Enhancing industry university engagement
through graduate research students:
a guide for universities

This ACGR Guide for Universities complements the Ai Guide for Industries.

AUSTRALIAN COUNCIL OF
GRADUATE RESEARCH

Ai
GROUP

Graduate research students undertaking a PhD or a Masters by Research represent a rich talent pool - possessing the knowledge, intellectual abilities, technical capabilities and professional standards to work on and solve industry-defined problems or generate new knowledge. By bringing a researcher mindset to industry, graduate research students can contribute to innovation across all sectors of the Australian economy and society and help underpin university-industry engagement.

This guide provides principles for collaboration and assists Universities in realising the substantial short-term and long-term gains from graduate research student-industry engagement.

It has been collaboratively produced by the Australian Council of Graduate Research (ACGR) and the Australian Industry Group (Ai Group) and is underpinned by the jointly developed Principles to Guide Industry-University Collaboration in Graduate Research Training.

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1. Benefits to universities and graduate research students

Industry[1] and universities collaborate via graduate research student engagement because it provides career development opportunities for students, builds workforce capability and enhances innovation. By applying their knowledge and research capabilities in the workplace, graduate research students are empowered to solve industry problems and develop new innovative ideas.

In the Australian Qualifications Framework graduate research degrees are the highest level qualifications and through research they produce a different type of graduate. Doctoral graduates (Level 10) are described as having 'systematic and critical understanding of a complex field of learning and specialised research skills for the advancement of learnings and/or for professional practice'. The capabilities of graduate research students are articulated more fully in university graduate attributes for HDR students and in Vitae Researcher Development Framework[2]. Industry engagement represents one of the best ways for a graduate researcher to test their capabilities as a researcher and their transferable and professional skills. By applying their capabilities in a setting where clear outcomes are expected they can receive feedback from end-users, develop a better understanding of work expectations outside of academia and reflect on their development as researchers. The contemporary aim of research training is to produce graduate researchers who are prepared for a variety of careers. Industry engagement helps graduate researchers to

embrace these opportunities and overcome some employer perspectives and demonstrate that PhDs are practical and outcomes focussed.

Industry engagement is a core element of the activity of all universities. Graduate research students represent the most flexible cohort through which research collaborations can develop since they can be involved in research with industry through their entire candidature or for more discrete period via a placement or internship. Through industry engagement via graduate researchers universities can develop joint research programs that can enhance business performance, develop innovative solutions to industry problems and produce commercial outcomes. Through industry engagement universities also demonstrate that their graduate researchers with the skills to meet future challenges.

[1]As in the ACOLA Review of Australia's Research Training System, Industry is defined in its broadest sense to include businesses, governments, government business enterprises, non-government organisations, not-for-profit-organisations, and community organisations.

[2] https://www.vitae.ac.uk/researchers-professional-development/about-the-vitae-researcher-development-framework

2. Establishing the university-industry engagement

Mutually beneficial relationships between industry and universities are established through trust and open communication which addresses different priorities, cultures and approaches between the sectors. Flexibility by both end-users and university partners around research project/activity size, timing and length of engagements increases the number of industry opportunities available, benefitting all parties.

Industry-university engagement occurs in many forms, from those involving an individual academic to whole of Institution and can involve both the coursework education and/or research. Additionally, end-users will range from those that have a well-developed understanding of universities to those where there is very little knowledge of universities, especially in relation to graduate researchers and their capabilities. To establish a good working relationship with industry it is essential that:

- the university provides a clear description of the way in which industry engagement is managed and the points of contact and processes relating to development of placements/projects and management of agreements.

- the university works with the industry partner to develop projects appropriate for a graduate researcher.

Once a point of contact has been made it will assist the establishment of your industry engagement if industry and university consider:

- the nature of the research challenge/ problem and the specific projects/ roles a graduate research student could undertake. The challenge can then be scoped and developed into a project with the relevant university academic supervisor and student.

