



CENTRE FOR
INVASIVE SPECIES SOLUTIONS

GUIDE TO THE BALANCED RESEARCHER PROGRAM: ENHANCED PHD TRAINING



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We acknowledge the Traditional Custodians of the lands on which we meet and work and pay our respects to Elders — past, present and emerging.

We acknowledge all Aboriginal and Torres Strait Islander peoples and their continuing connection to country, culture and community.

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FOREWORD

For over a decade, Australian governments and industry have recognised that the nation's world-class biosecurity research and innovation system is vulnerable, as its need for capability increases and many experienced researchers retire or soon to plan to.

CSIRO again brought this into sharp relief in its 2020 Australia's Biosecurity Future report. The report observed that Australia's biosecurity is challenged by rising threats and undermined by the long-term trend of declining and varying biosecurity capability across jurisdictions. Active succession planning through tailored graduate programs remains a critical part of the solution.

This is where the Balanced Researcher Program comes into its own. In place since 2005, this Centre for Invasive Species Solutions program has matured into a fabulous initiative that inspires, networks and trains graduate research students, giving them a multitude of skills and experiences that help them complete their study and position them for great careers in industry or government.

The proof is in the pudding. The Balanced Researcher Program has a graduate student completion rate of 96%, which is far higher than the Group of Eight average. Over half are still involved with invasive-species science and innovation in some way, and 70% remain in research or have some involvement in research. Behind these statistics are passionate and dedicated former students that have used the program's additional training, internships, mentoring and friendships to carve out impressive careers.

This guide outlines the 'secret ingredients' for the success of the Centre's Balanced Researcher Program. It updates our original 2011 guide to reflect learnings developed over the last decade from the Program Leader and revised guide author, Dr Tony Buckmaster.

These techniques and strategies work for our Centre and our field, but are not prescriptive and have been adapted by various Cooperative Research Centres and related organisations over the years. A central tenet of our (and derivative) programs is a long-term commitment to institutionalise student-centered approaches and culture into high-performing initiatives that deliver highly capable graduates ready to play an important part in Australia's research, innovation and policy community.

Andreas Glanznig
Chief Executive

PREFACE

The Balanced Researcher Program (BRP) is a postgraduate enhancement program run, currently, by the Centre for Invasive Species Solutions (the Centre). The program initially commenced as the Balanced Scientist Program in 2005 as part of the Education Program of the Invasive Animals Cooperative Research Centre (Invasive Animals CRC).

Throughout its life the BRP has remained a cross-institutional program involving a range of universities, research institutions, government departments, NGOs and private companies. Most of these have been based in Australia; however, there has been involvement from international universities, such as the University of York in the UK and Penn State University in Pennsylvania, USA. International research organisations such as Manaaki Whenua – Landcare Research in New Zealand have contributed to the program, as have international government agencies such as the United States Department of Agriculture and the Department of Conservation New Zealand. All of these have been brought together under the common banner of increasing the effectiveness of invasive species management.

The need for the BRP was highlighted by the Invasive Animals CRC's industry partners indicating that while PhD graduates were very skilled in their field of research, they lacked generic transferrable skills that make them employment-ready. When the BRP commenced, there were few, if any, guides or practical examples of such a program, especially for one that encompassed such a wide range of research areas and research species.

The initial Balanced Scientist Program led the way in this regard, and monitoring the program as it progressed and evolved allowed it to be adapted to better suit the needs of both the participant students and the workforce they were entering on graduation.

The Australian Council of Learned Academics (ACOLA) report (McGagh et al. 2016) showed that the choices made when initially developing the program were the right approach, and many of the key findings in that report reflect practices that had been implemented for over 10 years in the BRP.

The initial *Guidelines for the Balanced Scientist Program* (Dimond and Sarre 2011) laid the groundwork for other organisations to be able to implement such a program for the benefit of their postgraduate students. This revised guide expands on those initial guidelines and includes additional learning and changes to the program since that time as it has adapted to the changing educational, research and workplace environments. As with the first guidelines, these are not prescriptive and there is no 'tick box' metric to follow to develop and implement a similar program. It is recognised that the BRP model may not be perfect nor suit all organisations wishing to have a postgraduate enhancement program. To be successful, such a program requires significant investment in both time and funds. It also requires the institutions implementing it to be committed to the best interests of the participants and to see the program through.

It has been my absolute privilege to lead the BRP since 2011. I have had the pleasure of watching some of Australia's finest new PhD candidates transition from early career doctoral students, suffering extensively from imposter syndrome, to confident and exceptional researchers who are world leaders in their fields.

Some people are lucky enough to meet their scientist heroes; I have been fortunate enough to be able to watch mine grow and develop their careers.

Dr Tony Buckmaster

Principal RD&E Manager, Centre for Invasive Species Solutions

ACKNOWLEDGMENTS

This *Updated guide to the Balanced Researcher Program* is an update to the original *Guidelines for the Balanced Scientist Program* (Dimond and Sarre 2011). Much of the detail in that original publication is still relevant and has been reproduced in this revised guide. I am indebted to the authors of the original guide, Wendy Dimond and Stephen Sarre, for laying the foundations and setting a high standard from which this revised guide can launch.

The BRP could not have been the success it is without the participation and input of each and every student who has been part of the program.

The BRP has been funded over its iterations by the Australian Government, initially through the Department of Industry, Science and Resources as part of the Cooperative Research Centres program and, more recently, by the Department of Agriculture, Fisheries and Forestry as part of their commitment to the funding of the Centre for Invasive Species Solutions.

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EXECUTIVE SUMMARY

The Balanced Researcher Program (BRP) brings together postgraduate students studying a wide range of invasive species in an even wider range of fields. It gives them broad transferrable skills essential for their development both as a graduate researcher and in the workplace following their graduation but that are not taught in traditional PhD programs that run for three and a half years (seven semesters). The BRP provides training in areas such as leadership, communication and media awareness, team building and management skills, and stakeholder and community engagement skills. It also increases proficiency in areas that are essential for researchers, such as writing scientific manuscripts and grant applications.

These additional skills are complemented by increasing the participants' exposure to industry – where the research and output priorities are often different from in a counterpart academic setting – through a mandatory 20-day placement within industry. This exposure to industry is seen as a critical component of the program, as approximately 60% of PhD graduates now enter industry or government, rather than academia, following completion of their doctoral studies. To ensure that industry has an active role in the development and progress of the research, each PhD student is required to have at least one industry-based supervisor in their field of research.

Student development is ongoing through the program, with funding to allow them to access additional training over and above that provided by their host university. Similarly, students are encouraged to attend conferences, both within Australia and internationally, so they can present to and interact with peers in their field of research. This has the added benefit of allowing students to form networks and potential collaborations for future research opportunities. Funding is available from the program to facilitate this.

Overall, students are expected to undertake an additional 80 days of training and development over the course of the PhD studies with the BRP. These additional 80 days include the 20 days of required industry placement. This requirement would place a substantial burden on the students if they were in a traditional (seven semester) PhD program. To alleviate this burden, the BRP fully funds an eighth semester of study for the participants, allowing them four years to complete their doctoral studies. This additional time allows the students to complete the required training and development and attain the desired skills without impacting their ability to produce an exceptional research thesis.

The BRP has been running for 18 years and has resulted in increased completion rates for PhD students enrolled in the program. The completion rate for BRP students currently sits at 96%, which is well above the national average PhD completion rate of 63% after nine years of study. Most students in the program submit their thesis in the four years of the program, compared with only approximately 15% nationally that submit within four years of commencement.

Retention of graduates within the research industry is high. Approximately 70% of graduates from the program are still involved in research either in Australia or internationally. There is also a high retention rate within the invasives field, with 40% being directly involved in invasives species management or research and a further 17% having at least part of their current role related to management of invasive species.

These guidelines describe the techniques and strategies that have worked for the BRP. They also indicate the outcomes that have been achieved from implementing those techniques and strategies.

INTRODUCTION

The Balanced Researcher Program (BRP) was initially started by the Invasive Animals Cooperative Research Centre (Invasive Animals CRC) in 2005, then as the Balanced Scientist Program. It continued through the subsequent iteration of the CRC and then, following the end of the Invasive Animals CRC, continued under the Centre for Invasive Species Solutions (the Centre). The Invasive Animals CRC was part of the Australian Government Cooperative Research Centres Program. CRCs are an industry-guided collaboration between government, industry, researchers and the community and bring together multiple disciplines to focus research effort on a single issue; in the case of the Invasive Animals CRC, this was invasive species management. As part of the program, the Invasive Animals CRC committed to train students doing higher degrees by research (HDR – master-level and PhD programs). The Balanced Scientist Program, and its successor under the Centre, the BRP, were formed to enable and oversee the enhanced training of these students. The students were predominantly PhD level; however, several master-level students were included in the training program.

In a traditional HDR doctoral program in Australia, students receive a Research Training Program (RTP) stipend (Department of Education 2022a).¹ This stipend is available for three years, with extension possible for up to a maximum of four years, at the discretion of the higher education provider. However, many universities only provide support for three and a half years (seven semesters). Until 2017, tuition fees for HDR research were waived under the Research Training Scheme (Department of Education and Training 2017a) for four years; however, they are now included in the RTP but can be offset (Department of Education 2022a). Students are embedded in their primary supervisor's research group in the university or research organisation, and supervision occurs primarily in the academic environment. As changes to the HDR support system regularly happen, we strongly urge readers to familiarise themselves with the current system for funding HDR programs rather than rely on the information here, which is provided as a guide only.

During the initial planning of the first Invasive Animals CRC, it became apparent during the discussion with industry partners that there was a perception that, while the traditional HDR training programs used in Australian universities were producing highly knowledgeable graduates who were experts in their specific fields, many were not really market-ready on graduation. When they entered industry they required additional training in areas such as leadership and other interpersonal skills, communication, innovation and project management. The CRC's industry partners were looking for graduates who could effectively contribute in their roles from day one. This was borne out later by several recommendations of the report by the Australian Council of Learned Academics (ACOLA) into Australia's HDR system, which indicated a need for broader transferrable skills to be developed as a necessary part of HDR training (McGagh et al. 2016, key finding 4, pp. xiii–xiv).

There was also an increasing need for graduates to be able to manage complex and multilayered problems ('wicked' problems) that involve mixtures of environmental, economic and social characteristics. Solutions to these problems generally require a multidisciplinary approach and a positive attitude towards building networks, teams and collaborations. This is particularly important as the number of HDR graduates entering industry rather than pursuing academic careers is continually increasing, with about 60% of HDR graduates now entering professions other than academia (Hansen et al. 2014; Guthrie 2016). Many of these graduates are now pursuing careers in industry or government-based organisations.

Some sectors of Australian industry are becoming increasingly aware that the HDR graduates moving towards industry-based professions, instead of academia, fulfil an important role in maintaining the pipeline of trained scientists in research, development and extension (RD&E). A review by Meat and Livestock Australia indicated that the most common pathway into RD&E is high school → undergraduate degree → honours degree → PhD → one or more postdoctoral appointments, then employment as a scientist (Stephens et al. 2013). However, it is believed that these graduates often lack the suitable skills, real-world experience and understanding of industry context. As a result, they require additional training, close supervision and mentoring when they enter a role in industry. Graduating students that have had between three and 10 years of work experience prior to entering a PhD are perceived to retain their industry links and knowledge. The report concluded that industry involvement early in the entry pathway provides a far greater return than becoming involved just at the end (Stephens et al. 2013). This was also reflected in the ACOLA report (McGagh et al. 2016, key findings 5 and 6, pp. xiv–xv).

1 In 2016 the Australian Government replaced the Australian Postgraduate Award (APA) with the RTP (Department of Education and Training 2017b; Department of Education 2022a). All students in projects in the initial iteration of the Invasive Animals CRC were enrolled while the APA system was in place; however, later students were enrolled through the RTP process. The changes to the scholarship system were not vast, and similar processes were applicable under the RTP.

It is increasingly recognised, both in Australia and internationally, that the challenge of preparing the next generation of scientists must be faced by the entire profession (universities, industry and professionals in the industry) rather than just by the universities producing the graduates (McMullin et al. 2016). This shift from academic to industry-based career paths has not been met with an equivalent increase in the levels of collaboration between industry and universities in the training of students while they are still in the university system. The ACOLA report also indicated that the level of collaboration between universities and industry in Australia is among the lowest when compared with OECD competitor countries (McGagh et al. 2016, key finding 5, p. xiv).

The wide gap between what is taught at universities and what is needed by industry has been recognised in many fields (Muir and Schwartz 2009). The Invasive Animals CRC introduced its Balanced Scientist Program to help bridge this gap by providing additional training in key areas that are considered important by industry. This additional training was, and remains under the BRP, intended to build the skill sets of graduating HDR students to give them a competitive edge in seeking employment and to increase their capacity to function effectively within industry from the start without impacting on their ability to produce a high-quality doctoral research thesis.

The BRP has a secondary goal of increasing completion rates for HDR student participants. Since the program began in 2005, the average national completion rate for PhD students has been approximately 60–63% (Palmer 2012; Department of Education 2020). The most recent data shows that the average completion rate four years after enrolment (in the period supported by the RTP) is around 15%; six years after enrolment it is still less than 50%; and at nine years after enrolment, it is approximately 63% (Department of Education 2020). For master-level HDR students, the completion rate nine years after enrolment is even lower, at about 55% (Department of Education 2020). The financial investment by government, universities and industry in HDR programs is extensive; to have more than one-third of all students who start a PhD fail to complete within nine years is a large sunk cost. Increasing completion rates not only reduces this sunk cost but increases the number of graduates actively contributing to industry, research and academia.

THE BALANCED RESEARCHER MODEL

The BRP comprises a series of elements all based around a concept of what a balanced researcher actually can do, as shown in the Balanced Researcher Model. The model describes the key areas in which graduates need to develop skills and attributes for building capacity in their research careers and increasing their knowledge of the mechanisms of industry, as well as what will make them more attractive to employers when they graduate from the program. Balanced researchers will have skills in these five areas: self-awareness, teamwork, science, community sensitivity and governance (Figure 1).

Figure 1. Balanced Researcher Model around which the BRP is designed



Self-awareness

Self-awareness is considered an important quality for effective problem-solving in science, allowing conceptual exploration and acquisition of thinking skills needed for future learning (Hollingworth and McLoughlin 2001). This is referred to as metacognition, often defined as ‘thinking about thinking’ (Weinert 1987). Knowledge is considered to be metacognitive if it is actively used in a strategic manner to ensure that a goal is met. Cognitive strategies are used to help achieve a particular goal, while metacognitive strategies are used to ensure that the goal has been reached.

Highly developed metacognitive skills have been shown to promote student success (Sternberg 1998). Self-awareness has become part of the Balanced Researcher Model because metacognition encompasses everything you could come to believe about the nature of yourself and other people as cognitive processors (Flavell 1979). Courses that encourage students to examine their self and how they deal with situations are supported by the BRP.

Teamwork

Teamwork is a requirement for effective interdisciplinary research (Fiore 2008) and is important in the success of innovative projects (Hoegl and Gemuenden 2001). The social and organisational features of work have been acknowledged to be among the most critical potential factors influencing research performance among academic scientists (Fox and Mohapatra 2007).

Teamwork quality is described by six facets: communication, coordination, balance of member contributions, mutual support, effort and cohesion (Hoegl and Gemuenden 2001). Given that these aspects are important to teamwork, the Balanced Researcher Model focuses on teaching these skills to prepare people for collaboration in a teamwork environment.

Science

Students need specialised scientific methodologies to complete their current research projects, to prepare for future work in their chosen field of study and to apply scientific principles in their working life. The Balanced Researcher Model therefore supports the attendance of students at courses that teach scientific skills over and above what is learned in undergraduate work.

Community sensitivity

Scientific research, particularly in the field of invasive species management, rarely happens in isolation from stakeholders or the community at large. The Balanced Researcher Model recognises that scientists, researchers and managers need to be able to identify and respond to the human dimensions of the research and management actions they undertake. It helps them effectively interact with members of the community, understand community needs and concerns and communicate ideas and research outcomes to a wide range of audiences. The program believes that having a sound knowledge of community engagement practices, being able and willing to increase community capacity in the students’ fields of expertise and being able to interact with community members at all levels are essential skills for graduates of the program.

Governance

Governance in the balanced researcher context refers to making students more aware of the overarching organisational structure in which they participate. This means giving them an understanding of the structure, purpose, aims and policies of the organisation they are embedded in, whether that be a university, government department, industry partner or research organisation.

Effective participation in any organisation requires an understanding of the policies and procedures in these organisations. The BRP has identified ethics, work health and safety and risk management as some of these (but this is by no means an exhaustive list). For example, some graduates may end up working extensively with not-for-profit or volunteer organisations, which may require specific training in the people management skills expected by those organisations. The BRP acknowledges that this learning is essential and supports it through the four-year program.

AIMS OF THE PROGRAM

Traditional PhD programs aim to have students learn to conceive, plan and carry to completion a substantial piece of original research in a specialised area of academic study, under the supervision of a professional in the field. PhD candidates, on completion of their studies, are expected to have generated original knowledge and understanding to make a substantial contribution to their discipline and to disseminate and promote new insights to their peers and the community (Australian Qualifications Framework Council 2013). This is the base that the BRP starts from; however, it enhances and enriches the PhD experience and capabilities of the participants.

The BRP creates multiskilled industry-ready PhD graduates. It is intended that graduates from the program can enter employment on completion of their studies and actively contribute to the operational, management and research goals and outputs of their chosen workplace. The aim is to provide a comprehensive training and development program that turns out highly skilled graduates who can move between industry, government and academia, providing the vital links between these critical domains, both in Australasia and around the world. These graduates will have (1) broad knowledge of issues applicable to their discipline, (2) experience in relevant industry settings, and (3) knowledge of other disciplines and how they may interact with their chosen field.

Graduates attain a Certificate of Achievement in Research Leadership and Management detailing the additional training and experience they have gained as part of the program. We intend that graduates will be more attractive to employers and able to make a contribution to their field beyond that which would have been possible with conventional, thesis-only, training.

