCH STRATEGIC PLAN 2009-2011

## MAY 2009

### VISION:

**At age 50 (in 2014) Macquarie will be ranked among the top eight research intensive universities in Australia, and amongst the top 200 research intensive universities internationally.**

### MISSION:

**To establish a pervasive research culture across all areas of the University, and to achieve internationally and nationally leading research in selected concentrations of research excellence, by maximising the institution's intellectual and physical resources and by maintaining a continuous improvement framework.**

### OVERVIEW

This Research Strategic Plan has five major Goals based on the vision and targets set out in the Vice-Chancellor's plan for Macquarie@50. Macquarie University seeks to increase its performance and standing amongst the leading research-intensive universities in Australia and the world, in particular, we seek to attain a ranking amongst the top 200 Universities in the Academic Ranking of World Universities compiled annually by Shanghai Jiao Tong University.

The Goals of the 2009 – 2011 Research Strategic Plan address the essential aspects of research activity and outcomes: scale and quality of staff research across the whole University; concentration of research effort to achieve world-leadership in key areas of strength; scale and quality in our postgraduate research training; using our research results for the benefit of Australia and the community; and improving our international research collaborations and linkages. The Plan also aims to position the University to respond effectively to Australian Government research evaluations, such as the Excellence in Research for Australia (ERA) exercise. To this end external evaluation of Research Quality and an audit of Knowledge Transfer and External Engagement were conducted in 2007 and 2008, respectively. The University intends to repeat these evaluations in a three-year cycle.

The Goals outlined lead to specific objectives at University level, and this Plan will be accompanied by more detailed measures of institutional performance outlined in the Research Strategy Implementation Plan. Each Faculty will develop its own Research Strategic Implementation Plan, adapted as appropriate to the respective Faculty environments. These Plans will be integrated with Executive Deans' Key Performance Indicators, and will be reviewed annually against performance and external changes.

For the previous (2006 – 2008) Research Strategic Plan, the University developed a formal definition of Research Activity. The definition is a guide to individual staff on what the University's expectations of research productivity are, and to provide a benchmark of individual performance which allows the University to track institutional performance. The definition was reviewed as part of development of the 2009 - 2011 Research Strategic Plan and a slightly revised definition (**Appendix 1**) has now been adopted. The revised definition is consistent with international standards, and compatible with current research quality assessment processes. It is significant that the Research Activity indicator requires both a minimum level of research productivity (publication) and demonstration that the research activity of individuals is effectively translated into the teaching and learning objectives of the University, especially in respect of research training.

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### **GOAL 1: To establish at Macquarie University a pervasive research culture across all areas of the University**

***OBJECTIVE 1.1 By 2014 to increase the number of research active staff to 80% of total, and enhance research performance across the University so as to be among the top 8 research universities in Australia***

As a research-intensive Australian University, Macquarie expects all academic staff to pursue active research programs. To attain this objective the University has in place at University and Faculty levels a variety of structures to support staff in the development and maintenance of quality research programs, including funding mechanisms, mentoring, workload allocation, incentives and rewards. Research activity indicators will apply in all aspects of University processes for the management of our staff, for example in selection/recruitment, appointments, probation, Personnel Development Reports, incremental review, promotion, selection for Outside Study Programs, and other related processes. It is important to understand that the University will value research excellence wherever it occurs.

The University uses its research infrastructure and resources strategically in building its research culture. In particular the University operates a suite of internal research grant funding schemes designed to support new staff in developing research projects and establishing research track records, and to support more established staff to enhance competitiveness in seeking research funding from external sources.

***OBJECTIVE 1.2 To achieve increases in research funding, both via competitive grants and non-competitive sources, at national research-intensive University levels***

The University has limited internal funding resources for the support of research so that maintaining a high level of research activity requires that the majority of research funding be sourced externally. External research funding income is used widely in international benchmarking of institutional research activity, and competitive grant income in particular is used as a proxy for research quality.