- the requirements and expectations of each organisation during the project

- the support, supervision and mentoring to be provided to the graduate research student by the organisation

- the outcomes for the graduate research student and how they can be linked to their degree

- a timeline for the activity to occur.

A good starting point in industry-university engagement is to determine the type of interaction that would suit the industry partner and be appropriate for the proposed project.

Types of research engagement:

Australia has a rich and diverse range of programs involving graduate researchers in which the entire PhD project is jointly funded and/or jointly supervised by industry[2].

In this guide the focus is on short-term Industry engagement, although it should be noted that from such interactions a deeper, long term form of engagement may emerge.

The Department of Education and Training recognises graduate research student engagement with industry partners in several ways, outlined below:

- A **research internship** is defined as a temporary position with a research end user where a student has undertaken research and development (R&D) related to their higher degree by research (HDR). A research internship must be for a period of at least 30 days, can be either paid or unpaid, and can form part of the enrolment or be undertaken during an HDR period of suspension.

- **Jointly supervised by a research end–user** is defined as an HDR student that has at least two HDR supervisors, with at least one supervisor from a research end user organisation. The supervision arrangements must be endorsed by the HDR student's higher education provider and the research end user supervisor must be actively engaged in the student's HDR.

- **Jointly supervised by a research end–user** is defined as an HDR student that has at least two HDR supervisors, with at least one supervisor/advisor from a research end user organisation. The supervision arrangements must be endorsed by the HDR student's higher education provider and the research end user supervisor/advisor must be actively engaged in the student's HDR.

- **Other commercialisation and engagement activities** is defined as an arrangement with a research end user that enables experiential learning related to the student's HDR. This includes practicums or performances, R&D consultancy work, R&D commercialisation work, entrepreneurship, community engagement/outreach, and research extension work either with or for a research end user. These activities can be paid or unpaid, and no minimum amount of learning days applies. The activities exclude research internships unless they are shorter than 30 days, and exclude joint funding arrangements.

Although these categories are not intended to rigidly define the precise form of the industry project they can help define mutual expectations. Some examples of formal engagement programs are listed on the next page and others can be found on individual university webpages. It would be very helpful for Industry partners if universities could provide some examples of the types of placements/ internships possible at their institutions and their outcomes for all parties.

Examples of short-term graduate research student-industry programs

Research internships:

APR.Intern, Australian Mathematical Sciences Institute

http://aprintern.org.au/

- The APR.Intern is a national scheme that provides a platform for industry to engage and attract talent into their organisation through short-term (3-5 month), tightly focused research projects across all study disciplines and business sectors. HDR students are drawn from all universities in Australia.

Entrepreneurs' Programme Innovation Connections

https://www.business.gov.au/assistance/ entrepreneurs-programme/innovation-connections

- This program, for eligible SMEs, involves specialist Innovation Facilitators providing businesses research needs assessments, which may then involve a matched funding grant that assists direct access to research capability, including placement of graduate students.

UQ 30 day-plus Placement Scheme

https://cdf.graduate-school.uq.edu.au/placements

This scheme (RTP reportable) involves (usually unpaid) placements for a minimum 30 working days in duration. Students can self-source their own industry placement, often with the help of their supervisors.

Australian Technology Network of Universities (ATN) Industry Doctoral Training Centre

https://www.atn.edu.au/industry-collaboration/ IDTC/

Research students (Masters, Doctorates) collaborate with an industry partner to work on an industry/organisation problem, where solutions are driven by fundamentals of mathematical, statistical, information technology, and information sciences.

Team-based research and consulting:

Monash Graduate Research Industry Partnerships

https://www.monash.edu/graduate-research/ partnerships/grip

This program enables businesses to develop new ideas, products and services for the market with researchers and academic experts with interdisciplinary expertise; and to reduce research costs by gaining access to research facilities and state of the art technologies and equipment.

WA Industry & Research Engagement Program

https://www.iprep.edu.au/

iPREP WA is a collaboration between the five WA universities and has been established for PhD candidates who may not have had previous industry experience. The program involves interdisciplinary teams, working on a six week project (with scholarship) for an industry partner.

