

**Supply, demand and approaches to
employment by people with postgraduate
research qualifications in science and
mathematics:**

Case Study Report

Report to the Australian Government
Department of Education, Employment and Workplace
Relations

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Executive Summary

This is the third report in this research project which builds on knowledge of the issues surrounding supply, demand and employment outcomes for people with higher degree qualifications in the science and mathematics fields in Australia. The report contains the findings of four case studies into good practice in the employment of people with these qualifications. It follows on from two previous reports, a Literature Review and Data Analysis Report and a Consultation Report.

The four employers participating in these case studies are;

- the Sustainable Minerals Institute (University of Queensland);
- Roche Products' Pharma Development Methodology and Innovation Biostatistics (PDIB) team (Sydney, NSW);
- the Cooperative Research Centre (CRC) for Polymers (Melbourne, Victoria); and
- the Commonwealth Scientific and Industrial Research Organisation (CSIRO) Marine and Atmospheric Research Division's Ecosystem Modelling Team (Hobart, Tasmania).

These employers represent a variety of sectors, are of different sizes and are located in a range of areas in Australia.

Each of these employers was chosen for the case study because they displayed a genuine recognition and appreciation of the value of a higher degree qualification in the science or mathematics fields and were identified in the earlier stages of the study as fulfilling the following three criteria in respect to employment of persons with these qualifications:

1. Established links across sectors (i.e. university to industry and vice versa) that facilitate training, employment and research;
2. Ongoing training and development programs established for scientists and mathematicians; and
3. Established career enhancement opportunities and supportive career guidance practices.

Each of the employers included in this report display these key qualities. In addition, each also provided exemplary examples of different facets of employment and research in science and mathematics. Some of these included:

- A noteworthy example from the Sustainable Minerals Institute of how university-industry collaborations can foster research and provide applied and innovative research jobs;
- The Roche Products PDIB team provided a rare example from the private sector of how private industry can support, motivate and facilitate career direction for people with these qualifications;
- An important example from the CRC for Polymers of innovation in developing researchers and linking them with excellent future employment opportunities; and
- A significant example from the CSIRO Ecosystem Modelling team of how a core science organisation develops staff and creates expertise in key new fields of research.

The observations from each of these case studies meld closely with the key findings from other parts of this research project. The good practice and enthusiasm for higher degrees in the case studies themselves in some way provide an exception to the common practice or attitudes of employers towards these qualifications as found in this research project.

Some of the main themes following from the earlier research and appearing in these case studies include: issues relating to recruitment difficulties in finding highly skilled personnel with quantitative skills; the fact that people with these qualifications come from and move on to a variety of occupations before and after their employment at these sites; problems in finding good examples of employment of scientists and mathematicians with higher degree qualifications in private industry in Australia; and the common emphasis of the need for multidisciplinary skills – especially where quantitative knowledge is paired with skills in another discipline.

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Note

This report is one of four which make up a project examining the supply, demand and employment opportunities for graduates with higher degree research qualifications in the science and mathematics fields in Australia. Each report is intended to stand alone as an independent piece of research. However, in order to gain an overall perspective of the factors influencing supply and demand for this group it is important to consider all the reports in this project. In addition, the report findings highlighted here are based on information available at the time. These findings can be expected to vary with changing circumstances.

The four reports comprising the project are: 1) Literature Review And Data Analysis , 2) Consultation Report, 3) Case Study Report and 4) Final Report. These are available on the DEEWR website and can be accessed at:

<http://www.workplace.gov.au/workplace/Publications/ScienceEngineeringandTechnologySkills-Publications.htm>.

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Introduction

This report is the third in this project examining the supply, demand and employment opportunities for people with higher degree research qualifications in the science and mathematics fields in Australia. It details a number of examples of good practice in Australia among employers who hire people with these qualifications.

The case studies in this report detail the experiences of employees from four work places in Australia. These work places are widely spread geographically and cover the university, private and public sectors and involve the employment of scientists and mathematicians from a range of disciplines.

The case study employers detailed in this report are:

- the Sustainable Minerals Institute (University of Queensland);
- Roche Products' Pharma Development Methodology and Innovation Biostatistics (PDIB) team (Sydney, NSW);
- the CRC for Polymers (Melbourne, Victoria); and
- the Commonwealth Scientific and Industrial Research Organisation (CSIRO) Marine and Atmospheric Research Division's Ecosystem Modelling Team (Hobart, Tasmania).

This research builds on the two previous phases of the project which involved a literature review and data analysis and stakeholder consultations. The aim of the research project is to build an understanding of the issues that relate to the supply and demand of people with these skills in Australia.

Identification of good practice

The identification of employers for the good practice case studies was undertaken primarily during an earlier phase of this research project – the consultation of stakeholders. In this earlier phase (which involved consultation with university leaders and academics, science and mathematics discipline stakeholder groups, employers and employer peak bodies, early career researchers and higher degree students), a number of key facets of good employment practice were identified.

The employers for the case studies were chosen primarily because they displayed a genuine recognition and appreciation of the value of a higher degree qualification in the science or mathematics fields. In addition, three reference criteria were used to identify good practice examples in relation to the employment of people with these qualifications. These were:

1. Established links across sectors (i.e. university to industry and vice versa) that facilitate training, employment and research;
2. Ongoing training and development programs established for scientists and mathematicians; and
3. Established career enhancement opportunities and supportive career guidance practices.

As well as these key criteria, consideration was made to ensure that the case study groups covered a range of industries, locations and disciplines.

Methodology for case studies

The case studies were conducted by the ACER research team onsite at each of the employers involved. Employers were contacted by the researchers and asked if they would be interested in participation as case study examples. Employers were also sent a general overview of the project aims and expectations (see Appendix A).

The researchers visited the main sites of the employers involved in the case studies and interviewed team leaders or directors, early career researchers, mid career employees, and postgraduate students. Interviews conducted were undertaken in a semi-formal style, with key issues raised by the researchers. Interviews lasted between 30 minutes and an hour with each individual participant.

The main areas covered in the interviews included:

- the aims and mission of the centre/team/organisation;
- the extent of need within the centre/team/organisation for PhD or research qualifications;

- approaches to recruitment and methods of advertising, areas and regions from which recruitment is carried out;
- supply issues faced in recruitment and retention of staff;
- types of fields of science and mathematics from which people are drawn;
- typical career pathways of staff (before and after) working at the centre/team/organisation;
- strategies used for linking research with other sectors and the benefits that such linkages provide;
- discussion of individual team members existing position and research;
- discussion of individual team members career paths and their options/choices made along the way to get to their current position;
- discussion of individual team members reasons for choosing this pathway and their views of the value of current position;
- professional and personal development and training opportunities offered and the extent to which they are successful; and
- discussion of individual team members' future options.