An additional central objective of the program is to prepare graduates for leadership roles in industry. This is accomplished by providing leadership, management, team building and communication skills in addition to the sound research training designed to improve the knowledge base upon which research decisions rest. Graduates emerging from the BRP will be fully equipped with the knowledge and skills to become key players in industry and in the future of research. The BRP helps prepare them for this challenge.

To ensure that this additional training we require our HDR students to undertake does not place an unacceptable burden on them or affect their ability to complete a quality research project, seventh and eighth semesters of scholarship and operating costs are provided to students who have completed the requirements of the program. The seventh semester stipend is funded by the RTP program, while the eighth semester stipend is fully funded by the BRP. This ensures that all participants, regardless of the university in which they are enrolled, are able to access the full four years of study and training.

A further aim of the program is to increase the completion rates for master-level and PhD students. Across all areas of study, around 30% of all students who begin HDR studies do not finish, and nearly 40% of all students who start a PhD do not finish within nine years of commencing their studies (Palmer 2012; Department of Education 2020). While this is less in the natural, physical, agriculture and environmental sciences broad areas of study, where most of the BRP students fit, our view is that this rate of non-completion is not acceptable. People enter HDR studies in the full expectation that they will be able to complete them and that they will have the appropriate support and resources to be able to do so. The BRP is designed to build the capacity of the students to complete their research project by enabling a network of peers that support each other through their experiences, to provide support to students who need it at the time they need it and to facilitate access to the training and development that students need to successfully complete their research project and submit a thesis for marking.

LEARNING OUTCOMES

Given the aims of the BRP, we expect students to achieve learning outcomes beyond that seen in standard thesis-based training. The learning outcomes in relation to the Balanced Researcher Model are outlined below, with the addition of a placement in industry, which is an essential part of the program (see section about the placement). To avoid the students simply undertaking their doctoral research programs in another location and not gaining the benefits available from spending time within an industry body, three placement-specific learning outcomes must be achieved.

Self-awareness

1. Students will be able to express knowledge, novel ideas and opinions in their professional field, both orally and in written form, with confidence and clarity.
2. Students will demonstrate advanced knowledge and professional competence in the principles and practices of project management and have the skills to be flexible and responsive to the broad range of situations that confront them in a whole-of-life context.

Team

3. Students will have the capacity to work effectively in a team environment and will have the knowledge to initiate and participate in professional collaborations.
4. Students will be able to provide constructive feedback to peers and to receive and evaluate constructive criticism from peers in their professional field.

Science

5. Students will be able to design and implement a research program, inclusive of budget, research proposal, research ethics application and timeline to completion.
6. Students will be able to express a problem in statistical terms, summarise data graphically and statistically and conduct appropriate statistical analyses relevant to their professional field.
7. Students will be able to identify intellectual property rights and comprehend the commercialisation of research process for both their own and other people's organisations.

Community awareness

8. Students will have a comprehensive understanding of the role that stakeholder and community engagement plays in building the capacity of the community to implement research outcomes.
9. Students will be able to communicate their research outputs effectively and succinctly to non-scientist community members.

Governance

10. Students will have a comprehensive understanding of the organisational and management structure of Cooperative Research Centres.
11. Students will have a critical understanding and knowledge of research ethics and obligations, including the preparation of applications for ethics boards where appropriate.

Industry placement

12. Students will be able to form a range of networks and linkages that would not normally be possible through their research projects.
13. Students will gain experiences and knowledge that would not be available to them as part of their research project and synthesise these to add further depth to their research projects or intended career paths.
14. Students will gain valuable insight into the internal mechanisms and processes of industry and be able to apply this knowledge to further their careers.

MONITORING AND EVALUATION

Inherent in any program is the need to determine whether it is fulfilling its required outcomes. This is achieved through monitoring the students as they progress through the program to submission of their thesis and graduation as well as maintaining contact and following their careers after they graduate. The measures of success should include a comparison between the submission and completion rates of students within the program against the national average of those undertaking traditional PhD programs. This can be broken down further by comparing completion rates in the broad area of science, in which the BRP operates. Similarly, the BRP completion rates can be compared to other groups with high completion rates, such as the Group of 8 universities comprising Australia's leading research-intensive universities.

Evaluating success against intended outcomes allows the BRP to evolve with the changing needs of the students, the universities they are enrolled in and the workplaces they enter after they graduate. The process for this monitoring and evaluation needs to be planned and developed when the program is designed, rather than as an ad hoc addition towards the end of the program. The approach taken by the Centre, and the Invasive Animals CRC before it, has been to conduct a longitudinal study each iteration of the program that includes both the current participants and the program alumni and compare the outcomes against past surveys to determine if the program is still achieving its aims and if it could deliver the training in a better way. The longitudinal survey and some of the outcomes of that monitoring are discussed in the section Assessing the success of the project.



IMPLEMENTING THE BALANCED RESEARCHER PROGRAM

The program begins with identifying and matching PhD projects appropriate to the goals and existing programs of the parent organisation and project that the student will be part of, together with suitable university and industry-based potential supervisors (Figure 2). This phase is critical and requires significant input from the program and project leaders to ensure that all parties agree with the proposed directions of the PhD project.

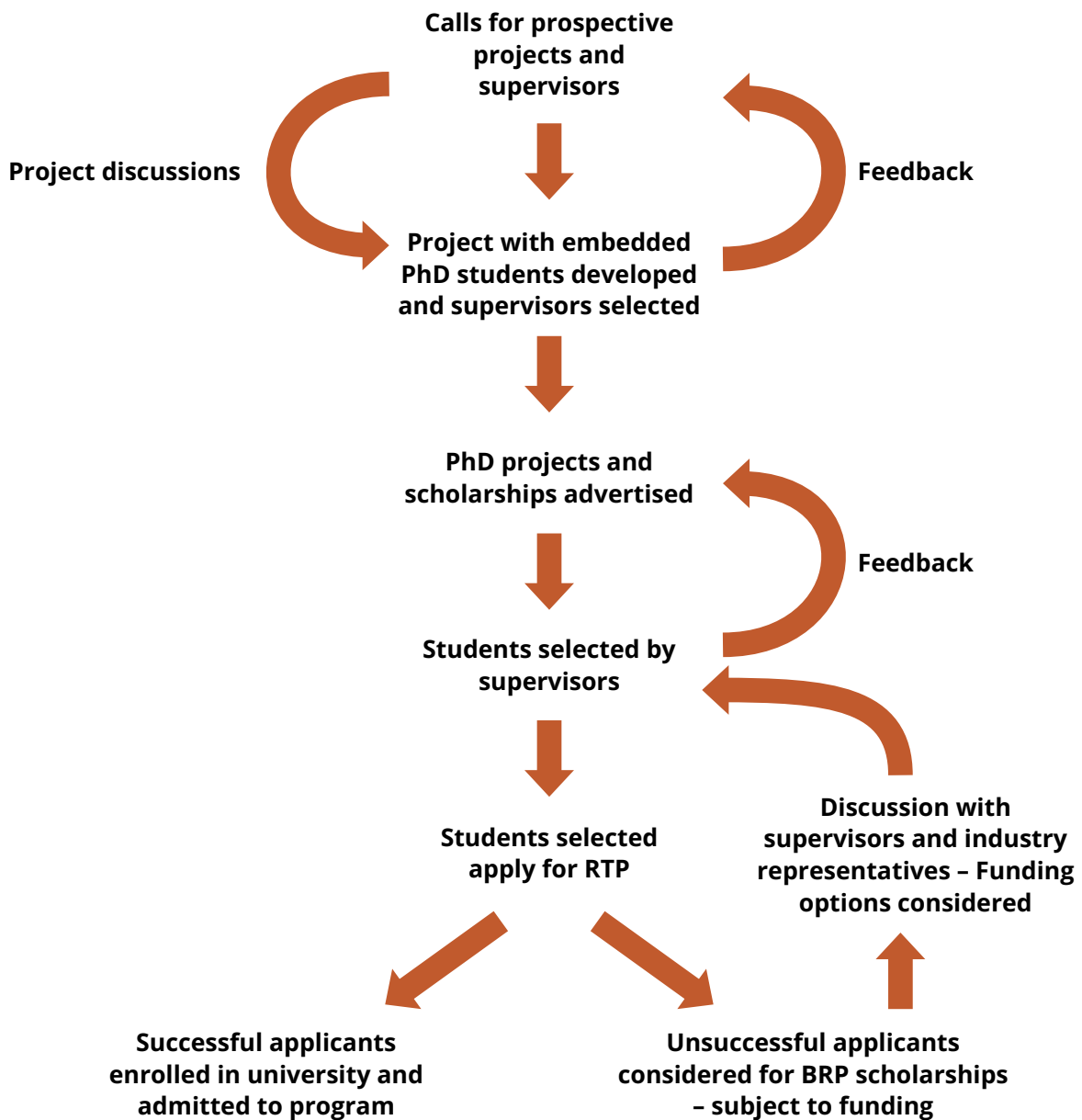


Figure 2. Process for developing PhD projects as part of the Balanced Researcher Program

Running a program such as this requires approximately a year of preparation time before the first students are enrolled (Table 1). From there, the timing is tailored to the academic year. In Australia, the cut-off for RTP scholarship applications through universities is generally 31 October, so all steps are based around this date. Some universities have different RTP application cut-off dates and it is necessary to check with the university to ensure that their application timeline can be complied with when planning the program.

FOUR-YEAR PROGRAM FRAMEWORK

As mentioned above, the average non-completion rate for postgraduate studies in Australia is significant, and 30–40% of PhDs may not finish (Martin et al. 1999; Bourke et al. 2004; Sinclair 2004; Palmer 2012; Department of Education 2022a). Factors associated with non-completion are of three broad types: (1) institutional/environmental, (2) individual supervisory arrangements, and (3) student cohorts and characteristics (Latona et al. 2001; Devos et al. 2017). Completion times in particular have been the focus of study, with the standard allotted time for an Australian PhD being three to three and a half years, although most students finish in four or more years (Bourke et al. 2004; Sinclair 2004; Department of Education 2022a).

The BRP mitigates many of the risks in relation to PhD completions by having a four-year program, including additional stipend support for candidates, as well as providing networks, mentoring and support beyond that in traditional PhD programs. The four-year framework of the program has been developed to allow additional time for PhD completion. This is especially important when the 80 days of training expected from the students is taken

into consideration and is a significant component in the high completion rate (96%) observed among BRP program participants.

PROJECTS, RECRUITING AND SUPERVISORY PANEL

Apart from through the additional stipend, potential for extended time frame and coordinated training and development program (described in more detail below), the BRP attracts students through the quality of the projects and supervision on offer. Students can undertake applied research with the potential for real-world outcomes. Many potential students are attracted by the possibilities for making a difference beyond conducting a nice piece of research.

Projects

The first step is to have appropriate PhD-scoped projects. Desired strategic topics or projects are defined in consultation with program leaders, the academic and research community, member institutions and industry representatives. These topics need to be based around the programs implemented by each organisation running the BRP. The milestones and outputs of the parent project in which the PhD is embedded cannot be reliant on the output of the PhD student, other than completion of the research thesis at the end of the project. If the outputs of the parent project do rely on the outputs of the PhD student within a given time frame, it is likely that the project requires either a technical officer or postdoctoral researcher to undertake those elements rather than a PhD student.

Undertake the call for projects and allow adequate time to receive proposals. This should occur 12 months out from the expected start date of the students (Table 1).

Table 1. Proposed minimum schedule for the implementation of the Balanced Researcher Program

PREPARATION	J	F	M	A	M	J	J	A	S	O	N	D	J/F
Solicit prospective supervisors and universities for projects													
Select projects and supervisors													
Advertise for students													
Negotiate student agreements with universities													
Interview and select students													
Students to apply for RTP or university scholarship													
Execute student agreements with university and student on award of an RTP													
Student commences studies													

Next, evaluate the project proposals involving students to ensure that the student will receive appropriate supervision, funding and opportunity to produce a rigorous research thesis and that the milestones of the parent project do not rely on the outputs from the PhD project. The projects are rated on a simple scale (1 = poor, 2 = satisfactory, 3 = excellent) against five criteria:

1. Does the proposal coincide with the objectives of the Centre and parent project in which the PhD is embedded?
2. Does the proposal have scientific rigour and sufficient depth to ensure it complies with the Australian Qualifications Framework requirements for a PhD?
3. Are appropriately experienced supervisors available to oversee the project?
4. Are the proposed supervisors appropriate for the field of study?

This then results in a score out of 12 from which all projects are ranked to determine which are to be short-listed for including a PhD and for inclusion in the BRP.

Aligned and orphan projects

Occasionally there will be a request for a PhD project to be included in the BRP that does not fall into the range of core projects being undertaken or implemented by the research organisation. These can be broken into two categories. The first, aligned projects, are those being undertaken by researcher organisations or universities that are aligned with or associated with the projects that are being undertaken by the Centre. The BRP has taken on students in all iterations that fall into the aligned project category. Funding for these students comes from a combination of the research organisation they are currently embedded in and from within the BRP as a whole.

The second category is orphan projects. These are PhD projects that do not align with the research projects being undertaken by the Centre but do fall under the broad theme of invasive species, and a specific request for the PhD student to be part of the BRP has been made either by their supervisors or host institution. The decision process to accept orphan projects into the program is complex and involves more than just the BRP leader. These requests are generally dealt with on a case-by-case basis based on the criteria detailed above, the closeness of the proposed project to the general theme of the research organisation and levels of funding available. However, blanket decisions whether to accept or refuse orphan projects can be made. As an example, in the first iteration of the Invasive Animals CRC several, but not all, requests for orphan projects that fell under the broad theme of invasive animals were accepted. In the second iteration of the CRC and in the Centre, the decision was made

not to accept orphan projects as part of the program.

The level of involvement of the aligned and orphan projects in the BRP can be altered if there is insufficient funding available to permit the full integration of the PhD student into the program. At a minimum those students should be invited to attend the student camps, giving them access to the core and group training that all participants receive and allowing them to form networks and collaborations that can help them through their PhD studies. Involvement within the program can then increase from that point, if funding permits, in stages up to full integration into the program. The BRP during the second iteration of the Invasive Animals CRC had a number of aligned students who attended the training camps and some of the additional training sessions but who were not fully integrated into the program and did not receive top-up scholarships, operating expenses or eighth semester scholarships.

During the Centre iteration of the program, it was opened up to postdoctoral researchers working in the same projects as the PhDs. No additional funding was supplied to the postdocs as stipend or operating; however, they were included in the training camps and additional training activities that were available.

Supervisory panel

Guidelines for the supervisory panel must be set to ensure uniformity of approach and parity between students, and to ensure that students can access industry knowledge and practice in their field of study.

All students in the BRP must have a supervisory panel containing at least one university-based academic supervisor and one industry-based supervisor with experience in the student's field of study. This split is recommended in the program so that there are clear industry ties available to the student through which they can look for industry placements and make valuable contacts for future work. This also allows the needs and requirements of industry, rather than just academia, to be incorporated into the PhD project as it is intended that most, if not all, of the Centre PhD project outputs will have an on-ground management or industry-based application rather than being simply a research-only process.

The university-based academic supervisor is usually the primary supervisor; however, where the student is embedded within industry rather than based at a university, the industry-based supervisor may take on the primary supervisory role. This is particularly the case where the student is embedded in another non-university research organisation such as CSIRO. All supervisors must meet the supervisory requirements of the university in which the student is enrolled.

RECRUITMENT OF PHD CANDIDATES

The role of the BRP in recruiting students is to help the supervisory panel find appropriate candidates.

ADVERTISING

To recruit the best students available, the details of the available PhD projects, the scholarships and the BRP were initially widely advertised in print or online. The general trend of moving from accessing information via hard copy to electronic copy has increased the variety of places to advertise for PhD students. As an example, in the first iteration of the Invasive Animals CRC, advertising for PhD students was mostly in the print media; for the second iteration, advertising was mostly through electronic media. An example of electronic media that can be used to advertise PhD projects is Seek PhD jobs (www.seek.com.au/PHD-jobs), Find a PhD (www.findaphd.com) and PhD portal (www.phdportal.com).

A number of these types of webpages are available, and no warranty as to their effectiveness or current legitimacy is made. It is up to those advertising the PhD positions to determine if they are suitable. Other avenues for online advertising include industry-specific online job noticeboards and partner university scholarship advertising webpages. For the Invasive Animals CRC, these included NRM Jobs (www.NRMjobs.com.au) and Green Career (www.greencareer.net.au).

While this broadscale advertising did reach a larger potential audience it also significantly increased the number of spam applications from overseas where the person applying did not meet the PhD entry requirements (Honours I or IIA degree or a master by research degree), although they were prominently shown on the advertisements. As an example, one PhD project attracted around 200 applications of which, after vetting for qualifications, only three were suitably qualified. Vetting these applications took a long time and a lot of resources, particularly as some applicants had indicated that they had degrees from universities that either did not exist or did not offer the degree that they indicated they had received, and each had to be checked and verified before accepting the application.

For the current iteration through the Centre, a more targeted advertising approach is used. Advertising through universities and having academic and industry supervisors advertise the positions through their own networks and to their current honours and master-level students has resulted in fewer applications being received; however, the number of spam applications was significantly reduced. Similarly, asking current participants and alumni of the program to pass the advertising to people in their networks also resulted in a more targeted approach.

Additional advertising is undertaken through letters sent to industry partners, through the media networks of the universities in which the students will be enrolled or other university colleagues to attract people interested in attaining a PhD. Polling current participants in the program and alumni about how they found out about their projects will also indicate the appropriate places to advertise the new projects.

Where short-listed projects are advertised individually, advertisements should provide contact details of the prospective supervisors and the leader of the BRP. This allows potential applicants to discuss the project with the supervisors and the content of the BRP with the program lead.

The approach to advertising the PhD projects should be discussed and agreed by the supervisors and partner organisations involved in the project and is likely to vary between both PhD position and iteration of the program.

APPLICATION

Prospective students interested in one or more of the projects being offered are advised to contact the listed supervisor to discuss the project and the possibility of supervision. This is an important step as it allows both the supervisors and student to determine if they are a suitable match for a supervisor/student relationship. This relationship is extremely important and is a key factor in ensuring completion of the PhD project.

