

UNSW@ADFA

CANBERRA • AUSTRALIA



Research and Research Training Management Plan 2005 – 2009

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1.0 INTRODUCTION

The new agreement between the University of New South Wales and the Commonwealth to provide undergraduate and postgraduate education to the Australian Defence Force recognises the reputation of UNSW@ADFA as a quality higher education provider. Excellence in research is the backbone of any institution's capability to achieve excellence in teaching and learning. The University of New South Wales is one of Australia's top research-intensive universities and as a faculty of this university, UNSW@ADFA aspires to be one of the top specialist institutions in the world by achieving a significant international research profile, thereby ensuring the delivery of education services to Defence is of the highest standard.

The strategic goals of UNSW@ADFA in research are:

- to enhance research management capabilities to identify and capitalise on emerging research opportunities through developing individuals and research teams;
- to assess the potential to expand on already established and developing research cooperation with the Faculties at Kensington for mutual benefit; and
- to strengthen the position of research at UNSW@ADFA through the further development of strategic research links with Defence and other research organizations.

This document describes a five-year plan to enhance the research profile, research culture and research training at UNSW@ADFA in order to achieve these strategic goals.

2.0 CURRENT STATE OF RESEARCH PROFILE AT UNSW@ADFA

2.1 Operating Environment

Since the establishment of the University College by the University of New South Wales at the Australian Defence Force Academy in 1986, UNSW@ADFA has been active in research which is conducted in all five Schools: Aerospace, Civil & Mechanical Engineering; Business, Humanities & Social Sciences; Information Technology & Electrical Engineering; and Physical, Environmental & Mathematical Sciences. UNSW@ADFA is the only national academic institution that has a strong and integrated Defence focus across many disciplines from history to culture, management, science, engineering and technology.

At the end of 2003, the new position of Associate Dean (Research) was established to assist the Rector in promoting and managing research. The Associate Dean (Research) is responsible for overseeing all research activities and the Research Office functions. The Research Office, working with UNSW Research Services, provides support to academic staff for the development of their research careers and research funding and monitors research performance. In addition, the Research Office is responsible for organising workshops to develop and enhance research students' skills and administering the progress review of research students and, working with the Scholarship Office in UNSW, is responsible for administering scholarships.

On the academic side, the Research Committee (a standing committee of the Academic Board) is responsible for research policy matters and for postgraduate degree admissions, progress and examinations. A Faculty Research Grants Committee chaired by the Associate Dean (Research), is responsible for assessing internal grant applications.

2.2 Research Performance

The research output of UNSW@ADFA (in terms of publications per staff member per year) in the period 1998-2002 is about the UNSW average, ie, at the level of Go8 universities. UNSW@ADFA was ranked in 2004 by Thomson ISI in the top 1% in Engineering in the world based on citations of publications in the period 1998 - 2002.

The academic staff at UNSW@ADFA have established strong collaborations with other universities and their research programs have been funded by many national and international organizations including ARC, NASA, DARPA, NSF, DSTO, CSIRO and ANSTO. For example, UNSW@ADFA is a contributor to the Australian Literature Gateway, a node of the ARC Centre for Complex Systems, an associate participant in the Bushfire CRC, a member of the Australian Hypersonics Initiative, one of the three hubs of the ARC Research Network for a Secure Australia and is attached to the Queensland node of the ARC Special Research Centre for Quantum Computer Technology. Current and emerging

areas of research strengths include Defence & Homeland security related areas, astrophysics and optics, complex adaptive systems, the economics/religion interface, environmental modelling and engineering, hypersonics, image and video processing, labour movements, knowledge transfer and innovation, leadership, management and economic issues, materials science, photonic quantum information technologies and uninhabited aerial vehicles & control.

The number of research students per full-time academic staff member is about half the UNSW average. Although undergraduates are traditionally a major source of research students at other universities, our undergraduates are posted to service upon graduation. Nevertheless, UNSW@ADFA has managed to attract a significant number of research students from other institutions. Since research students are essential members of a vibrant university research community, there is a need to attract more research students to UNSW@ADFA.

About 2% of the UNSW research income originates from the research activities conducted at UNSW@ADFA. While this is significantly lower than that of most faculties within the university, it has to be noted that UNSW@ADFA is a multi-disciplinary faculty in which some disciplines, such as humanities, do not require as high a level of funding to do research as disciplines such as engineering, science and medicine. An alternative indicator to research income is the grant participation index (expressed in terms of the number of grants per full-time academic staff member). The grant participation index for UNSW@ADFA in the period 2001-2003 is about half the UNSW average. Although both the research output and its quality at UNSW@ADFA is comparable with that of Go8 universities, it is clear that there is a need to improve on the grant participation rate to engender a more vibrant research culture at UNSW@ADFA.