In addition to the site visits and interviews, participating employers were also contacted by the researchers via email and telephone calls in which additional information about the work places (such as numbers of employees etc.) was gathered.

The interviews and additional information have been synthesised in this report to provide four concise overviews, one for each of the employers involved in the research. These overviews are designed to provide an idea of the employment practices, training regimes and career trajectories of employees in these work places – particularly for employees with higher degree qualifications in the science and mathematics fields.

The Case Studies

As noted above, the employers chosen for these four case studies into good practice in employing science and mathematics higher degree-qualified people are the Sustainable Minerals Institute (SMI), Roche Products' Pharma Development Methodology and Innovation Biostatistics (PDIB) team, CRC for Polymers and the CSIRO Marine and Atmospheric Research Division, Ecosystem Modelling Team. The sections below contain the overviews relating to each of these case studies. These sections include detail relating to the reason for choosing these employers, the type of work undertaken, the methods used by the employer in hiring people with these qualifications, availability of professional development, career opportunities for workers and ideas about future directions for the employer and employees.

1 The Sustainable Minerals Institute

1.1 Introduction

The University of Queensland-based research institute, the Sustainable Minerals Institute (SMI) is presented in this report as a good example of employment and training opportunities for science and mathematics PhD and Masters graduates within the Australian university sector.

The SMI provides ‘knowledge-based solutions to the sustainability challenges of the global minerals industry’.¹ The institute supports six core research centres that cover a range of disciplines in the science and mathematics fields. The research centres are the WH Bryan Mining and Geology Research Centre, the Julius Kruttschnitt Mineral Research Centre, the Mineral Industry Safety and Health Centre, the Centre for Social Responsibility in Mining, the Centre for Mined Land Rehabilitation, and the Centre for Water in the Minerals Industry.

The personnel working in the SMI have a range of skills and backgrounds. The centres linked to the SMI employ research scientists and mathematicians as well as a large number of engineers and some social scientists. Other staff working for the SMI are involved in commercial and support roles relating to the operations of the institute and its centres. During the case study visit to SMI, six staff, ranging from the Director to junior researchers were interviewed.

The SMI acts as a support base for its six centres, collecting ideas and knowledge from industry and feeding these ideas into the research projects of each of the centres. The SMI Director oversees the overall research directions and functioning of the institute, while each of the centres also has its own director with considerable responsibility and autonomy.

The SMI was chosen as a case study example in this research for a number of reasons:

- it is an employer of people with the qualifications of focus in this study;

¹ Sustainable Minerals Institute information brochure, available by emailing smimail@smi.uq.edu.au

- it has a very strong industry-collaboration focus – with both a reactive and proactive research approach in relation to the needs of industry;
- it operates in an industry (mining) that is currently booming;
- it employs people from a range of disciplines within the science and mathematics fields;
- the research it undertakes encourages multidisciplinary collaboration;
- it is keen to build future talent and capabilities in its areas of expertise;
- it prides itself on the fact that its graduates and employees are highly sought by industry;
- it facilitates knowledge sharing among its scientists and the wider industry through seminar programs and short courses; and
- it hires scientists at all levels of experience.

Within the SMI there are more than 250 staff and postgraduate students working on research projects that have links to every continent.

1.2 Mission, goals and operations of SMI

Professor Chris Moran is the Director of SMI. He believes the institute and its six centres have a very bright future due to the concentration of knowledge and expertise that they possess and due to the fact that the industry they conduct research in is of extreme economic importance to Australia.

Operating on the premise that mining is not going to go away, the desire of SMI is to help companies and scientists work together to develop more sustainable practices within the industry. The success of the institute is largely due to the innovative way that it conducts its research with the mining industry. Much of the research that they undertake is driven by the needs of industry in relation to building practical and economically viable solutions to sustainability issues.

The SMI builds its research projects in close collaboration with industry partners – often multiple companies are involved in the one research project. They find that different companies use their research in different ways (even within the same

project), so the research that they produce is flexible and provides adaptable innovations. As such, the research mind-set of those within the centres of SMI is somewhat different to what is generally found within the university sector.

There is a strong recognition that this industry focussed research is the key to the success of SMI and its centres. Overall the institute is only marginally reliant on government and university funding. Three quarters of the income generated by the institute comes from industry and other sources outside of government and the university.

From the perspective of its Director, the key to the success and recent growth of SMI is that the institute has established close links at all levels of industry. The SMI interacts with executives and senior personnel within key enterprises in the mining industry as well as with people working on site at mines and other facilities. In addition, the institute establishes links with researchers from other parts of Australia and the world who attend the SMI training and education courses. These links have helped to foster greater understanding of how processes work within industry, what research needs there are and how research can be applied to facilitate solutions to problems that the industry leaders articulate.

1.3 Staffing and recruitment practices

Due to the high-level nature of the research it undertakes, the SMI is reliant on scientists and mathematicians as well as engineers with higher degree research qualifications. It also assumes a training role, facilitating the scholarships of PhD students and salaries of research fellowships for early, mid and established career researchers.

The SMI also finds itself in an interesting position within the mining industry – while mining companies rely on it for high-level research, they also compete with the institute for the best and brightest young geologists, geophysicists, mathematicians, other scientists and engineers. It is the area of skill availability which seems to most threaten the future prosperity of the SMI. A senior member of the SMI team noted

that his greatest fear for the future plans for the institute revolve around the lack of availability of staff and researchers.

As would be expected in a time of massive growth in the mining industry, the SMI does struggle to compete with private industry in terms of salary packages. As articulated by its Director, in a very strong graduate labour market, '*industry salaries are enticing*'.

Therefore, instead of trying to compete with industry on salaries, SMI promotes itself to potential recruits as an opportunity to conduct sound and important research in order to ensure that an industry that is often considered an environmental problem can develop practices that lead to the sustainable development and increased ecological responsibility within the industry. This prospect has appealed to many of the scientists who work within the SMI and is put into practice through many of the industry-based projects that the researchers in the institute are involved in.