If after this process the student remains interested in the project, they are asked to apply to the program through the supervisors by submitting the following information by 30 September or 31 October, depending on the university, so they can start in semester 1 of the following year. This timeline enables evaluation of the prospective students by the deadline for applications for RTP scholarships at universities. The cut-off date for applications through the program is generally two months before the deadline for applying for RTP scholarships.

- a cover letter of no more than two pages stating which project they are interested in applying for and addressing the following selection criteria:
 - suitable qualifications and an interest in research and development
 - an interest in the research topic
 - demonstrated ability to communicate in oral and written form at a variety of levels
- a curriculum vitae plus contact details of two referees
- an academic transcript
- contact details.

If a student wishes to apply for more than one project, they are asked to send separate applications for each.

RESEARCH TRAINING PROGRAM

As the requirements of the RTP scheme are subject to change, it is imperative that organisations wishing to start a PhD-enhancement program such as the BRP familiarise themselves with the requirements of the scheme as it stands at that time. The information provided in this guide, while accurate at the time of publication, should not be relied on as being accurate at the time of reading.

Description: In 2017, the Australian Government changed the way HDR scholarships were administered. The new RTP combined the previous Australian Postgraduate Award (APA) and the International Postgraduate Research Scholarship systems into a single scheme (Commonwealth Scholarships Guidelines (Research) 2017). RTP scholarships are available to both domestic and international HDR students, but a maximum 10% of scholarships through a university can be for international students. The RTP Fee Offset and RTP Allowance schemes are used for offsetting HDR tuition fees, medical insurance for international students, relocation allowances and thesis printing and binding.

Support type: Stipend, allowances and tuition fee offsets

Current value: The 2023 minimum rate is \$29,863 per year; the maximum rate is \$46,653 (Department of Education 2022b). Each university can specify the stipend paid to its PhD students within this range.

Application closing date (for a start in Semester 1 of the following year): Depends on the university but generally 30 September or 31 October

Eligibility: The awards are open to both domestic and international students who hold a bachelor degree with honours class I or IIA or master-level qualification where a significant proportion of those degrees was by research, or an equivalent qualification. Generally, applicants cannot previously have held an Australian Government Research Scholarship for more than six months, be in receipt of an equivalent award (greater than 75% of the base stipend) or have completed a degree at the same level or higher than that proposed.

SELECTION

Candidates are selected by the supervisors as RTP-competitive and suitable for the project on offer. The candidates are invited to apply for an RTP through the supervisor's university. Every effort must be made to receive an RTP as part of the condition of receiving funding from the BRP; however, receiving the scholarship is not a definitive requirement as full scholarships can be made available subject to the amount of funding available. However, the more students funded through the RTP scheme, the greater the total number of students that can be supported through the BRP. The target for the first iteration of the Invasive Animals CRC was 24 students in three intakes, while for the second iteration the target was 15 as a single intake. For the Centre, the target was initially 11 as a single intake.

The number of student intakes generally depends on the lifespan of the organisation running the program. The initial iteration of the Invasive Animals CRC (and thus the program) was seven years, which allowed for several intakes and ensured that students would most likely have finished prior to the end of the CRC. The term of the second iteration of the CRC and of the Centre was five years, so a single intake was planned to maximise students' opportunity to finish before the program ended. In an ongoing institute such as a university research centre, a similar program would be able to have ongoing intakes.

STUDENT AGREEMENTS WITH THE UNIVERSITIES

To ensure that the funding from the BRP is used appropriately and to entrench the conditions of the award into the payment of the stipend, it is essential to have an agreement between the program, the university and the student before the stipend is paid. The agreement sets out the conditions for payment of the scholarship and ensures that both the university and the student are aware of the terms of the grant of the stipend. The agreement embeds the requirement for a full eight semesters of study, the value of the stipend paid to the students, the required conditions of the RTP grant and any other conditions that are necessary to ensure that the student has the appropriate support needed for those eight semesters of study. In the case of our student agreements, intellectual property (IP) rights and use and disclosure of confidential information were also explicitly stated, as was the right of the student to maintain copyright of their research thesis.

To maintain parity between BRP participants, the student agreements were as identical as possible between universities. Some universities required slight alterations to terms so they would fit with their internal requirements. This was accomplished without reducing the terms covering the program itself and were generally administrative in nature.

There must be sufficient time in the planning process for the negotiation and execution of the agreements, given that approval by the university's legal department can take an extended period. It is imperative that these agreements are fully executed before the student commences their studies, as payment to the universities cannot occur until then. Students receiving a full scholarship will not have a stipend paid to them until the agreement is executed, and extended delays will negatively impact the student. For students receiving a top-up stipend, the impact will be less. Regardless, it is unacceptable for a student to begin their research project and not be receiving the agreed stipend.

An example of a student agreement is attached as Appendix 1.

SCHOLARSHIPS

Candidates identified for PhD positions apply at their academic supervisor's university for an RTP scholarship as well as for any available university-based scholarships (e.g. University Postgraduate Award [UPA] or university-specific scholarships based around bequests, etc.) for which they might also be eligible. Although obtaining a scholarship of this nature is not a prerequisite for entering the program, it is both good experience for the student and, if attained, saves money in the program that can then be allocated to additional scholarships. Should an excellent student be unsuccessful in obtaining an RTP or university scholarship, then the program can consider providing an RTP-equivalent scholarship, based on merit and scholarship availability, which provides a stipend for the full eight semesters (see also section on the Operational fund). Several PhD students have received full scholarships over the course of the program; however, these are in the minority as a full scholarship is expensive and the funding may be more appropriately used to pay top-up scholarships for a number of students instead of a full scholarship for a single student. The decision to award a full scholarship needs to be made on a case-by-case basis.

The BRP scholarship (full or top-up) is available to the student for six semesters (the usual length that an APA or university scholarship was available and the minimum length of an RTP Scholarship). Each candidate then has the option of obtaining an additional year (seventh and eighth semesters) of scholarship on application (see section about this extension).

Scholarship packages offered by the BRP are based on the current base amount of the RTP scholarship. The RTP scheme has a range of stipend values between a minimum and maximum value, and this must be taken into account when budgeting for the stipend for the eighth semester. If universities

are paying above the base rate of the RTP to other students to ensure parity between students within the same university, negotiations can occur to increase the rate paid by the program. In some cases, this is not necessary as the top-up scholarship takes the value of the stipend above that which they would receive from a university that is paying higher than the base rate of RTP stipend. Under the previous APA system, the scholarships were equivalent to an APA scholarship. A full scholarship (for students unsuccessful in achieving an RTP or other scholarship) is to this value.

The program also offers a top-up scholarship to all PhD students regardless of whether they secure a scholarship through their university or receive a full program-based scholarship. The top-up scholarship is offered to ensure that the scholarship value remains competitive; the RTP base rate, while indexed annually, is still well below the salary of most entry-level positions for government and industry for a person with the qualifications needed to be accepted into a PhD program, and other universities may have more attractive scholarship programs. In the initial iteration of the project, the value of the top-up was \$5,000 per year, which increased to \$7,000 during the second iteration of the CRC. The Centre now offers \$10,000 per year. The BRP pays the funds to the student's university, and the funds are then paid to the student as part of their fortnightly stipend payments.

Seventh and eighth semester extensions

BRP full PhD scholarship holders and top-up PhD scholarship holders are not automatically entitled to a fourth-year extension. They must apply for seventh and eighth semester extensions and meet specific criteria. Approval is at the discretion of the program. A key criterion is demonstrated participation and involvement in the program, including attendance at annual training camps and completion by the end of the seventh semester of at least 80 days of approved training activities in the candidate's Postgraduate Training Log (see section about the log). By the end of their seventh semester, the student must have also completed an industry placement of at least 20 days as part of their 80 days approved training. Criteria for the eighth semester extension is more stringent than that for seventh semester, as the eighth semester is fully funded by the program for all students and is considered as direct compensation for the 80 days of approved training activities that the students have undertaken as part of the program. The specific criteria for seventh and eighth semester extensions are listed below.

Seventh semester extension

To be eligible for seventh semester extension (to 3.5 years) the holder of a full PhD scholarship or top-up PhD scholarship must provide the following:

1. a letter formally requesting the extension
2. a letter of support from their primary supervisor indicating adequate progress
3. a letter or notice from their university indicating they have applied for and received a seventh semester extension on their RTP or university scholarship where available (applies to top-up scholarship holders only)
4. a timeline to completion within four years of commencing
5. up-to-date periodic reporting
6. demonstrated active involvement in the program, including participation in annual training camps, and being on track to have at least 80 days of approved training activities completed by the conclusion of the seventh semester.

Eighth semester extension

To be eligible for eighth semester extension (to four years) the holder of a full PhD scholarship or top-up PhD scholarship must provide the following:

1. a letter formally requesting the extension
2. a letter of support from their primary supervisor indicating adequate progress towards timely completion and that the supervisor believes that the student will submit their thesis for marking at or before the end of the eighth semester
3. updated timeline to completion, including thesis submission, at or before the end of the eighth semester
4. up-to-date periodic reporting
5. demonstrated active involvement in the program, including participation in annual training camps and at least 80 days of approved BRP training (including their 20 days of industry placement) completed and recorded in their Postgraduate Training Log prior to the commencement of the eighth semester.

OPERATING FUNDS

Each PhD project is allocated operating funds to allow the student to undertake their research. These funds cannot be used for stipend purposes and must be used either to help the student undertake their research or for professional development and/or training for the student. To ensure parity between students, this amount is the same for each project and is paid to the host university in six-monthly instalments. These funds complement other funding that candidates may receive from their respective home universities or other sources. There are differing requirements and amounts that students receive directly from their university as operating expenses for PhDs, and it was anticipated that the operating funds paid by the BRP would enhance those funds. Of course, the funds needed to undertake a doctoral research project vary between fields of study. As an example, a PhD project based around a computer modelling project with minimal fieldwork would generally require less operating funds than one with extensive remote fieldwork or a large number of molecular analyses to be undertaken in a laboratory. As a result, the individual projects in which the students are embedded must budget for any additional funds needed to ensure that the student can effectively undertake their research project (see also section on the Operational fund).

TRAINING BUDGETS

Candidates are also able to access additional funding to help pay for training needs (e.g. short courses, workshops, conferences, field days, work placements) they identify in their individual Postgraduate Development Plan (PDP) at the start of their candidature as relevant to their own research needs and career goals and updated throughout their candidature. This is discussed in more detail in the section about the PDP.

FUNDING

A BRP can be funded in multiple ways. The two iterations of the Invasive Animals CRC program used separate funding models for the allocation of stipend and operating funds. The Centre maintained the funding model used in the second iteration of the CRC.

2005–2012 funding model

The funding for the student top-up scholarships, operating expenses and, where relevant, full stipends came from the BRP itself. The program had an allocation of funds to support the students in their CRC projects, and this was separate from the

budgets of those projects. In this model, projects with students who were unsuccessful in obtaining an RTP or equivalent scholarship could apply to the BRP for it to fully fund the student's stipend.

Under this model, the more students who successfully obtained an RTP or similar grant, the greater the number of students who could be supported by the program. The cost to the CRC for one fully supported student was approximately three times that of a student who received an APA or equivalent stipend. This also allowed additional PhD projects to be supported over and above those initially planned for if there were fewer fully CRC-funded students than initially budgeted for.

2012–2022 funding model

In the second iteration of the CRC as well as in the Centre, the funding for the students came from the individual projects in which they operated. A project that wanted to have PhD students (fully funded or top-up) was required to budget for those expenses. If a student within a project did not successfully obtain a full RTP scholarship, the project leader could apply for additional funds. However, this was only approved in exceptional circumstances.

This second funding model limits the number of PhD students to that budgeted for in the projects and does not allow additional students to be recruited for new projects unless those new projects have sufficient budget to support a PhD student.

In both models the funding for the BRP project lead, the training camps, additional training and development was funded through the Balanced Researcher Project itself and was separate from the stipend and operating funds. This ensured that these funds could not be redirected away from their intended purpose and used, for example, to increase the number of PhD students through limiting training and development opportunities for the other program participants and ensured that the goals of the program would not be compromised through lack of funding.

Both funding models filled their intended purposes within the Invasive Animals CRC and the Centre. There are likely other funding models that could be used, and organisations intending to have a similar PhD enhancement program should not limit themselves to the two models described here.

Funding a BRP-style program is more expensive than a traditional RTP-based PhD program. There are additional costs that are not covered by the RTP, and these need to be borne by the project and the organisation running the project. Such a program cannot be expected to run within the confines of the traditional PhD program funding and 3.5 years of study model; there must be additional funding.

The costs of the additional eighth semester of stipend, the costs of eight semesters of top-up stipend and operating expenses as well as the costs of running annual camps, providing funds for additional training and industry placements are all in excess of what would be incurred in a traditional PhD program. Additionally, the provision of the program itself needs to be funded by way of a program leader and their related expenses. Initially, the BRP program leader was employed at 1 full-time equivalent (FTE); however, this has been reduced to 0.4 FTE for subsequent iterations where there are fewer students.

OPERATIONAL FUND

The operational fund is monies available to students for project costs. Initially two models were identified under which the program can administer this money.

A merit-based application model

Under this model, all students in the BRP produce a fully budgeted costing for their project. Students use this budget as the basis for an application for project operational funds. They identify in their budget where funding has been attained from outside the program and where they are requesting funding be provided by the program. Under this model the program leader is required to assess all student applications and allot money accordingly, depending on budget, student and project needs, and on any arrangements entered into with the supervisor.

A set price budget

Under this model, which was that adopted by the CRC and by the Centre, a set price was agreed by those administering the program whereby all students are awarded a sum of money to be used for operational costs. Students are then asked to provide a budget indicating where this money will be used. If additional funds are required, they are asked to obtain those funds from alternative sources including grants or their linked research project funds held at their university under the Research Training Scheme or RTP offset funds, or they need to mount a case for further support from the program that describes where additional funds have already been sought, the amount of additional funds received from those sources and the amount of funding necessary from the program.

By having the program as a 'last resort' funder for additional operating expenses, many students gained valuable experience in applying for grant funds from outside organisations. Training for applying for grant funding is provided as part of the training at the annual camps, and many students put this training into practice and successfully obtained the grants they applied for.

POSTGRADUATE DEVELOPMENT PROGRAM

The aim of the BRP is to ensure that emerging graduates are equipped with the skills required to both undertake a high-quality research thesis and to move into their chosen field after their PhD studies. To achieve this, the program uses the PDP (see section about the PDP) to focus on the development needs of the students and to identify the priority training areas that could be provided by the education program. The PDP provides a framework for the BRP and enables each student to ensure that, in addition to training deemed by the program as essential, their training activities are focused on areas that are most relevant to them.

A PDP must be received from all participants to outline both their and the program's needs and is centred on the five core areas of the program:

1. self-awareness
2. teamwork
3. science
4. community sensitivity
5. governance.

Common training needs in key skills such as leadership, communication, media awareness, grant writing, science writing, ethics, team skills and career planning are provided at the annual postgraduate training camps (see section about the camps). These skills are deemed essential for all students to possess. Depending on their previous levels of training and experience, commencing students have varying levels of these skills. Rather than separate out those students with greater skill levels, it has been beneficial to have all students undertake the training together; those with higher skill levels can support students with lower skill levels, creating bonds between the students as a group.

In addition to training provided by the program, students are encouraged to consider all possible sources of training and development. Many universities provide good training courses in some of the areas. Wherever possible, students should take advantage of these courses in conjunction with those provided by the education program. The program is designed to be flexible to enable the development of courses specifically to fit the needs of its students.

The BRP includes a budget for individual students to attend more specialised training courses if the training need has been identified in the PDP and no other source of funding support is available. When applying for these funds, students need to provide a

budget detailing the overall cost, the other sources of funding they have secured and the amount they are seeking the program to provide.

Universities differ in their allocation of training funds for postgraduates. The introduction of the RTP has resulted in the previously separate APA and RTS funds received by universities being combined into a single funding program. It is now at the discretion of individual university's policies as to the disbursement of those funds to HDR students. The funding is awarded to universities to assist them in postgraduate training but is used differently at each institution. Much of that support funding will be spent in support of student projects through the provision of supervision and more general resources, but some universities will provide direct project funding for students, and some will provide support for training in such areas as thesis writing and other useful skills. The program makes it clear that it is the responsibility of each student to find out how these funds are distributed at their particular institution and to make use of them where appropriate.

Training and development in specific areas can also be covered by hands-on work experience, and students are expected to spend at least 20 days undertaking an industry placement (see section about the placement). The term 'industry' is relatively loosely applied and can include government departments and agencies, research institutes, commercial companies, non-government organisations (NGOs) and not-for-profit companies. Some students may be closely linked with an industry partner, while others will need to identify which industry partners are most relevant to their research interests or their intended career at graduation. There are key learning outcomes that must be fulfilled as part of the industry placement to ensure that it is not simply the student undertaking their PhD research in another location. The program should help facilitate this process and assist with organising placements and funding expenses while students are on placement if necessary.

Attendance at scientific conferences is considered an important development activity. The operations budget provided to students (through their project proposal with budget) can be used (with the agreement of supervisors) to support attendance at conferences. Students' universities may also support attendance at relevant conferences to present their work. Other sources of travel funding can be found through searching online sources where grants are advertised. The program supports attendance at conferences, and students are encouraged to attend at least one Australian and one international conference to enable them to present their work and benefit from networking and potentially forming research collaborations with other scientists in their field.

THE POSTGRADUATE DEVELOPMENT PLAN

The PDP is personalised to each student and outlines the specific areas that they feel are important to their development within the five key areas of self, team, science, community sensitivity and governance. A number of subjects from each of the five areas have been designated as 'core' skills (Table 2); these are the areas of development that are essential for graduates of the program. Training in these areas is provided through residential workshops attended by all the students. It is also recognised that the allocation of these skills to a key area is only indicative and that many will cross over two or more of the key areas.

