

Submission to
House of Representatives Standing Committee on Industry, Science and Innovation

Inquiry into research training and research workforce issues in Australian universities

In this submission the Institute of Nuclear Science and Engineering (AINSE) addresses the following aspects of the Committee's terms of reference

- The contribution of research training programs to Australia's competitiveness in the areas of science, research and innovation;
- The adequacy of current research training schemes to support Australia's anticipated future requirements for tertiary-qualified professionals in a wide range of disciplines.
- Adequacy of training and support (including income support) available to research graduates in Australia;
- Opportunities for career advancement for research graduates and staff;
- Factors determining pursuit of research opportunities overseas;
- Australia's ability to compete internationally for high quality researchers; and

Introduction

Although Australian universities make a vital contribution to Australian research, it is important to also recognise the valuable synergies that come through universities working with our premier research institutes, like CSIRO and ANSTO (Australian Nuclear Science and Technology Organisation). AINSE (The Australian Institute of Nuclear Science and Engineering) is the organisation which links universities to ANSTO by facilitating training and research in the use of neutron scattering, particle accelerator and other instrumental techniques as well as the use of naturally occurring radioisotopes for environmental analyses in Australia. These techniques have application are applied to a wide variety of disciplines including: archaeology, geosciences, environmental science, biomedical science, materials science and engineering, as well as fundamental physics and chemistry

Since much of Australia's cutting edge research is done at large organisations like ANSTO, continued and enhanced access to and support of research training at such institutions is vital for Australia to continue to be a player in international research. In particular, with the commissioning of OPAL, a world leading research reactor, ANSTO has become a magnet for international researchers. The exposure of young Australian researchers to internationally competitive research and researchers can but benefit their and Australia's research.

Nearly all Australian universities are members of AINSE, and their use of AINSE programs vary considerably.

AINSE's peer-review processes for access, and its arms length status with respect to the facilities provides a measure of independence, which has led to a robust development of Australian cooperative research with ANSTO. The collaboration facilitated by AINSE, between the universities and ANSTO is a successful example of a research training scheme which is not funded directly by the Department of Employment and Workplace relations. We would recommend that the committee take such schemes into account when framing its recommendations.

AINSE supports training at of Australian research students within four programs:

- (a) funding of access costs and travel to conduct research at nuclear facilities in Australia and overseas
- (b) provision of top-up scholarships for Australian PhD students

- (c) provision of research fellowships for outstanding young researchers in science and technology
- (d) support of the attendance of young researchers to local and international conferences.

AINSE currently supports research projects across a wide range of disciplines, from archaeology to polymer research. See figure 1. It should be noted that approximately 50% of the funds is devoted to research in the areas of archaeology, geosciences and environmental science.

Of particular significance are research projects in the following areas high resolution climate records, aeolian dust, ground water, radiopharmaceuticals, and biological applications for neutron scattering. In all these programs students have access to the facilities as well as the expertise of the research staff through co-supervision and collaboration.

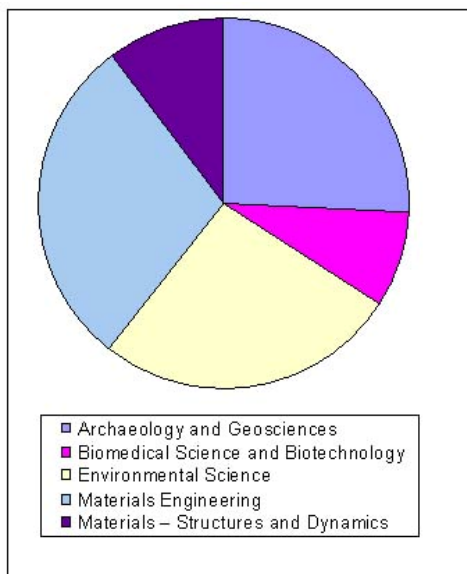


Figure 1. Distribution of AINSE funds by specialist area for 2007.

These programs are maintained by funds received from member universities and ANSTO which is supplemented by income from conferences. The following table shows that, since 2001, AINSE has distributed about \$2M per year in support of research, scholarships and fellowships (table 1).