Despite this approach, the availability of well qualified and highly motivated researchers is scarce. The SMI has found notable difficulty in hiring people with higher degree qualifications to research positions. The breadth of expertise in Australia in particular is relatively thin. Therefore, the SMI Director and other senior staff within the institute and its centres '*cast their net*' widely when looking for people to occupy new positions. These leaders of the institute rely on contacts across the world to recommend good people. In particular, staff are sought from a number of specific universities in the UK and USA, some parts of Latin America and South Africa. In cases where an exceptional candidate is found, often there is no hesitating in creating a position for them. One example among the staff interviewed was an English researcher who met the Director of SMI during a visit to an international conference, was offered a position, and had accepted a post doctoral fellowship three months before she had completed her PhD.

Due to the strength of graduate employment opportunities in the mining industry, often in the past few years the SMI has found the need to hire research staff with qualifications that are not at the level (usually PhD) that they had originally hoped for.

Instead of making this a limiting factor for their research capabilities, in many cases the SMI has facilitated these people in undertaking training to enhance their skills and qualifications while undertaking important research for the institute. In an employment climate such as the one that the mining industry has experience over the past decade, this approach is considered both practical and effective.

Recruitment difficulties are not only being experienced in relation to finding higher degree research qualified staff. The SMI has also found that recruitment to fill PhD scholarships has been particularly difficult in recent years. Solutions they have employed to this problem is to search for graduate students internationally, and to adapt positions to suit the people who are available to work. For example, recently two PhD scholarships in the mathematics field which they were unable to fill, were converted into funding for a post doctoral position for a mathematician from one of the University of Queensland's faculties who had recently returned from an overseas posting.

1.4 Employment pathways

The research staff employed within the SMI come from a range of backgrounds and have a variety of skills and expertise. As noted above, a number of the highly qualified staff working in the SMI's centres come from overseas. As part of the case study, staff at a number of levels of experience and qualification were interviewed. Their career pathways and motivations for joining SMI are explored below.

There appears to be no 'typical' pathway which characterises the careers of scientists and mathematicians at the SMI. Some of those working within the centres have been recruited locally, such as directly out of postgraduate programs in the University of Queensland, or from within industry positions in Queensland. Others staff members come from the UK, the USA, and the CSIRO in Australia. As the SMI Director noted, the scientists within the centres are generally there because they have a passion for the research being undertaken and an underlying appreciation that by helping to improve sustainability practices within the mining industry they are contributing substantially

to the future prosperity and environmental sustainability of Australia and the mining industry world-wide.

As is becoming the norm within universities across Australia and throughout the world, all positions at the SMI are short to medium term contracts – generally two to five years. The Director of the institute acknowledges that this can be an impediment for securing researchers, although was quick to note that tenure length within industry is no better. One of the key reasons for the existence of contracts within the SMI is the nature of the work that is being undertaken. Consultancy-based research projects are primarily fixed-term offerings and therefore long term staff contracts are not financially practical.

Among the staff spoken to at the SMI, these contract provisions are seen as an inevitability of the careers they have chosen. Most do not see a problem with the apparent short-term nature of the contracts. This is primarily because they see it as the norm. There are also views among the staff that within the lucrative mining industry there is always money in research – even in down times when productivity measures need assessment. Therefore, the renewal of contracts is often nothing more than a formality. For these employees, the flexibility of a short term contract also gives them the opportunity to reassess career opportunities, renegotiate contracts and change research projects every two to three years.

PhD graduates and former staff of the SMI tend to have very successful post-SMI pathways. The vast majority (over 80 per cent) of those who undertake their PhD in the institute end up being directly employed in the mining industry – many of them with companies who they have collaborated with for their doctoral thesis. Similar pathways and opportunities in industry are also available for those who have undertaken post doctoral fellowships and other research positions with SMI.

The industry trajectory that the SMI launches students and researchers into is generally seen as a positive outcome for those within the institute. Most of the people the institute attracts are interested in the applied research and industry focus of the work undertaken and therefore an industry-based future is seen as desirable. Some

staff acknowledged that although the institute is based within a university, the prospects of a future academic career may be limited due to the strong industry nature of the research being undertaken and consequently the lack of Australian Research Council (ARC) based grants. An ‘*ARC profile*’ is seen as imperative to moving into a good academic position in Australia.

1.5 Career enhancement opportunities

The fact that the SMI is based within the University of Queensland means that the SMI employees are able to access a vast range of support and professional development programs offered by the university. New and junior employees in particular find that the services offered through the university are of benefit.

Numerous introductory workshops, skills-building sessions and discipline interest groups are facilitated by the University of Queensland and attended by SMI staff. One new staff member expressed her delight at finding a position somewhere with the sort of introductory programs that the university provides.

In addition to the university-wide workshops and introductory sessions, the SMI itself involves its staff and students in numerous programs that provide the opportunity for career enhancement. One such opportunity is through teaching – researchers have the opportunity to teach at undergraduate or honours level as well as supervise postgraduate research students. Another opportunity is through involvement in short courses delivered by SMI.

Staff development within SMI and its centres is also encouraged through the operation of research seminar series – the SMI itself has one, while some of the research centres within the institute also run regular seminars in their particular areas of expertise. These seminars attract experts in the relevant fields from outside the institute to come and share their knowledge and also encourage staff members to present and have the opportunity to share their research with colleagues.

For senior members of staff, the opportunity the institute provides for building research expertise and forging new pathways into specific fields is also seen as a notable incentive to their positions. One professorial fellow interviewed for the case studies explained how the opportunities for him to build a team of experts and shape industry policy by developing innovative research solutions to complex problems was particularly appealing. Building such a team would be done through involvement in supervision of postgraduate research students, who would be encouraged to specialise in new areas of expertise, as well as by attracting established Australian and international researchers to the innovative industry-based research projects that the SMI was able to attract.

He noted that the orientation of the institute was such that there was great opportunity to create multidisciplinary research teams – a relatively new concept within the science community that is used to strictly defined discipline boundaries.

1.6 Conclusion

The SMI provides an important example of employment of scientists and mathematicians with higher degree qualifications within the university sector. It was chosen as a case study in this research for a number of reasons, including its multi-disciplinary approach to research, it is keen to build future talent and capabilities, and it is involved in a highly lucrative and economically important industry for Australia.

Of particular note in this example are the research partnerships that the SMI has built with core companies within the mining industry. These partnerships have not only helped the SMI to grow and provide employment to an expanding number of researchers, they have also helped to facilitate sustainability in the industry and provide future career paths for its staff into a range of industry-based occupations.