The PDP is an active document and can be updated and modified at any stage during the student's PhD. Ideally, the student should meet with their supervisor every six months to discuss their PDP, assess progress in addressing their training needs and communicate any changes to the program leader. Students and supervisors should be encouraged to do this. In the BRP, students are asked to speak with their supervisors at the end of each semester to update their PDPs and asked to submit revised plans at the end of each year or earlier if additional training is identified.

Collating PDPs from all postgraduate students allows the training program to focus on the key areas identified by students. The BRP program leader identifies those areas where additional courses may require development, areas that can be covered during the training camps and, where necessary, investigates individual courses for specialised areas of development.

How it works

Students are asked to meet with their supervisors and briefly outline their current understanding and state of knowledge for each of five attributes of a balanced scientist (as outlined in Table 2), the kind of training or development activity they feel would be most appropriate for their development both for their PhD research and for the career paths they may wish to pursue following graduation. Students and supervisors are requested, where possible, to suggest a course provider or other activity that will address this development need.

Students are asked to select skills from the columns in Table 2 to make up their PDP. With the exception of the core training areas (written in italicised uppercase), these skill lists are indicative only. Students should use only those that they feel are relevant to them and add further skills they deem necessary to their PDP as required.

The lowercase suggestions were sourced from job selection criteria to encourage students to consider which path they would like to take after their PhD studies; for example university/academia, commercial company, government, etc. It is important that program providers look into current job opportunities for their students and modify these suggestions to selection criteria that are relevant to their discipline and that they are updated to reflect the changing market.

As students identify the areas of training and development they would like to pursue, they are asked to add them to the appropriate development needs table (self, science, team, community or governance – Table 3 below). For each attribute, students are asked to briefly outline their current understanding/state of knowledge, the kind of training or development activity they feel would be most appropriate and, where possible, suggest a course provider or other activity that will address this development need. Not all attributes will be best addressed by a training course. For example, there may be some areas of development that students can address themselves by doing some background research; other areas may be covered as part of their industry placement or through undertaking volunteer activities, etc.

The completed PDP is returned to the BRP program lead so that a suitable training program can be identified for the camps and so that requests for training funding can be set against the stated aspirations and needs identified by each student.

Table 2. The five attributes of a balanced researcher and their subject areas. Subject areas written in italics are considered core areas by the BRP.

SELF	SCIENCE	TEAM	COMMUNITY	GOVERNANCE
Presentation skills	Data Analysis and Synthesis	Leadership	Stakeholder engagement	Policy
Time Management	Experimental design	Management	Capacity building	Ethical dealings
Financial management	Research methodology	Collaboration	Community interactions	Intellectual property
Project management	Writing (publications)	Team skills	Rural and regional Australia	Commercialisation
Personal communication	Writing (grant applications)	Listening	Not-for-profit organisations	Corporations/ commercial companies
Interpersonal skills	Knowledge in specific science areas (specify as many as relevant)	Supervision of students (e.g. honours, demonstrating)	Risk management	Economics
Prioritisation	Critical review skills	Project development	Environmental protection	Legal system
Motivation	Publication record	Budget management	Resource management	Government departments
Creativity/ innovation	Modelling	Managing conflicts	Agricultural extension	Local government
Driving licence	Database management	Negotiating	Social science	NGO
IT skills	Record keeping	Building teams		Work health and safety
Teaching/lecturing skills	Research ethics	Networking		
Foreign languages	Research management	Industry placement		
Career planning	Philosophy of science			
Working style	Problem-solving			
	Critical thinking			
	Current knowledge/ literature			
	Development of theoretical concepts			
	Knowledge in specific science areas (specify as many as relevant)			
	Critical review skills			
	Publication record			
	Modelling			
	Database management			
Record keeping				

Table 3. Example development needs table as provided by students. NB: the sections in italics are examples of how students may like to fill in their training needs. These tables make up their PDP. Only one example has been shown per attribute. Students would expand this to include all desired attributes/training in each of the attribute categories.

POSITIVE ATTRIBUTES	CURRENT STANDING	TRAINING NEEDS – COURSE/EXPERIENCE	SUGGESTED PROVIDER BRP/UNI
SELF			
Presentation skills	Some undergraduate training, have given presentations within the department and at one conference	Would like more formal training in presentation style	University runs a course in June each year – will enrol next year. BRP will cover this as part of residential course.
		Would like a better understanding of PowerPoint	Check university for courses/ tutorials
		Conference attendance – to present work	Need to identify a suitable conference within my research area – investigate funding opportunities
SCIENCE			
Data analysis	Good undergraduate training in statistics, but need help with advanced population dynamics and modelling	Training on use of MARK package (have agreed with supervisor that this would be the most appropriate for my data)	Training course on MARK is running in Perth in August – investigate possibility of uni covering the costs of this training as it is essential for my PhD. If not possible, contact BRP to apply for special funding or alternative course provision
TEAM			
Leadership	Have no training in this but feel it would be highly relevant	There are many different leadership courses available – the uni runs one and I will go along to that. It would be great to attend more than one course to get a feel for the different skills and strategies that are currently taught	Enrol in uni leadership course –BRP will cover leadership at training camps as well
COMMUNITY			
Stakeholder engagement	Have done some volunteer work with the local Landcare group and have linked that group with the local riparian revegetation group	Would be good to have some techniques for engaging with various community groups to enable the implementation of some of the outputs from my PhD research project in the local area	Possibly undertake the community engagement masterclass courses through CISS Community Engagement program
GOVERNANCE			
Knowledge of government environmental policy	Have touched on some aspects of this as part of the PhD but would like a better understanding of policy in invasive animal control	Probably no formal training course available in this. Check internet for information and contact BRP for guidance in this area. Look into possibility of taking up a placement in a relevant government department as part of the BRP training program	Check internet for suitable placements. Ask primary and industry supervisors/ BRP program leader for any suggested contacts

There are online skills recording and reporting resources that can be used instead of the PDP system that the BRP has used. When the program was implemented, the online resources available at that time were assessed as unsuitable for the intended application in the program because they were overly complex and could not be guaranteed to still exist at the end of the program when students would need them to present to prospective employers. It is likely that there are now potentially suitable online resources available, and these should be investigated. An assessment should be made of their ongoing availability for the duration of the program as well as afterwards to enable students to show them to employers and to update them as their skills increase through their employment.

POSTGRADUATE TRAINING LOG

Keeping track of training is important for both the program and the students. To record and track their professional, technical and vocational training activities, including industry placements, students are required to record all training and career development completed as part of the BRP, co-funded by their university or industry partner or funded entirely by outside sources in a Postgraduate Training Log (Table 4). Having 80 days recorded in the training log, including the 20 days of industry placement, during the first seven semesters of their PhD program enables candidates to qualify for the fully funded eighth semester, which provides more PhD thesis time as BRP students have given a lot of time to additional training activities.

The log also serves as a tool for building and/or enhancing a professional resume, as all the training students undertake is recorded on the reverse of their Certificate of Achievement in Research Leadership and Management. A worked example of a training log can be seen in Appendix 2.

It is the responsibility of the program leader to make sure that students are up to date with reporting on their completed training. Throughout all iterations of the program, students were asked at the end of each semester to submit their revised training logs. These records, in combination with the PDPs, help identify which training courses would best be provided on the camps. They can also help with the assessment as to whether particular courses may be suitable for recommendation to other students in the program.



Table 4. Postgraduate Training Log

POSTGRADUATE TRAINING LOG								
	Date							
Training event	From	To	No. Days	Running Total	Training provider	Source of funding	Cost	Notes
				0				
				0				
				0				
				0				
				0				
				0				
				0				
				0				
				0				
				0				

Please use this log to record all training activities. These may include university-run training courses, specialised short courses, BRP training camps, days spent on industrial placement and conference attendance. Please contact the program leader if you are unsure if an activity should be lodged here. Please forward an updated copy of this log to the program leader at the end of each semester.

NOTE: Please highlight the days you are counting towards your industry placement. You must have discussed your placement with the program leader and have it approved prior to undertaking the placement.

ANNUAL TRAINING CAMPS

A significant component of the BRP is a week-long annual training camp where specialist facilitators and program staff run intensive courses and workshops. Students are expected, where possible, to attend all of the camps that occur during their studies. Students who are not able to attend the camps are not penalised for missing a camp due to legitimate reasons. All travel and associated expenses are covered by the program.

Training in the core skills for all students is generally undertaken as part of these camps. Other content at the camps is driven by feedback from the PDPs. The program coordinators need to identify common areas for training and development and introduce these aspects into the training camp program.

Where the student intake for the program stretches over several years, there will be times where some students are not at the same level of training as the others due to entering the program later. To overcome this, the BRP has run shorter camps so these late-enrolling students can do the initial training in the core areas that their colleagues who entered the program earlier have already done. This means that at later camps, all students are at a similar level of training in the core areas.

The annual camp encourages the building of current and future collaborative networks through all-student gatherings. It provides customised training courses that are not normally available through other institutions to all students. The topics for these training courses are a combination of those considered by the BRP to be core for a balanced researcher – such as leadership skills, team building and communications skills – as well as those identified through feedback from the program participants. BRP students are encouraged to develop a professional identity associated with the CRC or the Centre and to feel they are part of a leading cohort that focuses on issues related to invasive species management.

Example camp

The BRP has held nine major camps, two minor camps and two virtual camps (see section on COVID-19) since the start of the program. One of these camps is presented here as an example.

Kioloa PhD training camp 2013

The Kioloa 2013 camp was run over seven days, with the students arriving the day before the camp began and departing the day after it ended. The camp was attended by all except one of the students enrolled at that time. The camp was also attended by several students from other projects affiliated with the CRC and four students from the Plant Biosecurity CRC. The decision to invite students from outside the program

was made to broaden the potential for networking and to help form collaborations with researchers in similar roles but outside the immediate theme of the CRC.

An objective of the training camp was to provide an opportunity for all the BRP students to meet and create networks for collaboration both now and in the future. The camp aimed to foster a sense of belonging to the program and the organisation and to understand the role of the BRP in providing training and support. At the camp, students were provided with training and development activities in key areas identified as essential in the Balanced Researcher Model. Students were also presented with an opportunity to meet some of the key players in the field of invasive species management.

Training activities were based on the core skills and competencies identified within the Balance Researcher Model, including team development and team management, personality profiles, communication, grant writing, IP, commercialisation, media skills, strategic pest management and career development. Students were also required to present their research or research proposal to their peers in a conference-like environment.

The venue

The camp was held at the Australian National University Kioloa campus on the south coast of New South Wales. This campus is set up to cater for large groups with accommodation, kitchen areas and training rooms. To ensure that participants were able to dedicate their time to the program, meals were provided by external caterers. There is good access to the internet and limited access to mobile phone reception. This ensured that while students could access needed material and were contactable in the event of an emergency, they were not distracted by calls and texts during the training program. Similarly, the students' supervisors were not permitted to attend the camp to ensure that the students were able to focus on the camp program rather than feeling they needed to keep working on their PhD research while at the camp.

The training schedule

Training activities were scheduled for each day of the camp except one and involved a mixture of externally contracted trainers, CRC staff and participants and guest speakers. Table 5 provides a summary of the scheduled training activities.

Leadership, team development and creativity/innovations

A professional workshop director (from Knowledge Teams International Pty Ltd) was employed to run these courses. He specialises in the development

of teams and leaders and research on team effectiveness. The sessions were run over several days during the training camp and covered team development, leadership, personality and interpersonal skills, assertiveness and conflict management, communication skills, creativity and innovation and emotional intelligence. The students and staff undertook a Myers-Briggs Type Indicator (MTBI) assessment prior to the camp. The results of these were discussed at the camp, as was how the differing MTBI types may impact on working relationships.

Students were divided into four groups in preparation for their team activities, which included developing an understanding of their team dynamics through a grant-writing task. The teams were predetermined by the course providers to obtain maximum team diversity and ensure that students would be working with other students they would not normally meet and interact with.

Grant writing

The grant-writing session highlighted the essential aspects of preparing a grant application and 'tricks of the trade'. This session introduced the teamwork exercise in which the groups were asked to develop a project proposal for the broad theme of managing invasive species and then apply for a grant from a fictional external funding organisation. This aspect of training was expanded on in a later camp by bringing in Dr Camilla Myers (CSIRO writing workshop facilitator) to run a one-day course and having the students apply for an actual grant provided by the program.

Intellectual property and commercialisation

The Invasive Animals CRC's Commercial Products program leader covered the important aspects of intellectual property and commercialisation both in the context of the CRC, but also to increase awareness of these issues in science in general. Much of today's research is undertaken in a commercial-in-confidence environment, and the protection and assignment of IP is an important skill for new scientists to grasp.

Guest speakers

The CEOs of the Invasive Animals CRC and the Plant Biosecurity CRC both attended the camp and gave overviews of their career paths and provided insights into the life of a scientist. Their comments on life, science and politics aimed to inspire the students to think positively about their career choices. It also gave the students the opportunity to talk with the CEOs in an informal and relaxed setting that would not normally be available to them.

(At later camps, other guest speakers attended to give insights into different career paths for the students

and to demonstrate that there are multiple career paths open to PhD researchers following graduation.)

Student presentations

Every student was required to present their research in a conference-style presentation, with each student giving a 10-minute PowerPoint presentation and responding to up to five minutes of questions following their presentation.

A panel of program providers judged the presentations and gave feedback to individual students on both their presentation content and style. The panel also awarded prizes for the best presentation and for best science communicator. The students were also assessed by their peers, who voted for the presentation they thought was the best.

Media training

Media training was provided through the media office of one of the partner universities. Students were led through the process of writing media releases and given tips and techniques for preparing for interviews. At the end of the first session, students were required to write a press release on their research project. During the second session, the students were interviewed on-camera regarding their research. The trainers gave feedback to each of the students on their interview style, and each student was given a copy of the video of their interview.

Free time

Based on feedback from students at previous camps, one day was set aside for non-teaching activities where students were free to explore beaches, go bushwalking or swimming or take whale watching cruises (at their own expense) and the like. This allowed students a break from the teaching and assisted in forming bonds between the students as they enjoyed recreational activities together.

Last evening awards session

On the last evening of the camp, an informal awards session was held following the group dinner. The prizes for the presentation session were awarded, as were other less formal prizes. During the camp, the program providers kept an eye out for unusual and humorous events and actions by the students and these were also awarded prizes.

Evaluation

At the end of the camp, participants were asked to complete an evaluation of the camp, the presenters and the types of training delivered. The evaluations were anonymous, and students were also requested to indicate areas they thought needed improving or would be valuable to include in future camps.

Conclusion

The training camp was a great success, with the training objectives being met. The student feedback was overwhelmingly positive; however, it was suggested that the camps could be shorter and that while the free time was appreciated and valuable, removing it would make the camps shorter. This contrasted with the feedback from different cohorts at previous camps who preferred the longer format with some free time included. Given that different cohorts gave contrasting feedback regarding the length of the camps and the need for a day of free time, it is likely that the duration of the camp needs to be flexible to accommodate the different needs of different student cohorts.

Table 5. Program overview from the example 2013 student camp. The days either side of the below program were travel days.

	MORNING SESSION	AFTERNOON SESSION	EVENING SESSION
Day 1	Guest speaker: CEO Invasive Animals CRC Leadership concepts	Commercialisation of research Personality preferences (MBTI)	
Day 2	Emotional quotient and personality Interpersonal skills	Research presentations	Guest speaker: CEO Plant Biosecurity CRC
Day 3	Interpersonal skills Building research teams Team formation and meetings	Media skills training	Team meetings
Day 4	Media skills training	Creativity and innovation	Team meetings
Day 5	Free time	Free time	
Day 6	Team meeting Grant applications	Team meetings Grant proposal preparation Careers in R&D and CRCs	Team meetings if required
Day 7	Proposal presentations Feedback from assessors	Team meetings Review and individual feedback from team members	Awards dinner

ADDITIONAL TRAINING

Student training needs are identified through their PDPs. By utilising both university and externally provided training courses, students can tailor their training to suit their individual research projects as well as their future career paths rather than rely on a generic, one-size-fits-all style of training.

The BRP is not designed to provide all the training that a PhD student will need to complete their doctoral research or for their future careers. Rather, it provides additional training over and above that which is already available to students. Students are actively encouraged to explore and take advantage of training that their host universities offer or that may be accessed through their industry supervisor's workplace or training and development courses run by outside organisations. All universities that have hosted BRP students to date have had internal training programs provided by their graduate research offices or equivalent units that are open to postgraduate students. These training programs include basic qualitative and quantitative statistical courses, manuscript and thesis writing workshops, software skills workshops (e.g. MS Word, MS Excel, Endnote) and GIS (geographic information systems) training. Several of the universities also allow HDR students to undertake a selected range of undergraduate courses to increase their skills without the need to pay course fees or attract HECS-HELP (Department of Education 2022c). As an example, some BRP students have completed undergraduate units in research methodology and GIS at universities in which they were enrolled. Many of these undergraduate and internally provided university courses give students a useful working knowledge in these areas that can be sufficient for their research projects. In many cases the students become proficient through using the training they received as they progress through their research project.

If training that is more specialised than introductory courses is required, or the student is unable to source a training program through their host university, the BRP can either arrange a training course if there are sufficient students requiring that training or can facilitate the student joining a training program offered by another provider. The program has provided group training at an annual camp in the statistical analysis program 'R' as there were many students who wanted training in that system. Similarly, the program has financially supported individual students' attendance at training workshops in population and landscape genetics, Bayesian modelling, bioinformatics, Spatially Explicit Capture-Recapture, analysis programs MARK and Distance, as well as attendance at advanced and remote first aid courses.

Conference attendance

A key component of postgraduate training is for students to present their work to their peers. The program actively encourages students, as a minimum, to attend and present their research outputs at one national and one international conference in their field of research. Students are encouraged to initially access conference funding through their university to attend these conferences; however, supplementary funding is provided to make up shortfalls.

In the invasives space, the Australasian Vertebrate Pest Conference is held every three years and all BRP participants are encouraged to submit abstracts to give talks or present posters at this conference. Organisers of the conference do not have separate sessions for students, so all student presentations are made alongside those that have been working in the industry for extended periods. Funding is made available for the students to attend the conference and present. It is seen as an important arena that enables students to present to their peers, gain information and ideas from others in the industry, form new networks and potentially form research collaborations for future work.