3.0 STRATEGIES

The current research profile indicates that UNSW@ADFA has achieved research output and quality at a level compatible with that of UNSW and Go8 universities. It is clear that UNSW@ADFA does not have a supply of postgraduate research students from its undergraduate body, its postgraduate research student population per capita is small and the grant participation rate of academic staff is low compared with the university average. As UNSW@ADFA is a small multi-disciplinary faculty, it is acknowledged that critical mass is lacking in a number of disciplines but this has not prevented it from making significant research achievements in some disciplines. More importantly, the multi-disciplinary nature of the faculty is also a strength that has yet to be fully exploited in a research world which today demands a more multi-disciplinary approaches to research.

According to the UNSW's Research and Research Training Management Plan, "the University's mission is to maintain its position as a respected international research institution where world-class researchers can pursue quality research." Within this context, *the mission of UNSW@ADFA is to enable its full research potential to be realised by providing an environment and support to academic staff and research students to pursue quality research in its areas of strengths.* Specifically, in order to further develop its research strengths, UNSW@ADFA has to develop strategies to increase its research students per capita and its grant participation index to at least the UNSW average.

In order to attain the strategic goals, UNSW@ADFA must take a fundamental step to improve its research culture and profile by building a reasonably large and vibrant research community. As UNSW@ADFA academics are expected to carry out three primary functions: teaching, research and administration, adequate resources have to be deployed to promote research and to support and reward staff based on research performance. More research students have to be recruited and supported by quality research training. Internal research funding schemes have to be more focussed in developing individuals and research teams and in producing outcomes that include greater and quality research output as well as increased external grant participation rate. With an increase in external research funding, there is a greater capacity for offering more scholarships to attract even more research students. The actions required in executing these strategies are given below.

3.1 Recruiting and Supporting Staff

- 3.1.1 UNSW@ADFA is currently undergoing a generational change. While it is gaining highly motivated junior academics capable of developing into academic leaders, it has been and is losing a significant number of senior academic leaders through retirement or appointments to other universities. It is essential that Professors of international standing be promptly recruited to provide research leadership in Aerospace Engineering, Civil Engineering and Computer Science. Appropriate recruitment of Professors in the Science disciplines needs to be made as more retirements will occur within the next five years.
- 3.1.2 Recruitment of academic staff must give priority to a strong research potential or track record, unless there are exceptional circumstances.
- 3.1.3 Schools are expected to distribute workloads equitably to ensure a balance between teaching, research and administration.
- 3.1.4 Newly appointed staff are supported by
 - research induction and Research Mentor programs conducted by UNSW Research Services aimed at developing staff research careers which include grant applications and research students supervision skills;
 - a lighter than average teaching and administrative load (preferably at half-load) in their first year of appointment; and
 - a new staff start-up grant which normally provides up to \$10,000 research funding for developing their research.
- 3.1.5 Women academics are also supported by the Women 21 Research program currently conducted through the UNSW Research Services.
- 3.1.6 Through the career development scheme, junior academics should each be provided with an appropriate mentor by their Schools to support their research careers.
- 3.1.7 Provide research support to staff by the use of competitive internal research funding schemes. It is the belief of UNSW that the very best research is achieved within a culture of diversity. In order to enhance the research profile, internally funded research schemes must be targeted at supporting the best research irrespective of whether it

is individually based or group based, discipline-focussed or inter-disciplinary, as well as encouraging the building of research groups with critical mass in single or multi-disciplines. A list of these funding schemes is given in Appendix A.

3.2 Attracting Research Students

- 3.2.1 Actively publicise UNSW@ADFA's research capability, facilities and quality of research training with improved advertising materials, improved website content and improved publicity in local media.
- 3.2.2 Increase the number of University College Postgraduate Research Scholarships (UCPRS) offered annually to match the number of well qualified students applying. A list of scholarships currently offered is given in Appendix B.
- 3.2.3 Establish Equity scholarships to attract female students to undertake research in non-traditional areas of study.
- 3.2.4 Streamline the scholarship application process.



3.3 Supporting Research Students and Research Training

- 3.3.1 Research Student Support Scheme – Each School is allocated \$500 per full-time research student per session (up to a maximum of \$3000 for a PhD student) to support research students' research. All Schools currently support research students presenting papers at one International Conference during their term of candidature.
- 3.3.2 Overseas Travel Grant – This competitive scheme, currently funded by the Business Services Office, provides up to a maximum of \$5,000 for a research student to undertake research activities directly relevant to the research thesis such as overseas research field trip or presenting papers at overseas conferences.
- 3.3.3 Completion Scholarship – This competitive scholarship is awarded to students in the last six months of their study.
- 3.3.4 Provide ongoing training for supervisors.
- 3.3.5 Conduct induction programs for new research students.
- 3.3.6 Monitor research students' progress better by employing the new university research student review process.
- 3.3.7 Organise workshops to develop research students' skills, such as the Research Workshop program conducted jointly in each session by the four universities in the ACT.
- 3.3.8 Improve the process of examination of research theses to ensure minimal delay.
- 3.3.9 Provide facilities to promote student interaction, such as establishing the Research Students Common Room
- 3.3.10 Establish means of providing housing accommodation to research students.