2 Roche Products (Australia) – Pharma Development Methodology and Innovation Biostatistics (PDIB) team

2.1 Introduction

The Roche PDIB team has been used to illustrate good practice in employment and career development for people with higher degree science and mathematics qualifications within private industry in Australia.

As highlighted in the Consultation Report of this research project, private industry demand for people with higher degree qualifications in these fields is not high. From the discussions with numerous employment agencies, employers, peak bodies and universities, it became apparent that in the science and mathematics fields, private sector employers in Australia prefer undergraduate or honours level graduates to the higher degrees due to a number of factors. These include the perception that a higher degree leads to a narrow specialisation that cannot be adapted to industry need, that spending too much time at university makes a person ‘institutionalised’ and unable to understand the commercial needs of the market, and perhaps most importantly, that there is only a small amount of research and development in these fields being undertaken by the private sector in Australia and therefore the need for such high level skills is not substantial.

As a result of this overall disinterest in the higher degrees, the research team had notable difficulty in identifying an employer in the private sector which displayed the elements that had been chosen to identify good practice in the employment of this group of people. After some searching, the PDIB (or biostatistics team) at Roche was identified as fulfilling the necessary criteria to be used here in a case study.

Roche is a large multinational pharmaceutical company based at Basel, Switzerland. It has sites and offices across the world. The Roche PDIB team is based at a large Roche facility in the northern suburbs of Sydney. It employs 19 people from a range of nations across the world. The team comprises primarily of statisticians and programmers. For the case study visit to the PDIB team, four members of the team

were interviewed. These team members included the site head – Dr Philip McCloud, a team leader, a senior statistician and a statistician.

Roche PDIB is involved in large and small clinical trials run by Roche scientists worldwide providing statistical solutions to trial planning, implementation, analysis and evaluation. Essentially the team members help to calculate the benefits and risks of new drugs in development. The staff at PDIB have specialist skills in applying statistical knowledge to clinical trials designed to find cures for diseases and illnesses such as AIDS, hepatitis, cancer and obesity. It prides itself on being able to help design and evaluate clinical trials that provide ‘*unbiased, objective and scientifically valid*’ results that can be used to identify whether a drug is effective in treating the problems it is designed to treat.

The team also work on other statistical problems not necessarily related to clinical trials, such as helping industry regulators implement rigorous procedures for testing products and advising other Roche personnel on how to interpret other research or how best to explain and communicate the Roche research.

There are numerous reasons why the Roche PDIB team was chosen as a case study for this research:

- the team leader and senior staff appreciate the value a higher degree can offer an employee and benefit a company;
- the research undertaken in the team is in an important and growing field – biostatistics;
- the skills of individual team members are nurtured and developed to ensure the most innovative techniques are being used;
- there is a core recognition that quality statistical methods need to be effectively used and clearly communicated;
- staff have a clear career progression;
- the team has no difficulty in retaining staff (even in this high demand field);
- the leadership is admired and respected by staff; and
- the team has developed close links with universities and with other private and public sector employers of biostatisticians.

2.2 Mission, goals and operations of Roche PDIB

The PDIB team is a small group which exists within a 30,000 employee multi-national company. It is based at the Roche site in Dee Why, Sydney, a site with about 400 employees working primarily in product development. The team itself has 19 members and operates within the structure and hierarchy of the company, but appears to have relative autonomy in making decisions relating to hiring of staff, professional development and involvement in the biostatistics community.

The team is led by Dr Philip McCloud, who has built up the personnel and expertise at the site over the past decade. The team aims to utilise its biostatistics skills to ensure that the risks and benefits of clinical trials are clearly established so that Roche clinicians can ascertain the success of a new drug and that the industry regulator has sufficient and robust evidence as to the benefits of new drugs before allowing them to be distributed to the public. Through the various projects that they are involved in, team members have the ability to permeate policy and develop new methodologies for practical purposes in industry.

The team is primarily made up of statisticians who help design the clinical trials, ensure that data is correctly collected, and help to analyse the data output from the trials that is used to evaluate the success of the drugs being trialled. It also comprises of a number of programmers who generally have mathematics and information technology backgrounds. These people write the computer programs that are used to create the data output required for each trial. They are essential in ensuring that once the data is collected, it is effectively utilised to make objective decisions about the viability of clinical tests on new drugs.

PDIB also operates within Roche Australia as a facilitator of statistical understanding. The team works with other divisions of the company to provide interpretation of analyses undertaken by other companies, to ensure that the results of Roche clinical trials are understood, and to teach other Roche personnel about how best to communicate the results of their own clinical trials. Within Roche, the PDIB team

works closely with the Regulatory Affairs, Health Economics, Medical Marketing and Clinical Operations teams to provide this support, advice and statistical interpretation.

The team has also provided support and assistance to other statisticians based in overseas Roche facilities. For example, members of the Sydney-based team have travelled to Roche in Japan over the past few years to run short courses on specialised techniques that they have developed.

PDIB also has a presence outside of Roche, liaising with industry regulators to solve complex statistical problems relating to the assessment of clinical trials and keeping in touch with other organisations that employ statisticians and biostatisticians. This latter involvement includes attendance and presentation at seminars hosted by public sector bodies such as the Australian Bureau of Statistics, and presentation of papers at national and international biostatistics conferences.

2.3 Staffing and recruitment practices

The Roche PDIB team are primarily trained in statistics and biostatistics, both areas of quantitative science that are currently in high demand and relatively short supply. As the leader of the team and the person who has built its capabilities, Dr McCloud is acutely aware of the general lack of availability of graduates at all levels of qualification in these fields. As a result, the team that he has built up comes from a range of different countries, with few trained in Australia. The origins and career pathways taken by the staff in the team are explored in the next section.

Most of the staff working in the PDIB team possess a masters degree, while two have PhDs and a couple are currently studying masters courses. In recruitment, the senior team members indicate research degrees are highly valued due to the fact that they equip people with the skills to design, implement and complete large-scale projects. According to the team leader, '*the research component of a higher degree increases your capabilities to be able to solve complex problems*'. However, in recruiting, they are equally interested in the communication skills, flexibility, enthusiasm and personality of potential team members. As noted by a senior member '*there are a lot*

of extremely bright people out there, but a good statistician is someone with the ability to explain complex concepts and to convince others theirs is a good argument'.