3. Developing the Project

In creating a project with industry it is critical that a mutual understanding of expectations is developed:

- Be clear about the differences in research capabilities between a graduate research student and a coursework student. Graduate attributes for HDR students and also the AQF description of different Levels can help to clearly describe the capabilities of a graduate research student.

- Develop an understanding of the nature of the industry research challenge/problem and help craft a project plan that fits the capabilities of a graduate researcher and the needs of the industry partner.

- Remind the industry partner that graduate researchers are students and that the principal purpose of the project is educational even though there can be collateral advantages to the industry partner.

- Recognise that industry has a business imperative and be clear that the university will make every effort to ensure that the graduate researchers understand these expectations.

Intellectual Property Agreements

Universities have developed flexible and transparent systems around IP matters that are able to accommodate a range of models (some of which will be defined by the scheme e. g. APR.intern). IP arrangements in an industry-university collaboration may vary. In some cases universities may encourage industry partners to own and commercialise the intellectual property arising from industry-funded research. Where university-owned or jointly-owned IP is needed for commercialisation, negotiations can bring about equitable terms for all parties.

The Australian Government's Australian IP Toolkit for Collaboration may simplify the management of intellectual property (IP) in collaborative projects between researchers and industry.

The toolkit can help researchers and business to:

- develop and build effective partnerships

- identify the important issues in developing collaborations, assisting them to understand what is important and how to protect their interests

- deal with key issues before beginning the collaboration

- reduce the need for legal advice, freeing up resources to focus on building the partnership

- attract funding.

The toolkit has been designed to be used for collaborations of around $100,000 or more. There is a Mini IP Toolkit suitable for lower value or less complex collaborations or both.

The toolkit contains:

- checklists of the key issues that need to be considered

- template contracts, confidentiality agreements and term sheets

- guides on developing partnerships and advice on the management of IP.

In circumstances where the university establishes an IP or other contractual agreement with an industry partner which impacts upon the experience or rights of the research student, an appropriate agreement may be necessary between the university and the student.

Irrespective of the university position relating to intellectual property there needs to be clear information relating to the range of IP models, information sharing and packaging of IP available to all parties.

Publishing, Confidentiality and Moral Rights

Although graduate research students retain the copyright of their final thesis and it is examined by external examiners, confidentiality and non-disclosure agreements may be organised between industry and university partners should this be required by the industry partner. In drafting these arrangements, it is also important to remind industry partners about the rights of the graduate research students and their academic supervisors, especially in relation to the importance to the candidate of publishing of their scholarly works and the implications when these are linked to ownership of copyright.

Moral rights pertain to copyright works and are the right to attribution and the right to integrity of the work. Typically, moral rights waivers may be sought in relation to the industry-linked research output to enable its further development/modification. The degree to which the universities need to protect the student's industry-associated research outputs may depend on whether the research forms part of a higher degree by research thesis or whether it is distinct.

4. Compliance and Managing Risk

Payment considerations

Legal frameworks exist to determine whether any payments are to be made to students undertaking research for industry. The Fair Work (FW) Act recognises formal work experience arrangements that are part of an education or training course. These arrangements are referred to as vocational placements, and are defined as being:

- undertaken as a requirement of an Australian based educational or training course, and authorised under a law or an administrative arrangement of the Commonwealth, a State or Territory, and

- undertaken with an employer for which a person is not entitled to be paid any remuneration.

It is recommended that students maintain an "enrolled" status whilst undertaking a educational internship and that the learning and assessment components of the educational experience are clearly articulated.

If these criteria are met, the person will not be covered by the FW Act and is therefore not subject to the minimum wage and other entitlements provided in the National Employment Standards, Awards and agreements.