INDUSTRY PLACEMENT

One of the key components of the BRP is that, as part of their additional training, students must spend at least 20 days undertaking an industry placement. The necessity of placements within industry was a key finding of the ACOLA report (McGagh et al. 2016, key finding 6, xiv-xv). For the BRP, these 20 days form part of the 80 days additional training that students must undertake as part of the program. Students are required to have this placement completed before the end of their seventh semester.

The purpose of the industry placement is to give students experience in industry setting. In the first iteration of the program, the learning outcomes and expectations were unclear to some students with many failing to take full advantage of what a placement could offer and simply continuing their PhD work in another location. In subsequent iterations of the program, the expectations and learning outcomes were strengthened and were clearly communicated to the students and supervisors both when they began their studies and when they were planning their placements. Contact was also made with those organisations offering the placement opportunities to the students, advising them of the intended outcomes of the placement.

With up to 60% of science PhD graduates pursuing non-academic career paths, gaining experience within industry prior to graduation allows students to gain valuable insight into the mechanisms, processes and context of an industry or non-academic role. The

placements are intended to give students additional experiences, knowledge and network opportunities as well as demonstrate the importance of skills sets needed in an industry context that are not generally obtained during a traditional academic-based PhD research project.

In the BRP, the term 'industry' is used in a broad sense. For the purposes of the placement, universities, other research organisations, government departments, NGOs and private and corporate companies all fall under this generic term. This broad definition allows students to tailor their placement to their needs without being restricted just to organisations dealing with invasive species, particularly if their intended career path does not involve this as a component. For BRP students, this has allowed a broad range of placements to occur (Table 6).

The discussions about where the student should undertake their industry placement is held between the student, their supervisors and the program leaders. Students are able to take a placement either to enhance their PhD research project (i.e. learn new skills in a different setting) or to gain skills in the field of their intended career path. It needs to be reinforced to both the students and their supervisors that the placement is not to be used to conduct their PhD research project in a different location.

Once the discussions about where the placement will take place and what duties or roles the student will do and have while on the placement, the student generally makes initial contact with the hosting organisation. The program leader can make the initial contact if the student believes that approach would be more beneficial. Following the initial contact, the program leader discusses with the industry body the learning outcomes to be achieved from the placement so that all parties are aware of what is required. The learning outcomes to be achieved are:

1. Students will gain experiences and knowledge that would not be available to them as part of their research project and to synthesise these to add further depth to their research projects and/or intended career paths.
2. Students will be able to form a range of networks and linkages that would not normally be possible through their research projects.
3. Students will gain valuable insight into the internal mechanisms and process of industry and be able to apply this knowledge to further their career.

Table 6. Examples of industry placements undertaken by BRP PhD students

LOCATION OF PLACEMENT	EXAMPLES OF DUTIES UNDERTAKEN
Australia Museum	Forensic molecular ecology on illegally traded species
CABI Malaysia	Assist in preparation of annual implementation report on forest invasive species in southeast Asia
NSW NPWS	Monitor endangered native species and data analysis
Biosecurity SA	Prepare risk analyses for importation of exotic species
South African National Parks	Work with implementing continuous learning projects
Smithsonian Conservation Biology Institute	Investigate and improve fertility preservation for endangered felid species

The costs of the placement are generally borne by the program, with funding budgeted to cover expenses such as accommodation and travel to the placement if away from the student's location. Students who seek funds from the program need to submit a budget indicating their expected expenditure and how much they request from the program. If the placement costs are greater than the allocated funding, students are encouraged to seek additional funding from external sources.

Following the placement, students are requested to write a short article giving details of their placement, the duties they undertook, how it may have benefited them and, if permitted by their hosting organisation, provide a few photos they may have taken of themselves while on the placement. These articles are then published in internal and external newsletters to showcase the student's experiences, skills and benefits provided to the host organisation.

CERTIFICATE OF ACHIEVEMENT IN RESEARCH LEADERSHIP AND MANAGEMENT

When a PhD student competes at least 80 days of additional training, including their 20-day industry placement, they are awarded a Certificate of Achievement in Research Leadership and Management. This is an acknowledgment and recognition by the BRP that the student has completed all the requirements of the program. Certificates are presented, where possible, at the annual training camps or at the annual meeting of the partners and participants of the Centre. The ACOLA report indicated that there needs to be a statement recognising the additional skills and knowledge gained by HDR students across their research degree (McGagh et al. 2016, key finding 9, p. xvi). This certificate provides broader recognition of the student's accomplishments during their time with the program. The additional training each student undertakes is recorded on the reverse of the certificate, providing a record that can be shown to potential employers. An example of the Certificate of Achievement in Leadership and Research Management is shown in Appendix 3.

The certificates are not issued as an Australian Qualifications Framework (AQF) qualification. While some of the training that students receive may be eligible for AQF certification, this must be awarded by the organisation delivering and certifying the training. Similarly, the training and development undertaken vary between individual students and it is not possible to acquit all the training neatly into the existing Vocational Education Training (VET) training packages. Inquiries have been made about how to get formal recognition at a VET or higher level award for the additional training undertaken as part of the program. This has not proved feasible to date.



CORONAVIRUS DISEASE (COVID-19) PANDEMIC

The arrival of the coronavirus in Australia in January 2020 and the subsequent lockdowns and restrictions on travel and face-to-face meetings necessitated changes within the BRP. This was primarily to ensure that the health and wellbeing of the participants was maintained during the lockdowns and, secondly, that they still obtained benefit from being part of program.

In many cases, the participants' universities and research organisations closed their doors and prohibited students from attending the campus or their laboratories. In many cases, the students were living away from home and families and were then confined to their rooms or flats for extended periods with little to no contact with people. To help overcome this, the program instigated fortnightly virtual catch-ups with all participants as a group where their research was discussed. They also held other activities such as a 'journal club', discussions around an interesting manuscript that one of the participants had found, or games such as trivia. Where appropriate or requested, one-on-one virtual meetings were also held with some participants to help them through the periods of isolation. As the lockdowns became less frequent and students were allowed back on their university or research organisations camps and laboratories, these meetings were rescheduled as monthly meetings and maintained as such until the end of this iteration of the program.

The restrictions on travel and face-to-face meetings as well as the move in many industries from a full-time office-based environment to either working from home or shutting down all but essential portions of their work made organisations reluctant to take on student placements. As a result, the industry placement requirement of the program was suspended during the first nationwide lockdown. As many states and territories then had a series of rolling lockdowns, and interstate travel was prohibited for varying and extended periods during the subsequent two and a half years, the industry placement requirement was dropped from this iteration of the program.

The first training camp of the 2017–22 iteration of the program was held in February 2020, with all students being brought together for face-to-face training in leadership, team building, communication and media skills. In March 2020, the first of the nationwide COVID-19 lockdowns was implemented. To comply with travel and face-to-face meeting restrictions, the rest of the training camps were converted to virtual camps so each participant received the group training without having to travel or be in a face-to-face environment. Two virtual camps were held.

The first of these in 2021 focused on expanding the leadership and team building training started in the first camp, as well as providing a science writing component where participants were guided through writing either a manuscript for publication in a science journal or a chapter for their thesis. The virtual camp was extended to two weeks in length; however, the daily content was shortened so participants were only involved in the camp for two to three hours per day. This was implemented to prevent 'virtual burnout' from sitting in front of a monitor for six to seven hours per day.

The second virtual camp comprised only a grant-writing workshop run over several days by Camilla Myers from CSIRO. As in previous iterations, the BRP provided a grant the students could apply for; students applied to either the BRP grant or for other suitable grants as part of the camp. Details of the BRP grant are provided in Appendix 4.

Additional training opportunities outside the BRP were, for many of the students, also diminished due to COVID-19 lockdowns. Fewer training courses were held and many organisations struggled with the transition from face-to-face training to virtual training. This meant that a smaller range of training courses were available for students to attend and gain skills from. Similarly with conferences, the transition to virtual or hybrid conferences was slow, and many students missed the opportunity to travel and interact face to face with peers in their field of study.

While students were still engaged in the BRP during the COVID-19 pandemic, it was apparent that they could not obtain the same benefit from the program as students in the preceding iterations.

ASSESSING THE SUCCESS OF THE PROJECT

The last 20 years has seen increased calls for doctoral education to include more emphasis on the development of generic/transferable skills as well as skills needed when graduates enter non-academic employment (Pritchard et al. 2009; Walsh et al. 2010; Department of Education 2014; McGagh et al. 2016). Generic or transferable skills are those which all graduates should possess, and which would be applicable to a wide range of tasks and contexts beyond the university setting (Gilbert et al. 2004). The new emphasis on training PhD students in transferable skills has been caused by the aims to professionalise researchers and increase the capability of students, preparing them for careers paths other than academia and potentially multiple careers in their lifetime (Pritchard et al. 2009).

Gilbert et al. (2004) noted that training programs that focus on generic or transferable skills have become widely accepted both in Australia and overseas, yet 'given their rapid development in a relatively short period of time, it is not surprising that questions remain unanswered about the most desirable and effective form that such programs might take' (Gilbert et al. 2004).

The BRP is one such transferable skills program that prepares graduates for leadership roles in the invasive animals management industry. Students have reported that these types of training programs have a positive impact on their development and they understood its benefits (Walsh et al. 2010). It is imperative that there is continued evaluation of the BRP to assess if it has a positive impact on its participants, as well as a real and measurable impact on their studies and careers.

By undertaking a critical analysis of the benefits of additional industry and academic training for PhD students, it is possible to better tailor the BRP for the changing needs of students and their future employers over time. Three rounds of a longitudinal study of both current participants and alumni has been held to assess against the learning outcomes (see section about the outcomes) and four key questions:

1. Did the program influence students' ability to complete their degree?
2. Are the linkages offered to the students instrumental in influencing their career paths?
3. What improvements can be made to the program that will better benefit participants?
4. How should future such initiatives be designed for maximum effectiveness?

The initial contact and evaluation for these surveys is completed as an online survey of all past and current participants of the program. This has been followed by interviews of those students willing to be interviewed. The interviews consist of a broad range of questions that explore an understanding of stakeholder perceptions of the program. Their function is to clarify and explore areas of strength and where improvement is required.

For each iteration of the longitudinal study, an external social scientist has been engaged to undertake the review to ensure its independence and to minimise the risk of bias from those providing the program itself. Additionally, such assessments – especially if they are to be completed over time or to be published in some form – generally require human ethics approval. To increase the response rate, the most recent survey provided two book vouchers as an incentive to undertake the survey. To ensure fairness and separation from the program providers, these vouchers were allocated at random by the independent researcher to students who undertook the survey, regardless of how many questions they answered or the content of their answers.

The semistructured interviews are wide-ranging to allow themes that arise to be explored, but the core questions are:

- What is your overall evaluation of the BRP?
- What core skills do you think a balanced researcher needs?
- Is/did the BRP an aid in the successful completion of the PhD? If so, how? If not, why not?
- Do you think the BRP has an impact upon future employability and, if so, why?
- What are the strengths and weaknesses of the program?
- If you had the opportunity to change the program, what would you do and why?

These core questions enable a discussion around the current program and the potential for improvement and allow the students to give their opinions.

The program providers are also interviewed to give their perspective on the program and to discuss their perceptions of where its strengths and weaknesses lie. Employers of students who have graduated from the program are also invited to be interviewed by the researcher. This reveals the end-user perception of the program and its benefits for the students they have employed. Employers are also encouraged to give feedback on areas of the program they believe need modifying as well as indicate what skills they think graduates need that may not be provided by the program. This feedback is crucial to the growth and direction of the program, to ensure that it provides skills that are valued by prospective employers of graduates.

At the end of the process, the independent researcher gives a report to the program leaders. This report does not identify comments made by individual students or employers, to ensure the anonymity of the people contributing to the study. As required by the human ethics approval, all the original and identifying data collected as part of the study is retained by the independent researcher and is not available to the program managers.

OUTCOMES OF THE LONGITUDINAL STUDY

Completion rates

The national average rate of PhD completions at nine years after enrolment is approximately 60–63% (Palmer 2012; Department of Education 2020). The average rate of completions at nine years after enrolment is slightly higher across CRCs and for the Group of 8 (Go8) universities at 65% and 68% respectively (Palmer 2012; Department of Education 2020). In the broad study area of science, the completion rate is higher at 70–75% (a lower rate has been reported in some studies such as 67% reported by Jiranek [2010]). Even using the more conservative rate, it still means that at least a quarter of all students who start a science-based PhD do not finish or receive their doctorate.

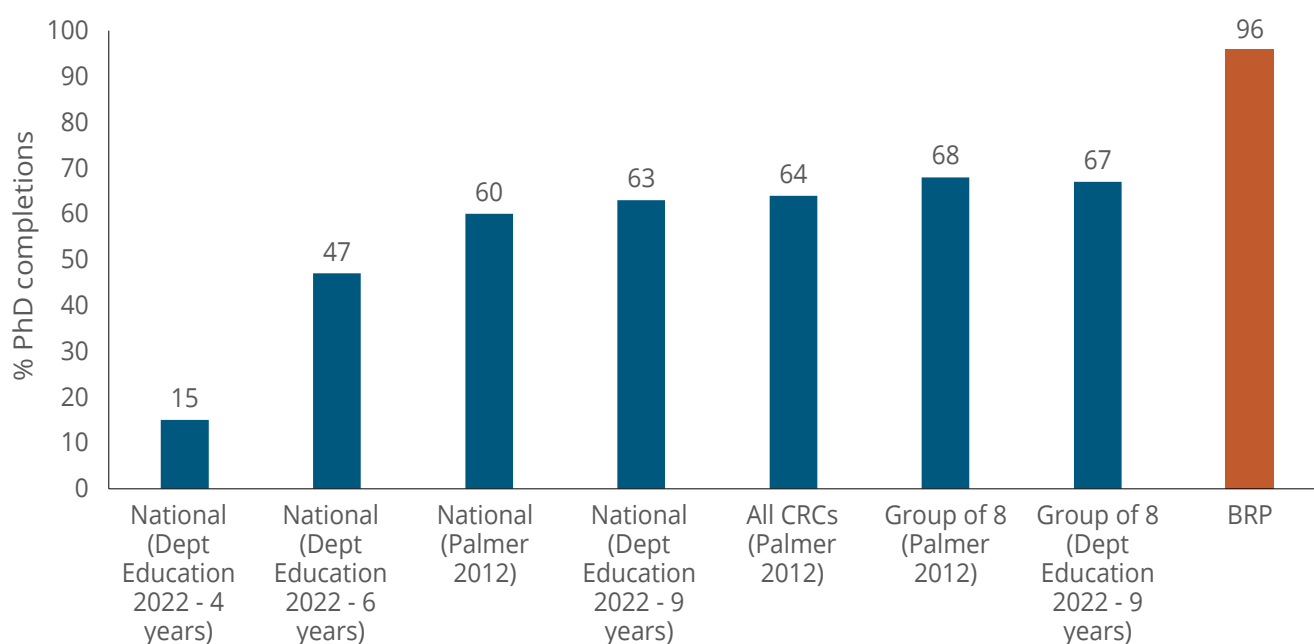
In the 2005–12 iteration of the BRP, 30 students commenced PhD studies and, since that time, 29 have submitted theses and were awarded their doctorates. The only student who did not submit a thesis for

marking withdrew from their studies due to chronic illness that precluded them from continuing their PhD studies. Of the participants in the 2012–17 iteration of the program, only one student has not submitted their thesis for marking. That student has completed the research work but has not submitted their thesis (the reason is unknown). In the latest iteration of the program (2017–22), all students who are due to have completed and submitted their theses have done so and there are only three remaining to submit. These students began their studies later in the program and are not due to submit until after the end of the current iteration. Those students are on track for submission at the time this report is prepared.

Over the three iterations of the BRP, this has resulted in a completion rate of 96% for PhD students supported by the program. This compares very favourably against the national completion rate for PhD students (Figure 3). Master-level students have a 100% completion rate within the program; however, there were far fewer of those.

Most of the BRP students submit their thesis within the four years (FTE) of the project. Nationally, only 15% of postgraduate students have completed their studies within four years of commencing their degrees. This increases to approximately 47% completing within six years of commencing their studies. It is noted that some of this for the national figures is due to full-time and part-time students being counted together, and very few students in the BRP were not full time.

Figure 3. PhD completion rates comparison for BRP. It is noted that the BRP completions are also counted in those of the preceding columns (e.g. a completion by a BRP student is also counted in the national completion figures as well as in the other rates where applicable). The years, where shown, are the number of years since commencement of study.



There are many reasons students do not complete their PhD research programs. It is recognised that not all of these can be overcome by a support or enhancement program; however, two of the primary causes are a lack of quality supervision and a lack of a supportive collegiate environment. During all three rounds of the longitudinal study, the students who had completed and been awarded their doctorates indicated that the support network provided through the program was of great importance in facilitating their successful completion (Blackman et al. 2014; Blackman and Moon 2016; Ecker 2021). Students identified the annual camps as places where they could share their ideas and discuss their issues and concerns face to face with their peers (Blackman et al. 2014).

Employment prospects

While increased employment prospects are hard to measure in a survey of program participants, the majority (75%) of students who graduated from the program indicated that it had made them more competitive for employment (Ecker 2021). It is noted that employment prospects for graduates are not linear or consistent and that, across the 18 years of the program, employment opportunities for graduates have varied. While the program cannot guarantee that graduates will find employment in their chosen field, it aims to make them more competitive for the roles that are available. Many of the graduates believe that the skills they learned are still giving them a competitive edge in employment prospects a number of years after having completed the program (Blackman and Moon 2016; Ecker 2021).

Retention in industry

Following the careers of the graduates after they leave allows the program to gauge its success at retaining graduates both within the industry and within research. However, limited data are available to compare retention within industry for graduates of the BRP against traditional PhD programs.