Recruitment to the PDIB team is undertaken through both formal and informal means. Positions are advertised in newspapers, online through the Roche corporate recruitment facilities and other large recruitment websites, and in industry newsletters. However, due to the lack of people with the desired skills and qualifications, the team also often recruits people through informal means. This is done through interaction with universities and statistical peak bodies, where potentially interested people are identified and approached (or where such people directly approach Roche).

During recruitment, senior members of PDIB find that they have very few applicants with a PhD qualification. Dr McCloud believes this is partly due to the fact that much of the private industry in Australia does not show interest in these qualifications and does not offer positions which allow research to be undertaken. He sees that PhD candidates are aware of this and therefore those interested in research positions on completion generally look towards universities, the CSIRO or overseas. As such, despite the opportunities Roche can offer, they do not attract a large number of people with these qualifications. Interestingly, this scenario is not replicated at Roche facilities elsewhere in the world, where PhD qualifications are more heavily desired across private industry and therefore PhD candidates are more tuned in to the potential that jobs within the company can provide.

2.4 Employment pathways

The PDIB team at Roche has grown over the past five years as demand for their services has increased and the importance of robust technical methodologies are realised by the industry. Those currently employed in the team come from a range of backgrounds. As noted earlier, most of the statisticians in the team have a masters degree and the few who don't are currently undertaking further study to enhance their skills.

The team is very multicultural in composition. Among the 19 employees, 10 different nationalities are represented. Therefore, the majority of employees have higher degrees from universities overseas rather than in Australia. Dr McCloud says that this is a direct result of the fact that over the past ten years Australia has not trained enough statisticians.

Positions within the team are offered as continuing (permanent) positions – something that is seen as highly desirable by the staff who were interviewed for the case study. Another important facet of the employment conditions offered in the PDIB team is that there is a clear career trajectory presented to staff. For the members of the team, this offers an opportunity to visualise how their career could be developed within the company both in Australia and globally.

These benefits combine with other positive factors of working within the company, such as generous remuneration, the opportunity to travel and a nurturing culture to make it, as one employee described ‘*a premium option*’ for biostatisticians in Australia.

Staff members occupying different levels of seniority were interviewed during the case study. All of the senior staff had been in the team for a number of years, while the junior staff indicated that they saw great opportunities for themselves if they were to remain with the company. Given the large demand for the skills these employees have (especially in the lucrative finance industry), the high retention rate of team members is testament to the conditions and environment that is nurtured in PDIB.

2.5 Career enhancement opportunities

Employees in the PDIB team are encouraged to maintain up-to-date knowledge and qualifications that conform to the latest statistical methodologies. The company sponsors employees from the team in their pursuit of further studies. In particular, they utilise masters courses offered at the universities who form part of the Biostatistics Collaboration of Australia (BCA). Other professional development courses offered help staff to increase their capabilities with the statistical computer

packages that they utilise in their work, help to build project management skills and offer opportunities to improve presentation and public speaking skills.

In addition to these courses, the PDIB team has sponsored Honours students to complete their research thesis in a biostatistics field and then take up a position in the team while working towards their masters. Roche, through PDIB also sponsor a post doctoral research position based at Queensland University of Technology linked to a project that explores the area of Adaptive Designs, a new field of statistical research where more capability is needed. This sponsorship is created not only to benefit Roche, but also to enhance the capabilities in these areas within Australian universities.

Employees in the PDIB team are also involved in group workshops. These workshops generally focus on helping to build an overall understanding of new methodologies and techniques that can be widely utilised by team members. For example, all statistics staff recently attended a workshop on Bayesian methods, an emerging area of statistics in which the team is keen to develop expertise.

Each member of the PDIB team has a senior member of staff allocated to them who helps to develop both project- and personal-related goals. The project-related goals are developed to ensure that members are satisfied with their workload and are provided with assistance in areas in which they are not familiar. One junior member of staff highlighted the importance of this because it gave her confidence to approach people for advice and mine the depth of statistics knowledge within the team.

In addition to the project-related goals, there is a strong emphasis within the team in maintaining personal goals. Both work oriented personal goals and other non-work personal goals are encouraged. An example of a work oriented goal is aiming to present a paper at an international conference, while non-work related goals might relate to holiday plans, sporting endeavours or family activities. Such a balance of work and personal oriented goals help to develop a nurturing and supportive environment that all of the team members interviewed highlighted as an important element in ensuring job satisfaction.

2.6 Conclusion

Among private industry in Australia, the employment of groups of scientists and mathematicians with higher degree qualifications is relatively rare. Therefore, the Roche PDIB team provides an excellent example of how people with such qualifications can provide benefit to private industry.

The PDIB team was chosen as a case study of good employment practice in private industry because it nurtures talent and expertise in a growing and important discipline, it provides staff with appealing contract terms and remuneration packages, it has been able to build a team and retain core members despite intense competition for such skills, it interacts with universities and other research organisations to build future statistical capabilities in Australia, and it has strong and admired leadership which provides vision and direction.

3 CRC for Polymers

3.1 Introduction

The Cooperative Research Centre for Polymers is based in Melbourne's south eastern suburbs. It has been chosen as a case study due to its strong emphasis on building research collaborations in Australia and employment of people with higher research degree qualifications in the science and mathematics fields.

CRC for Polymers is one of about 50 CRCs in Australia. The CRC Program is an Australian Government initiative designed to link researchers and organisations from the public and private sectors, and enhance the benefits of applied research for utilisation in solving economic, social and environmental problems. CRC for Polymers initially operated as CRC for Polymer Blends and was established in 1992, broadening its scope and changing its name in 1996.

The CRC has partnerships with private business, public sector organisations, governments and universities to develop research projects and solutions to problems in the areas of biomedical polymers, advanced polymeric materials, polymers for sustainable development, and design and engineering. It employs 55 PhD qualified staff that conduct research projects in the mining, agricultural, biotechnology, energy and manufacturing industries. The CRC for Polymers also facilitates research projects for PhD candidates, with a view to having 40 PhD enrolments between 2005 and 2012.

CRC for Polymers was chosen as part of this study to highlight good practice within the CRC Program – a program that provides many research-based employment and career enhancement opportunities for people with science and mathematics higher degrees in Australia. The CRC for Polymers is an important example for this research because:

- it keenly nurtures Australian scientific research talent;
- it has a strong focus on employing people with higher degree qualifications;
- it facilitates many opportunities for early career researchers;
- it provides tangible links between universities and industry;

- it focuses on applied research and encourages scientists to develop practical and commercial applications for their research;
- it provides a wealth of professional development programs for staff and PhD candidates that specifically enhance areas in which private industry desires greater knowledge from researchers – commercial acumen and communication;
- it provides the opportunity for scientists and mathematicians from different disciplines to combine in solving research problems;
- it facilitates beneficial career pathways for its staff and students – especially in private industry; and
- it effectively helps private industry in Australia to understand the benefits that people with higher degrees in the science and mathematics fields can offer to their organisations.