The University has set a number of targets for external research funding: an increase in total annual research income of 5% greater than the national average growth, and the non-ACG component of total research income to increase to greater than 60% by 2011. This objective requires that success in attracting Australian Competitive Grants (ACG) Schemes is maintained and improved, but also that external research funding sources are diversified. To achieve this we have in place a range of incentives and support systems for staff seeking external research funding. In addition to our internal research grant schemes which support staff to a point where they have competitive research track records, the University provides relevant staff development programs, mentoring and assistance within Faculties and central support services offered by the Research Office.

The University seeks to greatly enhance research funding from NHMRC and other sources for supporting medical research. This will be approached by expansion of the Australian School of Advanced Medicine through targeted recruitment and partnership with Macquarie University Hospital. We aim to expand research activity and income in engineering and applied sciences, social sciences and business through specific incentives and support for developing external partnerships.

### **GOAL 2: To achieve international leadership in selected areas of research**

Macquarie University seeks to develop and maintain world-leading research in selected areas of strength. To achieve this, the University has encouraged and supported the

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formation of research groupings which address major research issues. It is characteristic of such groupings that they attract large numbers of high-quality research students and research fellows, as well as funding from external sources to sustain their activity.

Achieving this goal entails identification of and targeted support for Macquarie's best performing research areas: this is addressed through a number of mechanisms, including formation of Macquarie University Research Centres (MQRC), funding for major research initiatives (Research Innovation Fund) and targeted recruitment of top quality research active academic staff into our best areas of research through the Concentrations of Research Excellence (CORE) strategic recruitment program.

Our aim is to establish up to 20 major internationally-leading research centres by 2014. We anticipate that each such centre will consist of ten to fifteen excellent (staff) researchers, together with a similar number of postdoctoral research fellows and twenty to thirty HDR students. It is intended that all areas benefiting from the CORE recruitment strategy will either have already gained MQRC status, or will evolve into MQRCs or major externally-funded research centres (e.g. nodes of ARC Centres of Excellence, equivalent NHMRC centres or Cooperative Research Centres) within a short period of completing their CORE appointments.

### ***OBJECTIVE 2.1 To strengthen existing and emerging areas of research excellence through targeted recruitment (CORE strategy)***

The University is building concentrations of internationally leading research through recruitment of top-quality research-active staff into identified areas of existing and emerging research strength. To be identified as an area of research excellence for inclusion in the CORE recruitment program, a group of researchers must demonstrate outstanding research performance for the individual staff involved, and both cohesion and focus in their research activities. For this purpose performance of the research group is evaluated using standard indicators (including publications and citations, HDR load and completions, external research income, and where relevant, socio-economic impact). It would normally be expected that key researchers in these areas will be rated at the highest levels (top 10% in the field world-wide) in a research assessment exercise.

CORE recruitment is also applied to areas of emerging research strength which enable the University to build research profile at international levels in engineering and applied science, medicine, business and social sciences.

To ensure we can make the best possible appointments and that new recruits can re-establish their research programs at the University rapidly and effectively, the CORE recruitment process uses individualised search processes and offers appropriately tailored commencement packages (including allocation of earmarked MQ Research Excellence Scholarships - MQRES).

Further expansion of capacity and capability in Macquarie's identified areas of research concentration and excellence will be by way of aligning external Research Fellowship (ARC Laureate Fellowships, Future Fellowships and co-funded ARC/NHMRC Fellowships) applications to these (CORE) areas.

The first step towards establishing future areas of research concentration and focus is to identify strongly performing individual staff in allied areas of research, or small groupings of collaborating staff undertaking high quality research at the project level. These staff are encouraged to consider more formal groupings - for example, Faculty Research Centres. The University has also put in place processes supporting major research group formation including University internal seed-funding (Research Innovation Fund) and specific support (including co- or in-kind funding) for major external funding submissions.

It is anticipated a third round of CORE recruitment will be initiated in 2010/11.