Year	Research Awards (\$)	Postgraduate Research Scholarships (\$)	Research Fellowships (\$)	Total Funding (\$)
2007	1,387,034	305,824	360,441	2,053,299
2006	1,757,163	436,362	25,867	2,219,392
2005	1,464,493	515,464	0	1,979,957
2004	1,447,293	480,630	0	1,927,923
2003	1,256,888	440,434	0	1,697,322
2002	1,676,662	413,957	0	2,090,619
2001	1,392,276	413,098	0	1,805,374
2000	977,326	357,020	0	1,334,346
1999	957,602	252,666	0	1,210,268

Table 1 – AINSE funding of research training

This investment has allowed AINSE to support typically 130 postgraduate students per year accessing research facilities for 2000 days per year (table 2).

year	Postgraduate Students	total number of days of access
2007	138	1725
2006	256	2282
2005	151	2534
2004	143	2331
2003	123	1090
2002	128	1124
2001	138	1457
2000	124	1097

Table 2 – Student access to research facilities through AINSE.

This support has resulted in the production of up to 40 theses (figure 2) and 200 refereed publications (figure 2) per year since 2003.

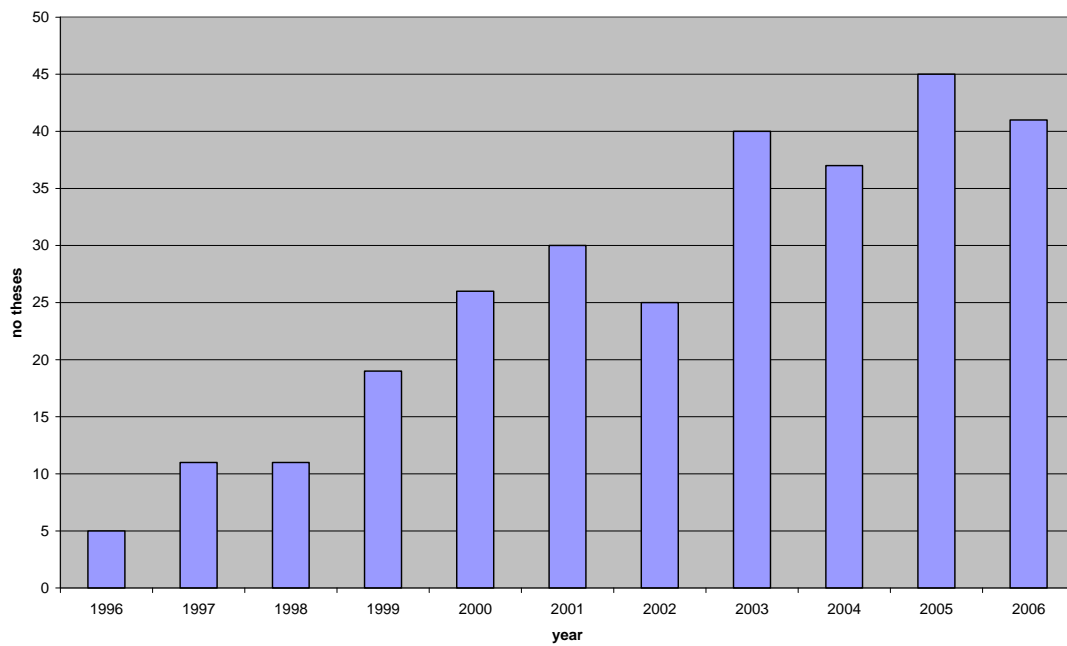


Figure 2 – PhD theses arising from AINSE funded research projects.

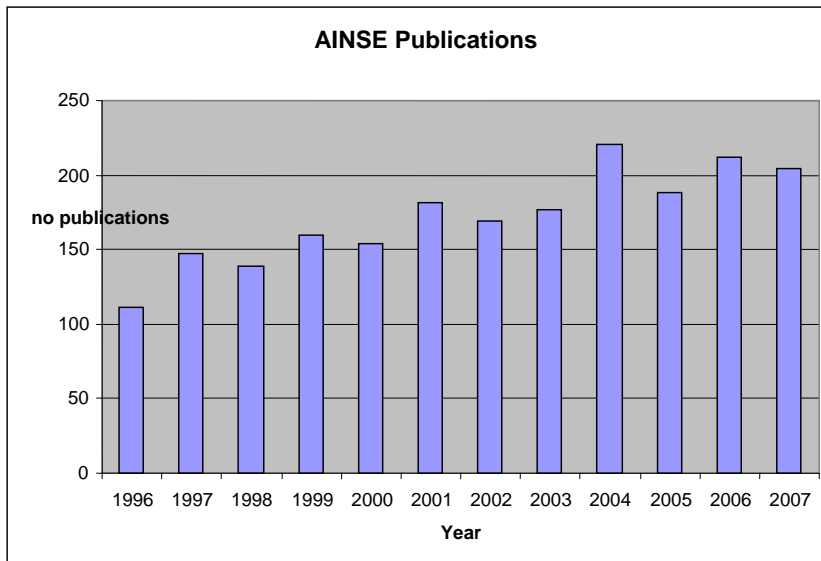


Figure 3 – Publications in international refereed journals arising from AINSE funded projects.