The BRP has a high rate of retention of graduates within the invasives industry. Approximately 40% of all graduates are still involved with managing or researching invasive species as their primary role, and a further 17% have at least part of their current role related to invasives species management. Retention within research is also very high, with 70% of all graduates still involved in research to some degree either as their primary role or as part of their role. Not all of these have remained in the invasives field, with some diverging into human disease research, threatened and endangered species research or other non-invasive species fields. Despite this, these graduates are still using the skills and techniques they learned as part of their PhD research and as part of the BRP.

Recommendations for change in the program from the study

No program is perfect for all participants, and the BRP certainly does not claim to be. One of the key factors in the success of the program is its flexibility and adaptability to suit the needs of its participants. The longitudinal study held towards the end of each iteration of the program consistently asks participants how they think the program can be changed to better suit their needs and the needs of the next cohort. These recommendations are closely examined and, where applicable and feasible, are incorporated into the next iteration of the program.

RUNNING A BRP

The BRP, or any PhD enhancement program, does not run itself. It needs to have a lead who is dedicated to developing and implementing the program and who can liaise with the universities, the students and the industry bodies, and with the primary funding body. This person is also tasked with arranging and implementing the student camps and additional training as may be required, as well as with organising and liaising with industry placement. The project lead should not be a supervisor of any of the students, within the program in order to maintain a suitable distance between the program and the supervision of the student's PhD research. This also allows the program lead to become an intermediary between the student and the supervisors if this becomes necessary.

Having a single and consistent point of contact for all these parties is essential for the successful running of the program. In the first iteration of the BRP there was a regular changeover of program leads. This led to some students beginning to disengage as there was a lack of consistency. The program lead needs to be able to build and maintain rapport and trust with the students. This can only be built over time; regular changes in program lead prevents it from being achieved. Ideally, the program lead should have a PhD so they understand what is necessary in a PhD research program being undertaken by the students and can understand the stresses of an intensive research project and thesis writing process.

There needs to be flexibility within the program to cope with changes in cohorts, trainers and the needs of different students undertaking different studies. As an example, while all BRP students were under the broad heading of invasive species management, there were students doing research in the fields of molecular ecology, virology, field-based ecology, modelling, the human dimensions of invasive species management, epidemiology, fertility control and detection of illegal trade. The range of species that the students dealt with was even larger. Attempting to have a one-size-fits-all approach to training needs and delivery is unsustainable, and the program will suffer accordingly.

The flexibility and adaptability of the BRP to fit the needs of the participants was a key component to the success of the program.

Additionally, each cohort of students is different and the program needs to be flexible enough to cope with changes in how different cohorts interact both internally with each other and externally with program and training providers. Having an agile and flexible approach to the delivery of the program allows this to happen without impacting the value of the program being delivered.

Celebrating success

Celebrating the successes of the students is essential for the program. Events such as papers published, awards received, thesis submissions and conferral of degrees (either doctoral or master) all need to be commemorated appropriately. In the BRP, these were celebrated through a combination of congratulatory group emails to the program participants advising of these important milestones and through their inclusion in internal and external newsletters.

Holding a reunion event for alumni and current participants is also a way of building networks and collaborations between the different cohorts of participants. It allows alumni to give details of their careers after leaving the program and can serve as a potential career guide for the current participants. As an example of this, the Centre recently held a Balanced Researcher Celebration event where nearly 30 past and present students attended and presented on their research and careers since graduation in a conference-like environment. A dinner followed the event, which allowed all participants in the program to talk and interact with each other and form new networks. Awards were also given at the dinner, which included both Career Development bursaries for current participants and a Distinguished Alumni Award.

Awards

Having an awards system in the project is beneficial and allows recognition of milestones and events in the participants' journeys, both through the program and after graduating from the program. Any awards system needs to recognise and celebrate the achievements of the participants of the program. It needs to be consistent across the term of the program and be well planned, with consistent requirements and judging criteria.

In the two CRC-based iterations of the program, the BRP had an annual CEO's Award for the Most Outstanding Student. The prize was \$2,000 to put towards professional development and use to help fund conference attendance, additional training courses or similar events that would enhance the student's skills or networks. All students were encouraged to apply for the award. The winner was judged by the CEO and the program lead based

on their contribution to their field of study and achievements to date in their studies, such as papers published or new techniques developed. Receipt of the award could be added to the winner's resume when applying for jobs or postdoctoral research positions after graduation. Previous winners were ineligible for subsequent awards.

To celebrate the achievements of the alumni of the program, the Distinguished Alumni Award was instigated in 2022 and was awarded at the dinner following the Balanced Researcher Celebration event. All past BRP participants were encouraged to apply. The criteria for the award were:

- Impact: evidence and scale of tangible impact and contribution the nominee has had in their profession or field of expertise
- Service: evidence the nominee is committed to reducing impact of invasive species on the Australian environment, agriculture or threatened species through their professional and/or volunteer efforts
- The Centre: the influence of their involvement with the program on their career and achievement and examples of how they have stayed involved with the Centre community.

This award was put forward by the Centre's Invasive Species Trust and awarded on the night by the chair of the Centre's board.

CONCLUSIONS

The BRP fulfils its aims and objectives by giving postgraduate researchers key transferrable skills above those generally gained in a traditional PhD. These skills help them in both finding employment and providing benefit to the industry they enter, as they do not need further training in those areas to be effective in their employment. Retention of graduates is high both within the research industry and within the invasives field, although there is little comparable data for traditional PhD programs. The BRP also creates a collegiate and supportive environment that supports participants in completing their high-quality research thesis at the same time as gaining these additional skills.

This guide to the BRP can be used as an outline for other organisations wishing to implement such a program in their fields or organisations. When the program was initially commenced by the Invasive Animals CRC, there was scant information and data on how to design, develop and implement such a program. The decisions made for, and directions taken with, the program have resulted in an effective and adaptable program than benefits both its participants and their employers once they graduate.

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APPENDIX 1. EXAMPLE SCHOLARSHIP AGREEMENT

Dated

INVASIVE ANIMALS LTD

and

NAME OF UNIVERSITY

and

NAME OF STUDENT

CENTRE FOR INVASIVE SPECIES SOLUTIONS SCHOLARSHIP AGREEMENT

SCHOLARSHIP AGREEMENT

THIS AGREEMENT is made the

BETWEEN

INVASIVE ANIMALS LTD (ABN XXXXX) of Building 22 (Innovation Building), University of Canberra, ACT, 2617 ("the Company");

AND

NAME OF UNIVERSITY (ABN XXXXXXXX) address of University ("the University");

AND

NAME OF STUDENT of address of student ("the student")

RECITALS

- A. The Company wishes to provide a research scholarship to a student enrolled at the University to participate in a project administered by the Company trading as the Centre for Invasive Species Solutions (CISS).
- B. The University wishes to maintain the enrolment of the student to undertake research and training courses, according to the rules and policies of the University, in research projects administered by the Company.
- C. The Company and the University have a common interest in assisting students undertaking research and training by combining their expertise and resources for the benefit of student research and training.
- D. The Student has submitted the Application, the Company wishes to offer, and the Student wishes to accept the Scholarship and undertake the Research Project, and the University will manage and administer the CISS Scholarship in accordance with the terms and conditions set out in this Agreement.
- E. The Company now wishes to enter into an agreement with the University and the Student regarding the Scholarship.

IT IS AGREED

1. INTERPRETATION

1.1 In this Agreement, unless the contrary intention appears:

"Activities" means all of the activities carried out by or on behalf of or under the auspices of CISS;

"Agreement" means the terms and conditions set out in this agreement and includes the attached Schedules;

"Application" means the application submitted by the Student to CISS for the Scholarship;

"CISS" means the Centre for Invasive Species Solutions which is a registered business name owned by the Company and it refers to that part of the Company which administers the research collaborations involving invasive species.;

"CISS Balanced Researcher Program leader" means the IAL employee holding that position from time to time.

"Completion" means the date of submission of the Research Thesis to the University for assessment;

"Intellectual Property" or **"IP"** includes all copyright (including rights in relation to phonograms and broadcasts), all rights in relation to inventions (including patents), plant varieties, trade marks (including service marks), designs, circuit layouts, knowhow, all other rights resulting from intellectual activity in the industrial, scientific, literary or artistic fields and any right to have confidential information kept confidential, but does not include Moral Rights or rights of performers;

"Party" means a party to this Agreement except where the context otherwise admits or requires;

"Project" means the project described in Item 2 of Schedule 1;

"Project Agreement" refers to the formal agreement titled Project Detail entered into by the Project Parties in respect of the Project;

"Project IP" means all Intellectual Property created or developed in the course of carrying out the Project; and

"Project Parties" means the parties to the Project Agreement which, for clarity, does not include the University or the Student;

"Research Project" means the research and training Activities set out in Schedule 1 and which have been approved for the Student as part of a Project, and which have been approved by the University on the basis that they are acceptable in respect of the academic qualification for which the Student is enrolled and all other Activities undertaken by the Student as part of the Project;

"Research Thesis" means the thesis to be produced by the Student as assessment for the higher research degree in which the Student is enrolled at the University;

"Scholarship" means the scholarship which is the subject of this Agreement, the terms and conditions of which are detailed in Schedule 1;

"Scholarship Conditions" means the conditions of award of the scholarship set out in Schedule 1 to this Agreement and such other rules as the Company may reasonably lay down in connection with attendance, behaviour and the conduct of the Research Project from time to time;

"Scholarship Funds" means the moneys paid by the Company to the University as the Scholarship which may include a stipend, top-up amount, operating allowance or other funding to support the Research Project or the Student, as set out in Item 2 of Schedule 1;

"Student" means the recipient of the Scholarship who is enrolled in a full-time PhD or Research Masters program at the University.

1.2 In this Agreement, unless the contrary intention appears:

- (a) monetary references are references to Australian currency;
- (b) the clause and subclause headings are for convenient reference only and have no effect in limiting or extending the language of the provisions to which they refer;
- (c) a cross-reference to a clause number is a reference to all its subclauses;

- (d) words in the singular number include the plural and vice versa;
- (e) a reference to a person includes a partnership and a body whether corporate or otherwise;
- (f) a reference to a clause, subclause or paragraph is a reference to a clause, subclause or paragraph of this Agreement;
- (g) a reference to a Schedule is a reference to a Schedule to this Agreement; and
- (h) where a word or phrase is given a particular meaning, other parts of speech and grammatical forms of that word or phrase have corresponding meanings.

2. GRANTING AND ADMINISTRATION OF SCHOLARSHIP

- 2.1 The Company grants the Student and the Student accepts the Scholarship for the Research Project on the terms and conditions set out in this Agreement and the Scholarship Conditions.
- 2.2 The University agrees to administer the Scholarship in accordance with this Agreement and the Scholarship Conditions.
- 2.3 The University will manage and administer the Scholarship in accordance with its usual procedures for administering scholarships. The University will pay the Student the Scholarship Funds as set out in Schedule 1, subject to the Student complying with the Scholarship Terms and Conditions specified at Schedule 1 and the University's policies regarding student enrolment (including disciplinary proceedings). The University will ensure that the Scholarship Funds are used only for the provision of the Scholarship and in accordance with the Scholarship Conditions.
- 2.4 The Company will provide the amount of funding to the University as set out in Schedule 1 and the University will pay the amounts to the Student within 14 days after receipt, provided the Student has made satisfactory progress.
- 2.5 The University will oversee the carrying out of the Research Project by the Student and ensure the proper and timely payment of Scholarship Funds in accordance with its usual administrative procedures and will take all reasonable steps to ensure the Student complies with all requirements of the University related to the carrying out of the Research Project which are necessary to complete the degree for which the Student has enrolled.
- 2.6 The University must use reasonable efforts to ensure that the Student observes the Scholarship Conditions and will immediately notify the Company of any breach of the Scholarship Conditions by the Student.
- 2.7 The Company may terminate or suspend payment of the Scholarship and may direct the University to cease payment of Scholarship Funds if the Student terminates or suspends his or her full-time enrolment or fails to observe the Scholarship Conditions, and the University will comply with any such decision and direction.
- 2.8 The University will advise the CISS Balanced Researcher Program Leader, and the Student agrees to allow and permits the University to notify the CISS Balanced Researcher Program Leader, within 14 days when or if the Student
 - (a) submits her/his Research Thesis for marking
 - (b) discontinues full-time enrolment
 - (c) fails to return to full-time enrolment after an approved period of leave of absence; or
 - (d) is terminated for non-compliance with the University's policies.

3. BACKGROUND INTELLECTUAL PROPERTY

- 3.1 The ownership and control of all Background IP remains with the entity that introduces it to the Research Project.
- 3.2 Subject to clauses 3.1 and 3.3, the University may permit the Student to use Background IP for the purposes of the Research Project in accordance with clause 3.5 of the Project Agreement but not otherwise without the written consent of the party that owns it.
- 3.3 With respect to Background IP, the Student agrees to comply, and the University must use reasonable efforts to ensure that the Student complies with the obligations in Schedule 2.

4. INTELLECTUAL PROPERTY RIGHTS

4.1 The Parties acknowledge that:

- (a) subject to this Agreement, copyright in the Research Thesis vests in the Student; and
- (b) other Intellectual Property arising from the Research will be treated as Project IP and will vest in the Company.

4.2 The Student agrees to comply and the University must use reasonable efforts to ensure that the Student complies with the obligations set out in Schedule 2.

4.3 The University and the Student will grant to the Company and Project Parties a non-exclusive, non-transferable, perpetual, irrevocable, royalty-free licence (excluding the right to sublicense) to use, reproduce and adapt the Research Thesis for research, education and training purposes and any purposes associated with the Activities of CISS.

4.4 Nothing in this agreement will prevent the Research Thesis from being produced and assessed in accordance with the University's normal rules and procedures provided that the University may require and arrange for the Research Thesis to be examined under conditions of confidentiality as required to protect Confidential Information, Background IP or Project IP.

4.5 The University and the Student must actively cooperate if required by the Company in the taking of any steps, including the signing of documentation, to give effect to rights granted under this clause 4.

4.6 The University and the Student must not take steps to obtain registered intellectual property protection over Intellectual Property arising from the Research Project without the prior written consent of the Company.

5. CONFIDENTIALITY AND PUBLICATION

5.1 The University and the Student acknowledge that Confidential Information may only be disclosed to and used by a Student in accordance with the obligations in Schedule 2.

5.2 Subject to this Agreement, the University or the Student may publish any material relating to the Research Project, the Project or the Activities provided that the publication of the information or material satisfies the following conditions:

- (a) it is not, in the reasonable opinion of the Company, inconsistent with the objectives of CISS or the objectives of the Project;
- (b) it is consistent with the accepted conventions of authorship and publication ethics;
- (c) it acknowledges the support of CISS, the Commonwealth and other CISS investors as appropriate;
- (d) it acknowledges CISS's role in and any contribution to the information or material;
- (e) it must not use the name of the Company, the CISS logo or the name or logo of any other party without prior consent of the relevant party;
- (f) where the publication is intended for extension purposes (for example, PestSmart guides), the author/s must first consult the Company and obtain its permission or approval as the case may require;
- (g) it must comply with Schedule 2 of this agreement; to avoid doubt, publication of the information or material must be done with due regard for the rights of an owner of any IP that is referred to, either directly or indirectly in the information or material;
- (h) it complies with the provisions of clause 6 of Schedule 2 to this agreement (Confidential Information);
- (i) it is not defamatory of any person.

Within 30 days of submission, the University or the Student must forward notification of submission for publication in writing to the CISS Balanced Researcher Program Leader with a copy of the draft information or material intended to be published.

Should either the University or the Student publish information or material which is in the opinion of the CEO of the Company in breach of this clause 5.2, the CEO of the Company shall notify the University and the Student of the following and thereafter clause 5.2 shall no longer apply to that University or Student or both (for the purposes of clauses 5.2 and 5.3, that party). Instead, if that party wishes to publish any

information or material, it shall first be subject to the permission conditions and process specified in clause 5.3.

5.3 Where the CEO of the Company has advised that clause 5.2 no longer applies to that party, if that party wishes to publish, it must, at least 30 days prior to submission for publication, forward a request in writing to the Company seeking permission to publish the information or material. That party must specify in its request any references, direct and indirect, to IP or confidential material as those terms are defined in Schedule 2 to this agreement, which are contained or referred to in the proposed publication. The Company shall not unreasonably withhold permission and may impose such conditions as it considers proper and appropriate. In considering the request, the Company will have regard to the following conditions:

- (a) publication would not be, in the reasonable opinion of the Company, inconsistent with the objectives of CISS or the objectives of the Project;
- (b) publication would be consistent with the accepted conventions of authorship and publication ethics;
- (c) the publication would acknowledge funding support through CISS, the Commonwealth and other CISS investors as appropriate;
- (d) the publication would acknowledge CISS's role in and contribution to the creation of the information or material;
- (e) whether the Company's, CISS's or any other party's name or logo would be used without prior written permission of that party;
- (f) whether the material or information would comply with Schedule 2 of this agreement; to avoid doubt, publication of the information or material must be done with due regard for the rights of an owner of any IP that is referred to, either directly or indirectly, in the information or material;
- (g) whether it would comply with clause 6 of Schedule 2 to this agreement (Confidential Information);
- (h) whether it is defamatory of any person;
- (i) such other things and matters that it considers relevant, necessary or appropriate.

The Company must notify that party of its decision within 30 days of receipt of a request. If the Company does not notify the requesting party within that period, the Company will be deemed to have given its permission for the publication.

If the Company, having regard to those matters set out in this clause 5.3, decides in its absolute discretion to approve publication, the Company will notify that party and other CISS parties of that approval and any conditions that it may decide to impose.

If the Company, having regard to those matters set out in this clause 5.3, decides in its absolute discretion not to approve publication, then the Company will notify that party of its decision, giving its reasons, and either:

suggest alterations to the publication that may influence the Company to change its decision; or

if altering the publication is impracticable, direct that party to delay the publication for a stipulated period not exceeding 18 months.