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### ***OBJECTIVE 2.2 Enhance performance and international standing of identified areas of research strength (CORE/MQRC)***

In parallel with the CORE recruitment strategy, the University has reviewed and restructured its internal Research Centres program. In 2005 the Macquarie University Research Centres (MQRC) Scheme was introduced, with research excellence at an international level as the key criterion. From 2009 the only Centres existing at the University will be national research centres, MQRCs and Faculty Research Centres. All MQRCs are expected to gain major external research funding or national research centre standing within 5 years of establishment, and are required to establish funding strategies and targets.

CORE recruitment and MQRCs are closely aligned - it is expected that all CORE areas will have gained MQRC status within 2 years of completing their initial CORE recruitment. To assist CORE/MQRCs to reach their goal of international leadership in their research area, the University gives priority to these areas through investment in major research infrastructure including capital and equipment funding and support for external infrastructure funding bids (EIF, NCRIS, ARC LIEF). The HDR student program associated with each area will be expanded through priority allocation of HDR scholarships (MQRES) to CORE appointees and CORE/MQRC areas. Additional capacity will also be afforded through targeting of external research fellowship applications to these areas.

CORE/MQRC areas will also be targeted in major external (end-user) partnerships, including potential partners for relocation to campus.

### **GOAL 3: To maximise research and research training outcomes through an expanded, high-quality higher degree research (HDR) program**

Maintaining a high-quality and substantial graduate research (HDR) program is essential to the University's strategy for building our research capacity and to our goal of ranking amongst the leading research-intensive universities of the world. HDR students make major contributions to our research outputs and outcomes, and are integral to development of our academic staff and their disciplines.

The University has undertaken a major re-development of our HDR program over the past 5 years, with the goal of reaching 2000 enrolled HDR students and 300 annual HDR completions by 2011. This has required significant improvements to be made in recruiting and enrolment processes, as well as substantial investment in HDR scholarships, both for Australian and international students. Ensuring high completion rates and high quality outcomes for HDR students has resulted in major improvements to HDR candidate management, including commencement, progression and completion programs.

### ***OBJECTIVE 3.1 Maintain the number of commencing HDR candidates at an average of 400 p.a. in 2009-2011***

To maintain high-quality HDR commencements at an average of 400 per year, the University will strengthen HDR recruitment activities, both for Australian domestic students and international students. Promotion and information services will be enhanced, together with continued improvement of enrolment processes. Annual new enrolment targets will be set for individual Faculties, and, in the case of international students, Macquarie International.

HDR enrolments are strongly coupled to availability of HDR scholarships. The University has established a substantial Macquarie Research Excellence Scholarship (MQRES) program with adequate budget to offer 200 new MQRES in 2009. Half of these are reserved for Australian domestic students. To manage the allocation of these scholarships strategically and effectively, priority areas have been identified including CORE/MQRC areas, recipients

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of Australian Competitive Grants (ACG), Federation Fellows, Distinguished Professors, and University Research Centres.

In addition to MQRES, the University expects an increase in its allocation of APAs, and aims to increase the number of HDR scholarship opportunities in other areas, such as externally-funded awards (e.g. APA-I awards), and Joint PhD Program and other international cooperative awards (for example, through the China Scholarship Council). The University also encourages Faculties to establish Faculty HDR tuition fee and stipend scholarships and, where appropriate, Associate Lecturer A (HDR Stream) appointments entailing HDR enrolment.

The University recognises an international trend towards Masters degree (rather than Honours degree) entry to PhD, and Faculties will continue to develop flexible HDR entry programs and admission criteria.

#### **OBJECTIVE 3.2 To increase the number of HDR completions to 70% of cohort enrolments p.a. by 2011**

The University seeks to both increase cohort completion rates (decrease drop-out rates) and to decrease completion times to below 4 expended EFTSU. Key strategies to achieve in-time completion of HDR students include:

- maintaining and enhancing Central and Faculty Commencement Programs;
- maintaining a quality Supervisor training program and further developing the associated Supervisor Register to ensure highest quality of supervision;
- ensuring adequate infrastructure and resources are available at Faculty/Department level to support HDR student projects through University infrastructure funding mechanisms and the Faculty Funding Model;
- maintaining and improving Faculty reviews of candidate's Annual Reports to identify and resolve progress issues;
- developing a comprehensive completion management program including availability of Faculty-level HDR Completion Scholarships;
- enabling flexibility of form for PhD/MPhil theses, and particularly encouraging thesis by publication.