There are large challenges in training and retaining graduates and staff in Australian universities. Given that Australia cannot compete with the high salaries offered overseas, we need to provide access for Australian researchers to high quality students, research facilities and expertise in Australia. AINSE provides this access in three ways. Firstly AINSE provides a transparent and efficient mechanism for accessing facilities. The availability of OPAL and other ANSTO facilities is a powerful incentive for researchers to remain in Australia but it is important that Australian researchers can access these facilities easily. The AINSE model provides this seamless access.

Secondly, schemes such as AINSE's provision of "top-up" scholarships, are an effective use of resources in supplementing Commonwealth postgraduate scholarships, which are by themselves inadequate to support postgraduate students.

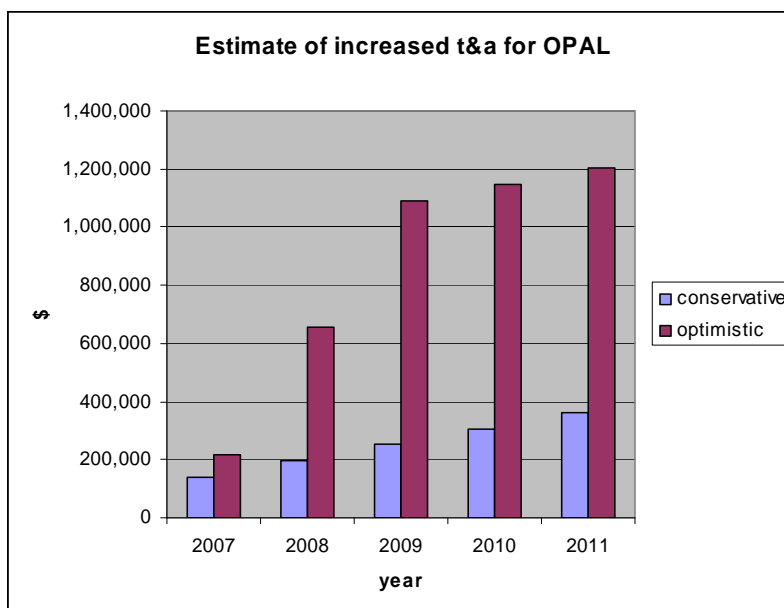


Figure 4 Estimate (2007 - 2011) of the growth on travel and accommodation costs for neutron scattering experiments at ANSTO through AINSE.

Unfortunately, many of the best graduates head overseas after completing a PhD. Recent AINSE Gold medal winners such as Andrew Wroe (University of Wollongong) are now working in the USA. So the AINSE council recognised that an additional mechanism was

required to attract graduates to stay and work in Australia. This third scheme, the AINSE research fellowships scheme, supports half the salary and on-costs as well as a contribution towards research costs of 2 outstanding PhD graduates per year.

The recent commissioning of the OPAL reactor represents an opportunity for Australian research and research training which must be taken advantage of. AINSE provides support for the OPAL neutron scattering facilities in two ways, by: providing funds for ANSTO to train novice users of neutron scattering instruments and by providing travel and accommodation funds for all university researchers conducting experiments at OPAL. It is estimated (fig 4) that the demand on this program will increase dramatically over the next few years, however, there are limits to what AINSE can fund.

We commend AINSE's approach to facilitating research training between universities and Commonwealth research organisations to the committee.

AINSE seeks assistance in raising the extra funds needed to meet the expected future requirements of university researchers.

Keeping in mind AINSE doctoral scholars represent the very best research students, it has been our experience that very few complete in three years, and a majority take approximately 3.5 years complete their doctoral studies.

We RECOMMEND that the length of APRA funding be increased to 3.5 years with an option to extend to 4 years.

Professor Allan Chivas
President
AINSE

A/Professor Bruce King
Vice-President
AINSE