3.2 Missions, goals and operations of CRC for Polymers

The vision of CRC for Polymers is to conduct ‘leading-edge polymer research to deliver the advanced polymeric materials and polymer engineering required to transform Australian industries and establish and expand companies in emerging high-growth areas of the economy’.² This vision is achieved by creating collaborative links between industry and researchers through innovative research projects designed to facilitate the enhancement of polymer technologies.

The employees of CRC for Polymers are based within research nodes located at 10 universities in Australia and at the CSIRO and ANSTO (Australian Nuclear Science and Technology Organisation). From these nodes, they are involved in research projects with industry partners including multi-national corporations, small technology start-up companies and Australian Small to Medium Enterprises (SMEs).

The CRC for Polymers is funded by the Australian Government and its research participants (universities, CSIRO, ANSTO and private industry). Its research work provides the majority of its annual budget of \$19 million. The research programs that

² CRC for Polymers information brochure, further information available at www.crcp.com.au

the CRC runs are overseen by its CEO, Dr Ian Dagley and the CRC is governed by an independent board.

Post doctoral positions funded through the CRC are created on collaborative projects that have a strong focus on providing commercially viable research for outcomes. On the other hand, the PhD candidates sponsored through the program are given projects that are based around a collaborative project, but not specifically set with the outcomes driven nature of the industry project. The PhD candidates are encouraged into topics that they have an aptitude for, that will give them the opportunity to publish, and that have a direction that they can guide. They aren't forced into a situation where they have to compromise their research for the commercial aspects of the projects they are linked with.

3.3 Staffing and recruitment practices

CRC for Polymers advertises its positions widely through a variety of means.

Conventional methods such as newspaper and internet advertisements are often used, but in addition potential candidates are identified through informal networks which are fostered by attendance at conferences, informal approaches to young scientists and suggestions from university academics.

The general approach of the CRC for Polymers has been to recruit people into their post doctoral fellowships and PhD scholarships from within Australia. However, due to recent shortages of applicants for positions, approximately eight of its current staff have been recruited from overseas. The overseas recruits tend to be in specialist areas in which the Australian research community does not have any expertise.

According to its CEO, the CRC for Polymers tends to attract scientists who are interested in working in industry on applied research projects. This can limit the scope of people interested in positions due to the highly academic-centric ambitions of many people with the relevant qualifications.

3.4 Employment pathways

As noted above, most employees in the CRC for Polymers are Australian university graduates and Australian based higher degree students. Among the post doctoral research positions, about two thirds of the researchers are undertaking their first post doctoral fellowship. Therefore, overall the workforce employed in the CRC for Polymers is relatively young and in the early career stage.

The post doctoral positions offered by CRC for Polymers are geared towards providing an industry-based research position for a short term (two to three years) project that will provide future employment and research opportunities outside the CRC. The post doctoral candidates interviewed during the case study were examples of this trajectory. Both had completed their PhD in the past couple of years and were in their first post doctoral position. While based in different sectors and working on very different research projects, both had an understanding that once their current research project was complete they could use the experience gained through the CRC to launch into a research career in their chosen field.

CRC for Polymers closely follows the pathways taken by former post doctoral fellows and completed PhD candidates. Those who complete their positions have a high success rate in finding employment in their areas of expertise. According to the figures from the CRC, about 40 per cent of staff make a transition into industry positions, 40 per cent into universities and 20 per cent to the CSIRO or ANSTO.

One PhD candidate spoken to in the case study visit provides an example of the career opportunities offered by involvement in the CRC for Polymers. His PhD project is a collaborative link between the university at which his supervisor is based and an industry partner – the partnership is facilitated by the CRC. During his candidature, the student will work at both the university laboratories and onsite using the technologies available at the industry facility. His project is highly applied in nature and based around a problem that the company he is collaborating with has been trying to solve for years. He is two years into his PhD, enjoying his research and has been offered an appealing position in the partner company on completion of his candidature.

3.5 Career enhancement opportunities

One of the best examples of good practice within the CRC for Polymers is the attention given to professional development programs. The CEO sees that one of the core aims of the CRC is to build the capabilities of young scientists not only in their research and technical skills but also in commercial understanding and communication. CRC for Polymers spends a notable amount of time sourcing courses for its researchers and helping providers to fine-tune them to suit the specific needs of the science community.

There are numerous examples of the career and personal development options made available by the CRC. These are embraced by many of the post doctoral fellows and PhD candidates that the CRC supports. They include the following innovations:

- A Polymer Summer School – where international and national experts in a range of polymer sciences are invited to speak and take part in workshops. This ‘school’ is aimed at expanding the breadth of knowledge among polymer scientists. Participants include undergraduates, postgraduates, post doctoral fellows and established researchers. PhD and post doctoral researchers from the CRC are encouraged to attend the Summer School.
- A Leadership and Innovation course – supported by the CRC and run by the University of Melbourne and the Australian Institute for Commercialisation. The five day workshop covers a range of essentials relating to the business side of the science industry. The areas covered include intellectual property, business skills, patent issues, management, and interpersonal skills. The course also focuses on encouraging young scientists to follow a multidisciplinary approach in their research. The CRC encourages all PhD and post doctoral researchers to undertake the course; about half take up the opportunity.
- Other short courses, such as a communication course, help candidates and researchers to develop presentation skills, communication skills, and offers guidance and tips for working with media.

In addition to these examples, CRC for Polymers have been working with the CRC Association (CRCA) to develop a Graduate Certificate in Research Commercialisation. CRC researchers and students will be encouraged to embrace this certificate as part of their tenure with the CRC. It is being developed to provide scientists with strong skills in the business-side of the science industry and to fill the knowledge gap that many industry employers believe exists in higher degree science graduates – a lack of commercial acumen. The certificate involves 4 units covering a range of issues from securing research funding, to patent law and gaining feedback for results. Essentially, it helps to develop capabilities for transferring research into commercial gain. The Australian Technology Network (ATN) universities will provide the course.