Annual completion targets are set for Faculties based on numbers of PhD (or MPhil) students entering their 4<sup>th</sup> (2<sup>nd</sup>) year of equivalent full time study.

The University will maintain an annual survey of HDR students' experience ("MUSEQ-R"). This survey, which commenced in 2006, is designed to identify potential problems and blockages which prevent students completing in time. The survey also assists in monitoring the quality of HDR student experience at Macquarie, and is complementary to the national PREQ survey.

#### **GOAL 4: To be a significant contributor to the nation's economic, social, cultural and environmental well-being**

This Goal aims to fulfil the requirements of the Macquarie University Act and recognises the need for the University to be seen as a significant contributor to the community if it is to be supported by the community. Developing external research partnerships with private industry, business, government at all levels, not-for-profit organisations and community groups will extend the range of our research and diversify the funding base supporting our research. The University has an obligation to identify Intellectual Property arising from our research, and take appropriate steps to commercialise such IP for the benefit of Australia.

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A comprehensive Knowledge Transfer and External Engagement Audit undertaken in 2008 has been an innovative step in establishing a benchmark for end-user impact of our research. The information gained from this Audit provides a target list of end-user organisations for developing further and enhanced research partnerships. Selected examples from this Audit will be used to showcase the University's outreach to the Australian community. As indicated earlier, the University will repeat the Audit on a triennial basis.

#### ***OBJECTIVE 4.1 To implement effective research policies and procedures to maximise research end-user engagement, knowledge transfer and commercialisation.***

The University seeks to identify and support excellent research activities that have the potential for high impact on the Australian community. The Knowledge Transfer and External Engagement Audit is one means by which this occurs. The value of research impact generated through research-based consultancy services, expert advice, and input into national and local policy development, will be acknowledged and given weight in appointment, annual staff performance evaluation, and promotion procedures. Research which has outstanding impact through innovation in technology, environmental and human health, social or economic policy, culture or service delivery is recognised publicly at the annual Macquarie University Innovation Awards.

Development of research-based partnerships with research end-user organisations is encouraged and supported through internal research grants including Research Development Grants, Vice-Chancellor's Innovation Fellowships and Linkage Seeding Grants. The Research Office will identify research contract and tender opportunities and assist staff in formulating bids/tenders for industry- or community-related research projects.

Faculties will also work closely with the restructured Office of Commercialisation and Faculty-embedded Business Development Officers to assist staff in developing and managing research partnerships. The University will actively pursue opportunities to participate in Co-operative Research Centres, and expand collaborative research with CSIRO, Rural R&D Corporations and other industry- or professionally-based organisations.

The University's commercial company AccessMQ offers an alternative interface to end-user organisations. The University will undertake a review of AccessMQ in 2009 with a view to enhancing its effectiveness and improving coordination with the Research Office, Office of Financial Services and other University functions.

The University has in place well-developed policies, processes and support structures to identify research-derived Intellectual Property and ensure it is effectively utilised for the benefit of inventors (staff or students), the University and Australia, through various forms of commercialisation or knowledge transfer. It is essential also that the University's IP policies and commercialisation procedures are robust and enhance education in and awareness of commercialisation and entrepreneurship across the University.

#### ***OBJECTIVE 4.2 To improve research links in Macquarie's local geographical environment (North Ryde, Sydney, and NSW)***

Macquarie University has a particular responsibility and opportunity to develop strong research and research training partnerships with organisations in our local area. To this end we have reviewed and refined our strategies for engagement with organisations in the North Ryde area, targeting organisations with whom we can develop in-depth partnerships, including the potential for relocation of significant activity to the University campus.