Depending on the engagement, the activities may require payment if there is deemed to be an employment relationship. The student must be paid if an employment relationship exists as follows:

- the student undertakes work beyond that required by the university e. g. filling in for a sick employee

- the placement exceeds the duration of time required by the university

- the work undertaken by the student is integral to the running of the company

- the focus of the arrangement is on productive work rather than meaningful learning for the student

- the company is predominantly benefiting and the resultant work is not part of the thesis; in a lawfully unpaid arrangement the main benefit should go to the student.

If the arrangement is considered to be an employment relationship, the student must be paid the minimum entitlements and there must be an employment agreement where the partner takes all usual responsibilities as the employer of the student.

For further information please refer to the Fair Work Australia factsheet and the Australian Collaborative Education Network's student placement FAQs.

Tax considerations

- In cases where student research projects involve scholarships or other payments, with respect to income taxation, the collaborating parties need to establish that the relevant principal purpose of the project is educational even though there may be collateral advantages to the industry partner. A clear understanding of the benefits to the industry partner arising from student engagement in comparison to those that would arise from those of an employee or contractor should be established

- Organisations may also be eligible for the R&D tax rebate, which can significantly reduce the total cost of a research project.

Insurance

- If the student's project is part of a lawfully unpaid vocational placement they are not considered to be employees and do not need to be covered by an industry insurance policy. Universities should check that their insurance covers unpaid student placements that are a requirement of their course, including public liability and workers compensation.

- The development of an agreement that outlines roles and responsibilities should include all legal requirements and insurances. Universities should discuss this with the industry partner prior to the commencement of the engagement.

Fitness to Practice

Fitness to practice is a term that is usually associated with Workplace Integrated Learning for professional coursework students. In the case of HDR students this term can be taken to mean that the student is progressing satisfactorily in the HDR candidature such that a placement in Industry would not affect timely completion of the thesis. In addition, the HDR student's knowledge base and research capability will also need to be considered in relation to the proposed project. However, it should be noted that not all projects need to be aligned precisely with the disciplinary/technical skills of the HDR student since it is also possible for them to undertake a project that makes use of their transferable (generic) skills as a graduate researcher.

5. Delivering the Project

Recruitment/Student Selection

Students can be recruited to projects in response to advertisement of projects (as in the APR.Intern scheme) but in some cases a university may enable the self-sourcing of a project in which a student makes use of university/supervisor connections to develop an industry placement. Irrespective of the route through which a student applies for or develops an industry project it is important that the following are established:

- The student is progressing satisfactorily in their HDR degree and has the capacity to take on a placement

- The student's supervisors/advisors are supportive

- The Industry partner has the opportunity to meet/interview the student and is supportive of the selection.

Induction, supervision and mentoring

Prior to beginning an internship students should receive a briefing regarding the placement that are to undertake and have a clear understanding of expectations and responsibilities. In some cases the student's university supervisor/advisor will also be involved.

All students should be introduced to their workplace research experience through an induction which covers company/organisation procedures, the standards and behaviours of the company/organisation, agreed outcomes, the assignment of a supervisor, encouragement of open communication and reflection by the graduate research student. Constructive informal and formal feedback to the student and review meetings will assist to focus on outcomes for both parties, as well as the strengths and areas of development identified for students, for example problem solving, initiative, planning and organisational skills, ability to communicate and to learn from others.

It is important that the university ensures that Industry agrees to provide this type of high quality professional and pastoral care during the placement. This should include:

- going through the agreement that outlines the research aims, learning objectives and responsibilities

- briefing students on industry expectations, the types of tasks they will undertake and the team(s) with which they will work

- assigning an experienced employee as a mentor/supervisor whom the student can approach for advice

- regularly checking on progress and provide open feedback and support. In particular, discuss the development of the student's employability skills that are important for your organisation

- in cases where the academic supervisor is involved liaise regularly on input to the research learning process

- provide specific feedback to the student by describing performance with examples and highlighting strengths

- in review meetings work with the student to develop concrete strategies to improve areas, reflect on their learnings and how they have developed.

Assessment of Outcomes

Measuring the outcomes of the project is important for industry, university and for the graduate researcher.