5.4 The Company acknowledges that the dissemination of knowledge is an important function of CISS Activities. Accordingly, and subject to this Agreement and in particular to clause 5.3, the Parties acknowledge that any period of restriction on the right of the Student to publish his or her research work (Protection Period) will only be such as is reasonably necessary to protect:

- (a) the Background IP;
- (b) Project IP;
- (c) Confidential Information;
- (d) any other valuable assets held by the Company.

5.5 The Protection Period will not extend beyond 18 months from the date of request to publish. If the Student so requests, the Company may, in its sole and absolute discretion, reduce the Protection Period. In making its decision, the Company shall consider:

- (a) commercial damage the Company might suffer;

- (b) reputational damage the Company might suffer;
- (c) any strategic or other reasons the Company may have that it considers may impact the Protection Period.

5.6 Nothing in this Agreement will prevent the Student or the University from providing examinable material to examiners for assessment, provided that prior to such examinable material (**material**) being disclosed to any examiner, the University must enter into agreements with all examiners who are to have access to the material that protect the confidentiality of any Background IP, Project IP or Confidential Information contained in that material.

5.7 If the Student or the University wish to promote their publication of information or material either by media, social media, email or otherwise, that party must forward a request in writing to the Company seeking permission to promote the information or material and specifying in the request any Project IP, Background IP or Confidential material, as those terms are defined in Schedule 2 to this agreement, contained or referred to in the proposed promotion. The Company will not unreasonably withhold its permission.

6. RELATIONSHIP OF THE PARTIES

The Parties agree that the University and the Student and the Company are all independent contractors and that no principal and agent relationship or partnership exists between or in respect of any of them. The Student will acknowledge CISS as her or his funding organisation in publications and presentations arising out of the Research Project.

7. WAIVER

Any waiver given by one Party to any other Party for any one or more defaults by that other Party in the performance of any of the provisions of this Agreement shall not operate or be construed as a waiver of any other default or defaults of a like or of a different character and occurring before or after such waiver.

8. APPLICABLE LAW

8.1 This Agreement shall in all respects be construed as an agreement made in the Australian Capital Territory and subject to the laws in force in the Australian Capital Territory.

8.2 In the event of any conflict, dispute or difference arising between two or more of the Parties that cannot be resolved between them, such dispute will be referred for resolution in accordance with Schedule 3.

8.3 Notwithstanding sub-clauses 8.1 and 8.2, a Party may commence legal proceedings in any court of competent jurisdiction seeking interlocutory relief, including injunction and specific performance, in the event of any alleged breach of clause 5 by any other Party.

9. NOTICES

Any notice, approval, consent, request, demand or other communication to be given to or served upon a Party shall be deemed to have been duly given or served if in writing signed for and on behalf of the Party giving or serving the notice, and either delivered by hand or sent by facsimile or similar electronic device or prepaid post to the other Party at their respective addresses, being:

in the case of the University:

Name of signatory

Role

University address

and in the case of Company:

Name of signatory

Role

Centre address

in the case of the Student:

Name of Student,

Address of student

Signed for and on behalf of the

UNIVERSITY

by:

(signature)

(name of delegate)
in the presence of:

(signature of witness)

(date)

(name of witness)

Signed for and on behalf of the

COMPANY

by:

(signature)

(name of Authorised officer)
in the presence of:

(signature of witness)

(date)

(name of witness)

Signed by the STUDENT

(signature)

(signature of witness)

(date)

(name of witness)

SCHEDULE 1

Scholarship – Specific Terms and Conditions (see clause 2.1)

1. RESEARCH PROJECT

NAME OF RESEARCH PROJECT

2. PROJECT

Description of Project

3. DATES OF AND AMOUNTS OF PAYMENT OF SCHOLARSHIP FUNDS

Paid to	Date due	Semester Number	RTP top-up or full amount	Operating amount	Total amount	Conditions of payment
Name of University	Commencement of student Sem 1, 2019	1	\$5,000	\$3,500	\$8,500	Student enrolled full time and commencement date set
Name of University	1 September 2019	2	\$5,000	\$3,500	\$8,500	Continued full-time enrolment by student
Name of University	1 March 2020	3	\$5,000	\$3,500	\$8,500	Continued full-time enrolment by student
Name of University	1 September 2020	4	\$5,000	\$3,500	\$8,500	Continued full-time enrolment by student
Name of University	1 March 2021	5	\$5,000	\$3,500	\$8,500	Continued full-time enrolment by student
Name of University	1 September 2021	6	\$5,000	\$3,500	\$8,500	Continued full-time enrolment by student
Name of University	1 March 2022	7	\$5,000	\$3,500	\$8,500	Successful grant of 7 th semester extension by CISS
Name of University	1 September 2022	8	\$20,015*	\$3,500	\$23,515*	Successful grant of 8 th semester extension by CISS
Total amount			\$55,015*	\$28,000	\$83,015*	

* Note: The RTP portion of this amount will be the base rate of the prescribed by the Department of Education and Training for an RTP scholarship at the time the payment is due. Amount shown is indicative based on 2017 amount plus indexation of 3% per annum. Please use the prescribed amount when preparing invoices.

Invoices are to be received at least 30 days prior to the due date and must note the semester for which the payment is due. Note: Amounts are per student.

Invoices should be directed to:
 Centre for Invasive Species Solutions
 UC Innovation Centre, Building 22
 University of Canberra
 BRUCE ACT 2617

or by email to finance@invasives.com.au

4. DURATION OF SCHOLARSHIP

SCHOLARSHIP COMMENCEMENT DATE: *DATE SCHOLARSHIP STARTS*

SCHOLARSHIP END DATE: *DATE SCHOLARSHIP ENDS (PROVIDED THAT SCHEDULE 1, CLAUSE 9.B. AND 9.C. EXTENSIONS ARE APPLIED FOR AND GRANTED.)*

5. THE PERSONS ASSOCIATED WITH CISS AND THE UNIVERSITY WHO WILL OVERSEE THE STUDENT FOR THE PURPOSES OF THE RESEARCH PROJECT (SUPERVISORS) (REFER ITEM 7)

Primary academic Supervisor: Supervisors name, position and university

Industry Supervisor: Industry supervisor name, position and address

Other Supervisors: Names and details of other members of supervisory panel

6. GENERAL

- 6.1 The Student's research subject area needs to align with the given Project detail.
- 6.2 The Student must comply with the terms of Schedules 2 and 3.
- 6.3 The Student is expected to participate in additional professional development and field placement/s and contribute to these as appropriate.
- 6.4 The Student is expected to join in CISS Activities and specifically to attend an annual CISS student workshop and such other student workshops as arranged. The Student is also expected to be involved in the relevant Project meetings aligned to her/his research.
- 6.5 The Student will have access to the resources of CISS and will be able to consult with CISS participants as appropriate.
- 6.6 The Student must obtain all requisite ethics approvals before commencing her/his research.
- 6.7 The Student will supply the CISS Balanced Researcher Program Leader with an electronic copy of her/his final Research Thesis both on its submission and following the Student making any corrections required by her/his examiners.

7. SUPERVISION

- 7.1 The Student's Principal Supervisor will be:
Name of primary supervisor or such other person as may be designated from time to time.
- 7.2 The Student must have a minimum number of two (2) supervisors with one from one of the non-university Project Parties (industry/end user/government) who has the relevant expertise and the other will be an academic from the University who meets the supervisory requirements of the University.

8. SCHOLARSHIP

- 8.1 The Scholarship is subject to:
 - (a) continuing satisfactory progress of the Student according to the University's policies, and
 - (b) an annual review by the Company.
- 8.2 If the Scholarship consists of a top-up award, it may not be transferred to another tertiary institute.
- 8.3 A Scholarship may transfer to another University only with the written consent of the Company and the University.
- 8.4 If the Scholarship consists of a full scholarship, the Student may not concurrently hold any other full stipend scholarship.

9. DURATION

9.1 The duration of the full-time PhD scholarship will be for up to 4 years in total, including professional development and industry placement/s and as specified below:

- (a) Duration of the Scholarship will be for up to 3 years conditional on the Student maintaining full-time enrolment at the University and subject to satisfactory progress according to the University's policies
- (b) The Company may grant the Student an initial extension of up to 6 months (seventh semester) where she or he:
 - (i) Makes written application to the Company for a seventh semester extension;
 - (ii) Has complied with all reporting commitments for the Balanced Researcher Program as specified on the Company's website (<https://invasives.com.au/research/balanced-researcher-program/>) and has been actively involved in the Balanced Researcher program including attendance at annual camps;
 - (iii) Has provided an up to date copy of her/his Postgraduate Training Log indicating that the Student is on track to complete the 80 days of additional training, inclusive of 20 days industry placement before the end of the seventh semester;
 - (iv) Provides a letter of support from her/his Principal Supervisor (as referred to in clause 7 of this Schedule 1) indicating adequate progress by the Student;
 - (v) Provides a timeline for completion to submission within 4 years of commencing her/his studies; and
 - (vi) Provides a letter of confirmation of a seventh semester extension for their Research Training Program (refer clause 15 of this Schedule 1) or similar scholarship if held.
- (g) The Company may grant the Student a further extension of up to 6 months (eighth semester) where she/he:
 - (i) Makes a written application to the Company for an eighth semester extension;
 - (ii) Has complied with all reporting commitments for the Balanced Researcher Program and has been actively involved in the Balanced Researcher Program including attendance at annual camps;
 - (iii) Has provided an up to date copy of her/his Postgraduate Training Log indicating that 80 days of additional training, inclusive of at least 20 days industry placement has been completed;
 - (iv) Provides a letter of support from her/his Principal Supervisor indicating her/his belief that the Student will submit her/his thesis for marking within the eighth semester; and
 - (v) Provides a timeline for completion, including submission of her/his thesis for marking by the end of the eighth semester.

9.2 Periods of study already undertaken towards the degree prior to the commencement of the Scholarship or undertaken during suspension of the Scholarship will be deducted from the maximum period of tenure.

10. OPERATING ALLOWANCE

10.1 An annual operating allowance of such amount as notified to the University is available to support the research program, professional development and industry placement/s as indicated below:

Operating allowance administered by the University

- (i) A general operating allowance as notified to the University and will be administered by the University will be available to cover project expenses such as consumables, vehicle usage, project and conference travel, equipment and inter-library loans.
- (ii) All expenditure is to be discussed with and agreed to by the supervisor.
- (iii) The ownership of assets purchased from the operating allowance funds administered by the University will vest in the University at the conclusion of the Research Project.

Operating Allowance administered by the Company

- (iv) A program of professional development and placement/s as discussed and agreed with CISS and supervisor will be arranged for each Student.

11. RELOCATION ALLOWANCE

- 11.1 A relocation allowance may be available to the Student if she/he is required to move from another Australian city to undertake the Research Project, or for an approved transfer, upon production of original receipts, up to an amount of \$2000 or an amount agreed by the Company prior to relocation. Application for reimbursement is to be made to the Company.
- 11.2 If the Student voluntarily relinquishes the CISS Scholarship within three months of commencement, the Company may at its discretion require a refund of all or part of the Company's financial contribution to relocation expenses.

12. TERMINATION

- 12.1 The Scholarship will terminate if the Student discontinues the full-time research studies for which it was awarded.
- 12.2 The Scholarship will terminate if the Student does not comply with the material terms of this Agreement.
- 12.3 The Scholarship will terminate if the Student does not comply with the University's policies.
- 12.4 The Scholarship will terminate at the end of the pay period in which the Research Thesis is submitted for examination or on the End Date (see Item 4), whichever is earlier.
- 12.5 The Scholarship will terminate if the Student does not resume full-time research study at the conclusion of a period of approved leave of absence or does not make arrangements for the approval of an extension to the period of leave of absence.

13. LEAVE ENTITLEMENTS

- 13.1 The Student is entitled to leave as prescribed for Research Training Program (RTP) scholarships as set out in the *Commonwealth Scholarships Guidelines (Research) 2017* as amended or revised from time to time. As a guide, at 1 December 2017 these were:
- (a) The Student is entitled to receive up to 20 working days' paid recreation leave and ten working days paid sick leave for each year of the Scholarship. These leave entitlements may be accrued over the life of the Scholarship but will be forfeited if and when the Scholarship is terminated.
 - (b) The Student is entitled to receive additional paid sick leave of up to a total of 60 working days during the duration of the Scholarship for periods of illness where the Student has insufficient sick leave entitlements available under paragraph (a), provided that a medical certificate has been provided by the Student to the University.
 - (c) Sick leave entitlements (including additional sick leave) may also be used to cover leave for the Student with family caring responsibilities, subject to the usual practice of the University.
 - (d) If the Student has completed 12 months of the Scholarship, she/he is entitled to a maximum of 60 working days paid maternity leave during the duration of the Scholarship. Subject to the usual practice of the University, paid leave may also be approved if the Student has adopted a child.
 - (e) If the Student is a partner of a woman giving birth while receiving the Scholarship and has completed 12 months of her/his Scholarship, the Student may be entitled to a period of paid parenting leave at the time of the birth or adoption, subject to the usual practice of the University.

14. LEAVE OF ABSENCE

- 14.1 The Student may apply for a break in study without stipend for personal reasons. A maximum period of up to 3 months suspension is available during the course of the Scholarship.
- 14.2 The Student may apply for a break in study without stipend if a technical difficulty hindering the satisfactory progress of the study is encountered during the course of the Scholarship. The duration of this suspension will be as agreed between the Student, the Student's Principal Supervisor and the CISS Balanced Researcher Program Leader.
- 14.3 The Student must obtain approval of suspension from the Company, the University, the Student's Principal Supervisor and the CISS Balanced Researcher Program Leader before a leave of absence is taken.

15. OVERSEAS STUDY

- 15.1 The Student may be permitted to pursue studies overseas for a limited period in order to advance the Research Project.
- 15.2 It must be demonstrated that adequate supervision can be provided.
- 15.3 The Student must remain enrolled at the University for the duration of any overseas study.
- 15.4 The duration of the overseas study must be agreed to by the Company and the University prior to departure.
- 15.5 The CISS Balanced Researcher Program leader's agreement must be obtained before departure.
- 15.6 The overseas study will be in accordance with the University's relevant policies.
- 15.7 The Student may apply for supplementary awards or scholarships related to overseas study to assist with travel expenses.

16. EMPLOYMENT

- 16.1 The Student is not required to undertake employment as part of the award.
- 16.2 The Student is expected to devote herself/himself on a full-time basis to her/his studies. The Student may, however, undertake a strictly limited amount of paid employment, provided it does not interfere with the Research Project.
- 16.3 The Student may not undertake a greater period of paid employment than 270 hours a year during normal working hours of 9.00am to 5.00pm Monday to Friday. Generally, up to 9 hours employment a week for 30 weeks is permitted.
- 16.4 Employment may only be undertaken with the permission of the CISS Balanced Researcher Program leader.

Schedule 2

ADDITIONAL INTELLECTUAL PROPERTY AND CONFIDENTIALITY TERMS AND CONDITIONS

1. DEFINITIONS

The following are definitions for the purposes of this Schedule 2 and this Agreement where used therein or as the context requires:

“Confidential Information” means information of a person that is designated by that person as confidential or which a reasonable person would regard as confidential and includes information generated as a result of the Activities designated by the Company as confidential or which a reasonable person would regard as confidential;

“Intellectual Property” or **“IP”** includes but is not limited to all copyright (including rights in relation to phonograms and broadcasts), all rights in relation to inventions (including patents), plant varieties, trade marks (including service marks), designs, circuit layouts, all other rights resulting from intellectual activity in the industrial, scientific, literary or artistic fields and any right to have confidential information kept confidential, but does not include Moral Rights or rights of performers;

“Owner” means:

- (a) in the case of Background IP, the party making it available for the Activities;
- (b) in the case of Project IP, the Company; and
- (c) in the case of Confidential Information, the owner of that information;

“Results of the Research Project” means all results and outcomes arising from the Research Project; and

“Supervisor” means the University employee that is designated as the Student’s principal supervisor for the purpose of carrying out the Research Project.

2. BACKGROUND INTELLECTUAL PROPERTY

- 2.1 The Parties agree that Background IP remains vested in the Party that makes it available for the Activities.
- 2.2 Where the Student is permitted use or access to Background IP made available by the Company or the University or a third party or to Project IP, the Student must:
 - (a) use that Background IP or Project IP only for the purposes notified by the Owner;
 - (b) keep confidential and not disclose that Background IP, Project IP or any documents or material containing or referring to that Background IP or Project IP that may prejudice the subsistence of any Intellectual Property in that Background IP or Project IP;
 - (c) comply with any restrictions on use of the Background IP or Project IP notified by the Owner;
 - (d) on the Owner’s or the Company’s or the University’s request, immediately deliver to the Owner all documents or materials containing or referring to the Background IP or Project IP that are in the Student’s possession, power or control.
- 2.3 The Parties agree that they will take all necessary steps to give each other prompt notice of any infringement of Background IP that comes to their attention.

3. INTELLECTUAL PROPERTY IN RESULTS OF THE RESEARCH PROJECT

- 3.1 Subject to clause 4.1, the Student, in consideration of the payment of the Scholarship Funds, hereby assigns to the Company all Intellectual Property in the Results of the Research Project for the purpose of vesting ownership in that Intellectual Property in the Company to be held as Project IP. This does not impact on the Student’s right to publish pursuant to clauses 5.2 and 5.3 of the Agreement.
- 3.2 The Student agrees to actively cooperate when required in the taking of any steps, including the signing of documentation, to give effect to the assignment of these Intellectual Property rights. To give effect to the rights conferred upon the Company under this Agreement, the Student appoints the CEO of the Company (**CEO**) to be his or her attorney (**Attorney**). The power of attorney given to the Attorney begins immediately upon execution of this Agreement and gives the Attorney the power, on the Student’s behalf if the Student refuses, to do anything that the Student may lawfully do by an attorney, provided that it is

for the purposes of and always subject to the terms of this Agreement.

- 3.3 The Student must not take steps to obtain registered Intellectual Property protection over all or any part of the Results of the Research Project.