3.4 Promoting interaction among Schools and Disciplines

- 3.4.1 Establish a Strategic Research Initiative Funding Scheme to promote interdisciplinary research (see Appendix A)
- 3.4.2 Actively promote multi-disciplinary initiatives such as the newly formed Defence Studies Forum.
- 3.4.3 Invite established overseas researchers to provide impetus to UNSW@ADFA research activities through the Rector sponsored visiting fellowship program and in the process raise the research profile of UNSW@ADFA.
- 3.4.4 Organise an annual Research Day to promote research and interactions among researchers.
- 3.4.5 Coordinate staff to apply for external funding that has a multi-disciplinary focus such as the successful ARC application in early 2004 for a research network on security.
- 3.4.6 Encourage Schools to consciously support interactions across disciplines through their annual budgeting and resource allocation process.

3.5 Strengthening Research Collaborations with UNSW, Defence, Government Organisations and Industry

- 3.5.1 Actively publicise UNSW@ADFA research strengths and facilities at the Kensington main campus by organising inter-Faculty visits and workshops to initiate more collaborative research and joint grant applications.
- 3.5.2 Actively build on existing research collaborations with Defence/ DSTO to strengthen the partnerships and to further develop research strengths.
- 3.5.3 Actively exploit UNSW@ADFA's geographical proximity to many government organizations to seek and build on existing research collaborations through research contracts, ARC linkage programs or high level research type consulting.

4.0 Concluding Remarks

University education is not just about knowledge delivery. It is more about learning what questions to ask, how to obtain knowledge, how to synthesise information, how to push the boundary of knowledge, and therefore, how to solve new problems and handle unforeseen circumstances. These are the same skills sets required for conducting research. An enthusiastic, high-performance research culture fosters critical enquiry and creativity. Undergraduate students are inspired by lecturers who are involved at the frontiers of knowledge and who can convey that intimate research discovery experience which cannot be learnt from textbooks. These lecturers instil confidence in students that they are also capable of achieving and that they are learning from the best. By excelling in research, UNSW@ADFA ensures that its students acquire knowledge at the cutting edge of technology that is both challenging and relevant to their Defence careers and that the research expertise base of Defence is enhanced.

While the responsibility of implementing this Research and Research Training Management Plan rests with the Rector, the Associate Dean (Research), Heads of Schools, the Academic Board and its Research Committee, it is the collective desire of UNSW@ADFA academics to build a large vibrant and intellectually challenging research community, to achieve international recognition of its research activities and establish UNSW@ADFA as a premier specialist higher education provider to the Australian Defence Force.

Appendix A

List of Competitive Internal Research Funding Schemes

- A.1 **Research Infrastructure Block Grant (RIBG)** – This competitive program provides functions for research infrastructure to support research and research training activities.
- A.2 **Special Research Grant (SRG) Program** – This competitive program provides seed funding (currently up to a maximum of \$5,000) to enable staff to develop their research to be competitive internationally in terms of quality and/or ability to attract external funding. Priority is given to new staff, early career researchers and staff changing research directions.
- A.3 **Faculty Research Grant (FRG) Program** – This competitive program provides funding (currently up to a maximum of \$30,000) to support research of modest cost, cross-disciplinary research, quality research projects that have failed to receive continued external support, early career researchers or new staff and emerging research strengths. The program is designed to develop staff to be competitive in attracting external funding.
- A.4 **Strategic Research Initiative Funding Scheme** – While the SRG and FRG provide support for quality research, these schemes only provide modest research funding. This new competitive Strategic Research Initiative Funding Schemes (up to a maximum of \$75,000) is aimed at building research groups to achieve critical mass and encouraging cross-disciplinary research in both existing and emerging areas of research strengths.

Appendix B

List of University College Scholarships

- B.1 **University College Postgraduate Research Scholarships (UCPRS)** – awarded competitively to students with strong research potential.
- B.2 **Equity Scholarships** – awarded competitively to female students undertaking research in non-traditional areas.
- B.3 **IPRS (International Postgraduate Research Scholarships) Support Scholarships** – provide a stipend to successful IPRS applicants to support living expenses.
- B.4 **University College Top-up Scholarships** – awarded to successful APA (Australian Postgraduate Award) applicants to bring the stipend to the same level as UCPRS.
- B.5 **Completion scholarships** – awarded competitively to students in the last six months of their study.