3.6 Conclusion

CRC for Polymers provides a notable example of industry-university collaborative links in research. It offers a range of professional development opportunities for its researchers and it provides substantial employment to a large number of PhD qualified scientists in Australia.

In addition, it offers excellent career pathways for the post doctoral and PhD researchers who work on projects it has facilitated. The opportunities for early career researchers available through the CRC are an important example of the way in which future scientific expertise in Australia can be nurtured.

4 CSIRO Marine and Atmospheric Research Division, Ecosystem Modelling Team

4.1 Introduction

The CSIRO is a significant employer of people with higher research degrees in the mathematics and science fields in Australia. As such it devotes resources to promoting science and building the capabilities of Australian scientists. It is a large employer of the group of people targeted in this research, and an important case study example.

There are a wide variety of research programs in the CSIRO that involve the employment of science and mathematics higher degree graduates. For this case study, an ecosystem modelling team based at the Marine and Atmospheric Research Division in Hobart has been chosen. This is a small, but important team, with young scientists working on important issues relating to marine sustainability. Our study necessarily reflects one aspect of CSIRO employment and focuses on the development of a research team in an emerging area of research importance under the auspices of the CSIRO CEO Science Leader program.

The Ecosystem Modelling team was chosen for this case study for a number of reasons:

- it provides an example of the leadership possibilities and nurturing of talent among future leaders within the CSIRO;
- it works in modelling – a cutting-edge area of growing demand and massive potential in the future;
- the skills required for the high level modelling undertaken are most commonly acquired through the completion of a higher research degree;
- it is located in Hobart, a smaller city than many of the other Australian capitals, making recruitment and retainment of staff more challenging;
- it has been closely involved with the University of Tasmania in developing a quantitative marine sciences PhD program in order to build Australian capabilities in these areas;

- the skills utilised in the team require a multidisciplinary approach, drawing on expertise from a range of science and mathematics disciplines;
- it operates within the CSIRO and therefore staff have access to a range of personal and professional development programs and support mechanisms; and
- team members have an acute awareness of the need for encouraging participation in science throughout the education pipeline and are involved in promoting their research to schools and universities.

The 15 members of the Ecosystem Modelling team are lead by Dr Beth Fulton, a pioneer in this kind of research, who has received many accolades for her work since completing her PhD in 2001. In particular, she was awarded the Science Minister's Prize for Life Scientist of the Year in 2007 for her achievements in marine ecosystem modelling and the impact of her work in regional marine planning, managing the impacts of fishing, and understanding and managing climate change.

As part of the CSIRO's CEO Science Leader program, Dr Fulton oversees a core group of scientists working on the marine ecosystem model that she has developed. The projects the team undertakes are primarily driven by industry demand – a demand which is growing rapidly in this highly important area of modelling.

Five members of the Ecosystem Modelling team were interviewed during the case study visit to their Hobart headquarters. The interviewees spanned a range of experience, from 20 years at the CSIRO, to a junior researcher and postgraduate candidate.

4.2 Mission, goals and operations of the Ecosystem Modelling Team

The Ecosystem Modelling Team works within the overall vision and goals of the CSIRO encapsulated in the statement: 'By igniting the creative spirit of our people we deliver great science and innovative solutions for industry, society and the environment'.³ The Division of Marine and Atmospheric Research is in the final

³ CSIRO Vision Statement, http://www.csiro.au/csiro/channel/_ca_dch31.html

stages of a strategic plan linked to the CSIRO Wealth from Oceans Flagship. The Ecosystem Modelling Team is expected to have a key role with its modelling directed to benefit the economy, the environment and society.

Within the team, there is an underlying desire to create the most accurate and efficient modelling program for marine ecosystems ever developed. This model can be utilised by environmental agencies to manage fishing licences and predict stock numbers by governments to ensure ecological sustainability and by industry to predict future yield and plan for sustainable financial outcomes.

The team has a vision to ensure that Australia's capabilities in science – especially quantitative science – are enhanced. Team members promote science by visiting schools to talk about their work, hosting schools at the research site, supporting undergraduate and postgraduate science students and helping to develop university programs that equip students with the skills necessary to build competence in modelling techniques.

One of the key projects the team is undertaking relates to the fine-tuning of the world-renowned marine ecosystem modelling tool called Atlantis. Utilising the skills of biologists, statisticians, mathematicians and computer programmers, the team is primarily involved in industry-based projects relating to marine sustainability and forecasting future growth and degradation of marine ecosystems using the Atlantis model.

4.3 Staffing and recruitment practices

The complex modelling techniques required to develop and work with the systems that the Ecosystem Modelling team use require specialist skills that are in high demand and short supply worldwide. The 'whole-of-system' modelling that the team uses is a very new field in science and therefore there are few people in the world with the necessary skills to undertake such work. As a result, recruitment in this area is very difficult.

In recruiting for new positions, senior team members utilise contacts with specific academics and universities worldwide that are developing expertise in these areas. Universities in France, South Africa and the USA (particularly the University of Washington) tend to be the most proficient producers of scientists in the quantitative fields that the team is interested in. Links with people in the relevant establishments are made through conference attendance and research project collaborations.

Due to the general shortage of such skills in the world, the CSIRO and the University of Tasmania have developed a Quantitative Marine Science PhD Program⁴ designed to encourage interest in the field and build Australia's potential in these areas. Members of the Ecosystem Modelling team have an ongoing role in the program through teaching, supervising and helping develop coursework curricula. This is a proactive approach to the supply issue that is likely to pay dividends over the coming years.

4.4 Employment pathways

The 15 members of the Ecosystem Modelling team come from a wide variety of backgrounds. Many are Australian trained and have honed their skills by learning on the job. Most have a PhD or a masters qualification and others in the team are currently undertaking postgraduate study in the specific field they are working in – some in the joint CSIRO-University of Tasmania Quantitative Marine Science program.

As a large government organisation, the CSIRO is attractive to many scientists due to the favourable employment conditions and the emphasis on undertaking applied research. One of the members of the team interviewed had been with the CSIRO for decades, working in different locations and in different teams before this niche area was established. Others have backgrounds in marine science developed through work for federal and state fisheries departments. Younger members of the team have joined the CSIRO following or during their candidature in postgraduate programs.

⁴ See <http://www.utas.edu.au/cms/qms/index.html> for more information about the program.