4. CONFIDENTIAL INFORMATION

- 4.1 Subject to clauses 4.3 and 4.4, all Confidential Information that comes to the knowledge of the Student during the Student's involvement in the Research Project must be kept confidential and not disclosed by the Student unless written consent to release is first obtained from the Owner.
- 4.2 Where the Student is permitted use of or access to Confidential Information, the Student must:
- (a) use that Confidential Information only for the Research Project or such other purposes agreed to by the Owner in writing;
 - (b) comply with any restrictions on use of the Confidential Information notified by the Owner; and
 - (c) on the Owner's or the Company's or the University's request, immediately deliver to the Owner all documents or materials containing or referring to the Confidential Information that are in the Student's possession, power or control.
- 4.3 The Student may disclose Confidential Information:
- (a) to legal, financial or other professional advisers who have a need to know for the purposes of this Agreement only to the extent that each has a need to know and provided any such disclosure is made subject to an obligation of confidentiality; and
 - (b) to the extent required by law.
- 4.4 The obligations imposed on the Student by this clause 4 will not apply to Confidential Information which:
- (a) prior to disclosure is in the public domain or subsequent to disclosure permitted under this Agreement lawfully becomes part of the public domain; or
 - (b) is received by the Student from a third party without any obligation to hold in confidence and which has been obtained and disclosed lawfully by that third party; or
 - (c) is independently developed by the Student while having no knowledge of the Confidential Information.
- 4.5 The Student has the onus of showing that any of the above exceptions apply.
- 4.6 A combination of information will not be taken to be in the public domain merely because it contains information in the public domain.

5. SURVIVAL OF OBLIGATIONS

- 5.1 The obligations in this Schedule will survive the expiration or termination of the Student's enrolment at the University and her/his involvement in the Activities and the expulsion of the Student by the University.

SCHEDULE 3

DISPUTE RESOLUTION

NO ARBITRATION OR COURT PROCEEDINGS

- 6.1 If a dispute arises out of this Agreement (**Dispute**), a Party must comply with this Schedule 3 before starting arbitration or court proceedings (except proceedings for interlocutory relief).

NOTIFICATION

- 6.2 Any Party who claims a Dispute has arisen must give the other Party or Parties (as the case may be) to the Dispute notice setting out details of the Dispute.

PARTIES TO RESOLVE DISPUTE

- 6.3 During the 30 days after a notice is given under clause 2 (or longer period if the Party or Parties to the Dispute agree in writing), each party to the Dispute must use its reasonable efforts to resolve the Dispute and, if necessary to resolve the Dispute, involve the chief executive officers. If such Parties cannot resolve the Dispute within that period, they must refer the Dispute to a mediator if one of them requests.

APPOINTMENT OF MEDIATOR

- 6.4 If the parties to the Dispute cannot agree on a mediator within seven days after a request under clause 3, the CEO of the Company or the CEO's nominee will appoint a mediator.

ROLE OF MEDIATOR

- 6.5 The role of a mediator is to assist in negotiating a resolution of the Dispute. A mediator may not make a decision binding on a Party to the Dispute except if that Party agrees in writing.

CONFIDENTIALITY

- 6.6 Any information or documents disclosed by a Party under this Schedule 3:
- (a) must be kept confidential; and
 - (b) may only be used to attempt to resolve the Dispute.

COSTS

- 6.7 Each Party to a Dispute must pay its own costs of complying with this Schedule 3.
- 6.8 In light of the costs involved in engaging a mediator, the costs of a mediator will be met by the Company and The University on a fifty/fifty basis, even in circumstances where the mediation involves all three parties.

TERMINATION OF PROCESS

- 6.9 A party to a Dispute may terminate the dispute resolution process by giving notice to each other party after it has complied with clauses 1 to 4 hereof inclusive. Clauses 6 and 7 survive termination of the Dispute resolution process.

APPENDIX 2. EXAMPLE OF COMPLETED POSTGRADUATE TRAINING LOG

POSTGRADUATE TRAINING LOG						
Training event	No. Days	Running Total	Training provider	Source of funding	Cost	Notes
CMR workshop by Krebs & Gruber	4	4.0	U. Canberra	U. Canberra / AERG	Nil	Was good
CRC social / economic benchmarking workshop	1	5.0	CRC	CRC	Unknown	Day following CRC review in Adelaide
Modelling and program MARK workshop by Anderson and White	7	12.0	DEC (WA)	DEC(WA), CRC & DSE	Unknown	Exceptional course can recommend to CRC to run
OH&S Driver training	1	13.0	National Driver Education Pty Ltd	U. Sydney	Unknown	Safe driving techniques and emergency stopping
Principles in Ecology (2nd year) Jervis Bay field class – ran small mammal trapping field class	5	18.0	University of Canberra	U. Canberra	unknown	I designed and then ran the small mammal trapping experiment. Also marked all the assignments for the small mammal and turtle groups but not included in time allocated
Communication in Science (1st year) tutorials	3	21.0	University of Canberra	U.Canberra	unknown	Ran 11 tutorials at 2 hours each (= 22 hours = 3 days) over the semester
Lecture – Detection techniques and mammals lab session	0.5	21.5	University of Canberra	U.Canberra	Unknown	Delivered inaugural lecture on 40th birthday then ran mammals lab. Ecology and Biodiversity (2nd year)
Successful science writing and editing course	1	22.5	University of Canberra	U.Canberra	Unknown	Good course – can recommend for CRC
Statistics and Research design course	1	23.5	University of Canberra	U.Canberra	Unknown	Course did not meet expectations.
Structuring and writing the research Thesis course	0.5	24.0	University of Canberra	U.Canberra	Unknown	Needed to be science based to be more relevant but picked up a couple of points
Introduction to Project Management Course	1	25.0	University of Canberra	U.Canberra	Unknown	Excellent course. Was very useful for project

Note: This example shows an older training log as COVID significantly interrupted training in the most recent iteration of the program.

POSTGRADUATE TRAINING LOG						
Training event	No. Days	Running Total	Training provider	Source of funding	Cost	Notes
Increasing publication output course	0.5	25.5	ACU	U.Canberra	Unknown	Not bad. Too many detours and sidetracks by facilitator.
Analysis and display of quantitative data	0.5	26.0	ADFA	U.Canberra	Unknown	Good
IA CRC Canid and Felid workshop	1	27.0	IA CRC	IA CRC	Unknown	Excellent. Should be at least an annual event. Picked up a lot of contacts and methodological approaches to using my GPS collars
IACRC Wee Jasper training camp	7	34.0	IA CRC	IA CRC	Unknown	Overall was good.
Principles in Ecology (2nd year) Jervis Bay field class – ran small mammal trapping field class	5	39.0	UC	UC	Unknown	Industry placement.
Uptake program review Perth	3	42.0	IACRC	IACRC	Unknown	Excellent to see other projects and progress on demo sites. Field trip to examine mesopredator project was very useful
R training course	4	46.0	IACRC	IACRC	Unknown	Good course.
Wildlife Masters unit – Arthursleigh.	2	48.0	U.sydney	U.sydney	Unknown	Industry placement. Training for running the course next year,
Arks forum	1	49.0	DSE	DSE	Unknown	Presentation of project and some results at forum promoting Southern and Glenelg Arks to the Victorian Government
Resource Science Project. Sole supervision of 3rd year students and their project	7	56.0	Uni Canberra	Uni Canberra	Unknown	Industry placement. Was sole supervisor for 3rd year student field trip for 7 days. Supervised both their project design, data collection and analysis.
Lectures – Invasive carnivores and Herbivores – University of Sydney	4	60.0	U. sydney	Nil	Nil	Industry placement. For preparation of lectures and delivering them at University of Sydney to 2nd year Veterinary Conservation Biology students.

Note: This example shows an older training log as COVID significantly interrupted training in the most recent iteration of the program.


POSTGRADUATE TRAINING LOG						
Training event	No. Days	Running Total	Training provider	Source of funding	Cost	Notes
animal handling and darting course	3	63.0	U.sydney	U. sydney	\$825.00	Training to use firearm tranquilizer and drug administration for S4 drugs on animals.
Fenner Conference on the Environment incorporating AWMS	4	67.0	conference	U. sydney	\$300.00	Presented a talk at the conference.
Presenting cat trapping techniques presentation to NPWS	1	68.0	Industry placement	Nil	Nil	Industry placement with NSW NPWS teaching rangers how to trap cats using soft jaw traps.
Field trapping cats as training exercise for National Parks and Wildlife Service Perisher office	2	70.0	Industry placement	Nil	Nil	Industry placement with NSW NPWS teaching rangers how to trap cats using soft jaw traps.
Principles in Ecology (2nd year) Jervis Bay field class – ran small mammal trapping field class	7	77.0	Industry placement	nil	nil	Industry placement
Postgraduate camp 2	5	82.0	IACRC training	IACRC	IACRC	Training in leadership etc
AVPC Darwin	3	85.0	conference	IACRC and U. syd	Approx \$2000	Presented paper at conference
National Feral Cat workshop	0.5	85.5	workshop	nil	nil	Presented paper at workshop
Vertebrate Pest Management Unit. University of Sydney. Planning and lecture writing	6	91.5	Industry placement	U. sydney	Nil	Planning of week-long masters unit and writing lectures for the course
Vertebrate Pest Management Unit. University of Sydney. Running week-long course	5	96.5	Industry placement	U. sydney	Nil	Convening and lecturing a full unit for the Wildlife Health and Population Management course
Guest lecturing – U. Sydney	1	97.0	Industry placement	Nil	Nil	Two lectures given to Veterinary science students on invasive animals
Distance sampling workshop -Perth	3	100.0	Invasive Animals CRC	IA CRC	Approx \$3000	Excellent course. Has allowed better definition to my project and will really solidify some elements of the research

Note: This example shows an older training log as COVID significantly interrupted training in the most recent iteration of the program.

POSTGRADUATE TRAINING LOG						
Training event	No. Days	Running Total	Training provider	Source of funding	Cost	Notes
Principles in Ecology (2nd year) Jervis Bay field class – ran small mammal trapping field class	4	104.0	U. Canberra	U. Canberra	Nil	Industry placement
IACRC Kioloa annual student conference	8	112.0	IACRC	IACRC	unknown	Papers writing course / mini seminar / student love-in
Please use this log to record all training activities, these may include University run training courses, specialised short courses, CRC training camps, days spent on industrial placement and conference attendance. Please contact the Coordinator if you are unsure if an activity should be lodged here. Please forward a copy of this log to the Coordinator each time you update it with an entry. NOTE: Please highlight the days you are counting towards your Industry Placement						

Note: This example shows an older training log as COVID significantly interrupted training in the most recent iteration of the program.

APPENDIX 3: EXAMPLE CERTIFICATE OF ACHIEVEMENT IN RESEARCH LEADERSHIP AND MANAGEMENT



CENTRE FOR
INVASIVE SPECIES
SOLUTIONS

BALANCED RESEARCHER PROGRAM

Certificate of Achievement in
Research Leadership and Management

|
AWARDED TO

Student name

this XX day of XXX, 20XX

Mr Andreas Glanzrig
Chief Executive Officer

Dr Tony Buckmaster
Program Leader

Student name has completed an additional 83 days of training as part of the Balanced Researcher Program as detailed below

<p>Annual IA CRC short camp 2014</p> <ul style="list-style-type: none"> • Leadership concepts • Personality preferences and emotional intelligence • Interpersonal skills for EQ • Creativity and innovation • Team review and feedback techniques <p>Annual IA CRC training camp 2014</p> <ul style="list-style-type: none"> • Grant writing workshop (facilitated by Dr Camilla Myers CSIRO) • Science communication • Strategic media training • Social media for science • Interpersonal skills - using influence • Creativity concepts and techniques • Decision making • Leadership and influencing • Stakeholder and community engagement <p>Annual IA CRC training camp 2015</p> <ul style="list-style-type: none"> • Introduction to R <p>Annual IA CRC training camp 2016</p> <ul style="list-style-type: none"> • Science writers workshop 	<p>Conference / symposium attendance</p> <ul style="list-style-type: none"> • Genetics Society of Australia conference (2014) • <u>Neobiota</u> – 9th international conference on biological invasions, Luxembourg (2016) • 17th Australasian Vertebrate Pest Conference (2017) <p>Courses completed / Workshops attended</p> <ul style="list-style-type: none"> • <u>BC2</u> Laboratory training – University of Canberra • First Aid Training – Parasol – certificate attained • Liquid nitrogen, fume cabinet and autoclave training – University of Canberra • R training – Genetics society of Australia • R training – Australian National University • Chemical Safety training – Australian National University • SPSS training – University of Canberra • <u>EMBI</u> Resource training – Genetics Society of Australia • Excel-Fu – Intersect Australia • GIS for beginners – University of Canberra • Turbocharge your writing – University of Canberra • Using MS Word effectively – University of Canberra • Writing in the Sciences – Stanford University Online • <u>4WD</u> driver training – Sutton Road training centre • Research integrity training – University of Canberra • Chemical Safety training – University of Canberra • Nature Masterclass: Scientific writing and publishing – Springer Nature <p>Industry Placement</p> <p><i>*Student*</i> completed 20 days of industry based placement with the Centre for Agriculture and Biosciences International (CABI) – Southeast Asia.</p>
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Note: The training shown in this example is from an earlier program as COVID significantly interrupted training in the most recent iteration.

APPENDIX 4: POSTGRADUATE RESEARCH GRANT USED FOR GRANT-WRITING CAMPS

2020 CISS POSTGRADUATE RESEARCH GRANT

The 2020 Centre for Invasive Species Postgraduate Research Grant is a small research grant intended for postgraduate / postdoctoral researchers working on CISS or related research projects. The grant is to be allocated for the work of the researcher and is not for the general administration of their employer, university School or Department.

The grant will be awarded to a single postgraduate / postdoctoral researcher and the maximum amount of the grant is **AUD\$3,000.00** inclusive of GST. The size of the grant means that the CISS Postgraduate Research Grant may:

- bridge a gap in existing funding,
- be used to instigate a pilot study,
- be devoted to travel costs in the field,
- be used to purchase equipment, or
- be used for professional development (eg training courses).

Please note: the grant **cannot** be used to support or supplement travel to, or the registration costs of, conferences or workshops.

The overall objective of the grant is to provide financial support for invasive species research that will ultimately result in tangible outcomes for management. The scope of the grant is open to terrestrial, marine, freshwater or social research on animals, plants, pathogens or capacity building within communities and included projects for the prevention and/or detection of invasive species. The grant aims to draw out innovative ideas to extend or raise the impact of existing research projects. The grant must be spent within 12 months of the date of notification of the award.

Applications are due by 5pm EDST on the 18th December 2020.

Please note:

- a. Late applications cannot be accepted
- b. Applicants will be notified of the outcome of their application by the 22nd January 2021
- c. Applications will be assessed against the selection criteria by a panel comprising representatives of CISS research staff, partner organisations and/or external independent assessors.
- d. If you have any questions or require further information that is not provided in the Instructions to Applicants, please send your inquiries to tony.buckmaster@invasives.com.au

INSTRUCTIONS TO APPLICANTS

Your Proposal

You must prepare a brief proposal that explains how you want to use the grant and how it will benefit your project and to CISS. Your proposal must be a maximum of four (A4) pages (in Times New Roman font size 12 or equivalent). Please provide the following information in your proposal:

- a. Your name, address and host university / employer for your research project.
- b. Research project title and summary (<350 words).
- c. Your expenditure plan for the grant, including:
 - a description of what you want to do with the grant, including anticipated outcomes and significance,
 - a justification for how the proposed use of the grant will contribute to your research and the aims of CISS (i.e. will be a good use of CISS funds),
 - your methods and/or project design (if appropriate), and

- a timeline or schedule for the work supported by the grant.
- d. A brief budget that clearly supports your expenditure plan and represents good value for money.
- e. A brief CV demonstrating your track record of achievements relevant to your proposal.
- f. A supporting reference from your PhD supervisor highlighting how this award will contribute to your project and/or your professional development.
- g. A signed statement from your supervisor verifying that the project has been represented accurately and that the Institution is prepared to administer the award.

Proposals should be written concisely and so that a person without familiarity or specialist knowledge with the research project can evaluate it.

Selection Criteria

Applications for the CISS Postgraduate Research Grant will be assessed on the following criteria:

- Demonstrated benefit to the research project and goals of CISS
- Proposal represents good value for money
- Track record of the applicant moderated by the length of time in research (ie an early stage PhD researcher will not be expected to have the same track record of research and publication output as a late stage postdoctoral researcher)

Conditions of award

1. The grantee must provide a project report to the CISS RD&E Manager by 18th December 2021. This report should include:
 - a. An abstract of up to 400 words suitable for publication in the CISS Feral Flyer newsletter. The abstract should inform members of the nature and outcomes of the use of the grant. As there are many research disciplines in CISS, the grantee should assume limited prior knowledge on the part of readers and the abstract should be written in a relatively informal style compatible with past Feral Flyer Newsletters.
 - b. The main body of the report should include a summary of the results of the work undertaken using the grant and their significance and implications, a financial account of how the grant was spent (receipts should not be forwarded with the report, but should be retained for six months in case they are required by CISS auditors), and a statement of any publications that may arise from this support. Project reports may be posted on the CISS website.
2. The results of research supported by this award, where possible, should be published in the scientific literature.
3. The grantee must undertake to acknowledge the support provided by CISS in any publications or spoken presentations arising from the research. A copy of relevant publications or conference abstracts should be forwarded to the CISS RD&E Manager.
4. Any native animal specimens which may be collected as a result of support by the grant must be offered to an approved public (not private) zoological collection. Normally this means deposition in the collections of a State Museum.
5. Upon completion of the project, the grantee must consult with CISS about the ultimate disposition of any equipment purchased using funds from the CISS Postgraduate Research Grant. Normally such equipment will become the property of the host institution in which the work is carried out. In any case, when the grantee is not using this equipment it should be made available to others whose projects will benefit from its use.
6. Applicants must indicate that they have obtained (or will obtain) all necessary permits and animal or human ethics approval from relevant authorities to carry out the research supported by the 2020 CISS Postgraduate Research Grant. The grant will be conditional on all necessary permits being obtained before the research begins.
7. Applicants are required to be Postgraduate (Masters by research or PhD) or Postdoctoral researchers working on CISS or related research projects.

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