The University has in place structures and mechanisms aimed at enhancing effective interactions with State government, local government, tenants of the adjacent Macquarie Park, tenants of Macquarie University Research Park, and other organisations located on the University campus. A key strategic initiative has been establishment of the Office of

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Institutional Advancement, as well as the restructured Office of Commercialisation – the latter including a significant business development function.

These offices will work in cooperation with the Macquarie University Property Investment Trust to identify and target external organisations with potential - for relocation onto campus and/or to establish major partnerships involving co-funding of collaborative research facilities, industry-funded staff positions, HDR scholarships and other forms of sponsored research capacity and new capability. The University will target the Commonwealth Government Education Investment Fund for co-funding of large-scale co-operative projects with private-sector or government partners.

#### **GOAL 5: To increase Macquarie's international research collaborations, outreach and global impact**

##### ***OBJECTIVE 5.1 To increase the University's international profile and standing by 2014 through enhanced international research collaboration***

A major goal, as expressed in the University's Vision Statement, is to be ranked among the top 200 research universities in the world (as measured by the Shanghai Jiao Tong index) by 2014. To achieve this, the University plans to increase its research productivity, quality and impact world-wide across all areas of the University. In particular, the University will aim to both recruit and develop HiCi researchers.

The University seeks to increase international research collaborations and strategic partnerships by increasing the number of applications to international research linkage funds (e.g. ISL), international funding agencies and foundations, and expanding participation in major international research programs (e.g. participation in the EU Framework and accessing major international research facilities). Additionally, the University, through its Faculties, will support staff and HDR students to participate in major international conferences and exchange schemes, and to participate in other international activities (for example, journal editorships) leading to recognised Academic Esteem Factors.

The Outside Studies Program has been substantially revised to ensure international experience appropriate to the discipline is a key part of the research activities undertaken by staff while on development leave.

Joint supervision of HDR students by Macquarie staff and staff of other leading research-intensive universities is an effective way of both enhancing the research training experience for the students, and building in-depth collaboration with leading research institutions internationally. A major strategic initiative currently being implemented is targeted expansion of joint PhD programs with selected overseas universities. These encompass dual degree and joint degree programs with partner universities, and institutional cohort agreements for exchange of groups of candidates.

**Appendix 1**

**Macquarie University “Research Active” Definition(s)**

A “Research Active” individual is understood as being someone who pursues research on an ongoing basis, as a major focus of their academic activity.

From 2009, to be regarded under the Macquarie University definition as “research active” a staff member (minimum 0.5FTE appointment) shall:

- a) Be author or co-author of at least five peer-reviewed (weighted) publications in the past five years that satisfy the requirements for the following HERDC publication classifications:
- Research book (weighted 5)
  - Chapter in research book (weighted 1)
  - Refereed journal article (weighted 1)
  - Refereed conference paper (weighted 1) (does not apply in all areas of the University)

For the purposes of this definition: “Research” has the meaning of research defined in current HERDC Guidelines.

Note also that the publication count is NOT weighted for number of authors – that is, for example, for a journal article with three authors, each author scores 1 weighted point.

The University continues to collect publications data under the categories originally established in 1994 by DEST. For the purposes of this definition the following categories are deemed as weighted 1, and may be included in the formula for calculating outputs per year: Registered Designs (H), Patents (I) and peer-reviewed creative works (J1).

Where staff members do not meet the requirements of the abovementioned criteria, because they have recently (since 2005) begun to engage in research, or because they are early career researchers, or because they have had a break in their research career (e.g. maternity leave), then the definition defaults to an output equivalent to an average of one weighted HERDC publication point per year.

*and:*

- (b) Have the demonstrated capacity to translate research outcomes into teaching and learning by way of measures approved by the Executive Dean of Faculty - including but not restricted to:
- Higher Degree Research student supervision that has led to a completion in the past two years, or, where the opportunity has not arisen, current supervision of Higher Degree Research student(s);
  - Other participation over the past two years in research training, including coursework and Honours programs with research training or preparation components;
  - Current satisfactory progression towards completion of a Research Higher Degree;
  - Delivery of research-based professional education and training; or
  - Delivery of research-based community service and enterprise.