- For industry, the immediate question relates to the impact of the student on the activity of the end-user; did she/he solve an important problem, help develop a new product or indirectly improve a business through a research project?

- For the university, feedback should be sought in relation to the quality of the graduate researcher's performance in relation expectations relating to their research, professional and transferable skills.

- For students, feedback from industry and their own reflection on the effect of the placement on their development as graduate researchers should be clearly documented since it is critical that the educational dimension of the student experience be well-defined.

Conducting a robust assessment of outcomes enables the university and industry partner to deepen their relationship, leading to sustained collaboration.

6. Building the Industry Partnership

A positive outcome for industry in terms of the ease of interaction with the university, the quality of the performance of the graduate researcher in relation to graduate attributes and in meeting Industry expectations should lead to a strengthening of the interaction between the university and the industry.

Measures of success could include:

- **Continued placement of students with an industry (repeat business)**

- **An increase in scale or depth of the interaction (research collaborations)**

- **Employment opportunities for graduate researchers**

Celebrating success and maintaining contact is a critical element in building the industry partnership.

[2] ATN Report – Enhancing the Value of PhDs to Australian Industry https://www.atn.edu.au/siteassets/publications/atn01-phd-report-web-single.pdf
[3] ibid: [4] Australian Postgraduate Research (APR) Intern program, https://careers.amsi.org.au/ :   [5] ibid

Appendix 1 - Principles to guide industry-university collaboration in graduate research training

Graduate research candidates (PhD and Research Masters) develop expert knowledge and research skills, authoritative judgement, adaptability and independence during their candidature. They can make a significant contribution to innovation within an industry and equally a graduate research candidate can benefit from the experience of working in industry from a career development and learning perspective. These principles form the basis for a guide for industry-university collaboration involving HDR students.

Benefits for Industry

- Graduate research candidates apply their expert, specialised cognitive, technical and research skills in a discipline area to independently and systematically provide creative solutions to challenging questions and to innovate.

- Industry benefits from knowledge transfer from the university to the industry.

- Industry supports development of high quality graduate researchers who may realise opportunities for careers outside academia

- Mutually beneficial relationships between companies and universities are established.

Benefits for Graduate Research Candidates and Universities

- Graduate research candidates develop their capabilities as producers of knowledge or creative solutions while developing transferable and professional skills, exposure to work place cultures and establishing professional networks.

- University staff and graduate research candidates may work collaboratively with an industry partner to co-create a new product or develop a creative solution to a problem.

- Universities develop a better understanding of industry expectations, priorities and cultures leading to deeper collaborative partnerships with industry.

Establishment of Expectations and Protections for all parties

- • Industry collaboration involving graduate research candidates varies around project scope, timing and length of interaction. This requires a clear understanding of the types of industry-university engagement (using RTP categories as a guide) that graduate research candidates can undertake and the roles of academic and industry based advisors.

- The primary purpose of the interaction of the graduate research candidate with industry should be educational although collateral advantages to industry can occur. It is not sufficient that an educational purpose is a by-product of the industry interaction.

- Projects developed by industry and universities involving graduate research candidates should include an agreement relating to insurance and public liability as well as university confirmation of a candidate's fitness to participate in the project and each party should sign a formalised agreement.

- Intellectual property agreements arising from industry-university collaboration should be negotiated at an early stage and may consider a range of IP models, information sharing and packaging of IP, and can make use of available resources such as *The Australian Toolkit for Collaboration.*

Mentoring and Assessment

- Graduate research candidates are supported in their industry collaboration through induction, which should involve company procedures, the standards and behaviours of the company, assignment of an industry advisor (supervisor) or mentor and agreement on project aims and objectives.

- Universities should work with Industry to co-design assessment tasks, measuring outcomes and evaluating the performance and development of the HDR candidate against the expected attributes of a research student. These attributes include disciplinary knowledge, technical and intellectual capabilities, personal qualities, professional conduct and knowledge transfer capabilities.