Due to the high demand and very small supply of people with expertise in these areas worldwide, there are potential problems for the team with retaining highly skilled staff. However, those staff interviewed indicated that the financial lures offered to people with their skills from overseas companies and from within other industries (especially finance) were not sufficient to outweigh the benefits of being involved in interesting research projects, and in a team and organisation that promotes a balanced and enjoyable lifestyle. One member summed this up saying, *'people who work here do so for the science and lifestyle, not for the money'*.

The nature of an organisation the size of the CSIRO means that scientists have opportunities to develop career pathways and goals over a period of time. As well as the core research-oriented work, the CSIRO also offers the opportunity for scientists to become project leaders, policy collaborators and occupy key administrative positions.

Nevertheless, it was clear that the interests of those members of the team who were interviewed were focused on their research and at this stage had no real desire to follow a career path into the administrative side of the organisation.

4.5 Career enhancement opportunities

As a significantly large employer of scientists with higher research degrees, the CSIRO has a wide range of professional development programs and a multitude of career opportunities for its staff.

In particular, the post doctoral program offered within the CSIRO is coordinated to provide researchers with exposure to a wide array of training opportunities that can be used to forge a successful career in science. The post doctoral program courses include skill building workshops in the following areas:

- writing skills;
- presentation skills;
- networking skills;
- team working ability;

- leadership skills;
- mentoring skills;
- negotiation skills; and
- risk management.

These types of skills are seen by the organisation as essential to the development of scientists that will be able to facilitate innovation in Australia into the future. The programs listed above are generally available to other research staff (i.e. those who are not post doctoral fellows).

Within the Ecosystem Modelling team, these opportunities are available and are utilised by staff, especially those in the early phase of their careers, with one member who is undertaking a postgraduate qualification, while employed by CSIRO, planning to utilise a communication skills course in order to enhance her presentation skills.

The post doctoral programs within the CSIRO also assist young researchers by ensuring that their pathway in the organisation follows the CSIRO 'Science Stream'. This is viewed as important by members of the Ecosystem Modelling team because it sets young scientists on a clear pathway towards research intensive work.

The career trajectory of the team leader, Dr Fulton, provides a good example of the career enhancement opportunities offered to young, talented scientists within the CSIRO. Dr Fulton began her career at the CSIRO in 2001 as a post doctoral fellow, a position in which she was encouraged to broaden her expertise and work closely on applied and industry-relevant projects. Following this position she became a senior researcher in the Marine and Atmospheric Research Division, where she continued to update her Atlantis model, as well as working with others to develop another model, known as InVitro. In 2008 she was recognised for her pursuits in science and given a position within the CSIRO CEO Science Leader program, which has helped her to build her team of modellers, further develop the capabilities of her models and engage in more industry-relevant research projects.

4.6 Conclusion

The CSIRO is an exceptionally important organisation which promotes, engages in and develops science in Australia. The organisation employs people with higher degree qualifications in a wide variety of the science and mathematics fields. In this case study, the Ecosystem Modelling team, based in Hobart within the Marine and Atmospheric Research Division has been used because it provides notable examples of industry-based research collaboration, engagement with universities to build future skills, a multidisciplinary approach to research and has access to a range of career development opportunities.

In addition, the Ecosystem Modelling team provides an example of the utilisation of modelling methodologies, which have been identified throughout this wider research project as being of crucial importance to the future of science and have potential significance in a wide range applications.

Report Conclusions

This report has examined four organisations which follow good practice in the employment and career development of people with postgraduate qualifications in the science and mathematics fields in Australia. Each of the employers in the four case studies display key qualities such as:

- appreciation of the value of a higher degree;
- strong links across sectors (i.e. between private industry and universities);
- established training and development programs;
- and supportive career enhancement opportunities.

In addition, each also provided exemplary examples of different facets of employment and research in science and mathematics. Some of these included:

- a noteworthy example from the SMI on how university-industry collaborations can foster research and provide applied and innovative research jobs;
- the Roche Products PDIB team which provided a rare example from the private sector of how private industry can support, motivate and facilitate career direction for people with these qualifications;
- an important example from the CRC for Polymers of innovation in developing researchers and linking them with excellent future employment opportunities; and
- a significant example from the CSIRO Ecosystem Modelling team on how a core science organisation develops staff and creates expertise in key new fields of research.

The observations from these case studies fit within the findings and overall conclusions of the wider research project of which this report is a part. The good practice and enthusiasm for higher degrees in the case studies themselves in some way provide an exception to the common practice or attitudes of employers towards these qualifications as found in this research project.

Themes that have consistently emerged throughout the case studies and other parts of the research include:

- reference to recruitment difficulties in finding highly skilled personnel with quantitative skills;
- the fact that people with these qualifications come from and move on to a variety of occupations before and after their employment at these sites;
- problems in finding good examples of employment of scientists and mathematicians with higher degree qualifications in private industry in Australia; and
- the common emphasis of the need for multidisciplinary skills – especially where quantitative knowledge is paired with skills in another discipline.

Appendix A: Example of Case Study Request form

RESEARCH INTO DEMAND FOR AND EMPLOYMENT OF MATHS AND SCIENCE POSTGRADUATES

CASE STUDY REQUEST

The Australian Council for Educational Research (ACER) is currently undertaking new research for the Federal Department of Education, Employment and Workplace Relations (DEEWR). The research is examining demand for postgraduates with mathematics and science skills.

As part of this project we have undertaken scoping research into existing national and international literature and data on the issues and have carried out a consultation process involving a wide range of stakeholder groups, peak bodies, universities, employers, students and early-career researchers in the maths and sciences in Australia.

The final phase in this project involves carrying out case studies of a range of groups involved in training and employing people with higher degree research qualifications in the science and mathematics fields.

What the project involves

As you are no doubt aware, Australia's productivity and success in a competitive global marketplace increasingly relies on critical science, technology, engineering and mathematics skills. DEEWR has already conducted some research around these broad skills issues, much of it focused on supply-side questions.

The research now underway is looking specifically at demand for higher degree-qualified scientists and mathematicians in Australia, i.e. those with a PhD or Masters by Research qualification.

The ACER research team are requesting XXXX to be involved in this project as a case study of good practice in training and providing career paths for people with these qualifications.

As part of the case study, we would like to come and visit XXXX, speak with some key management personnel, some early-career researchers and some postgraduate students about the opportunities that the XXXX offers. The visit would be for no longer than half a day and would not take up more than half an hour of each person's time.

As discussed, we hope to undertake this visit on XXXXXX.

The ACER Project Director, Daniel Edwards, will be in touch with you to discuss this request in more detail.

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