



Guidelines for the Balanced Scientist Program

Compiled by:
Wendy Dimond and Stephen Sarre



Invasive Animals Cooperative Research Centre



UNIVERSITY OF
CANBERRA

AUSTRALIA'S CAPITAL UNIVERSITY

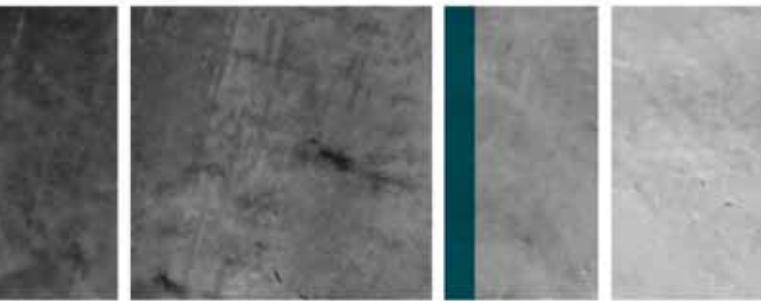


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Invasive Animals
Cooperative Research Centre
University of Canberra
Kirinari Street,
ACT 2601

2011



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Report prepared for the Education Program's project, 11.E.4 - Postgraduate Training and Development.

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Cover image: IA CRC Balanced Scientist Program PhD student Megan Barney presented with the 2009 CEOs award for excellence (Photo T. Heinsohn)

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Foreword

In developing a proposal to the Australian Government to fund a seven-year Cooperative Research Centre on Invasive Animals in 2003–2004, virtually every scientist involved felt we should “add more value” to our PhD scholars. “Adding value” sounds like we treat our students a bit too much like a commodity than a person but what we meant was that we wanted the new generation of scholars to have more skills and more confidence to make changes to our industries, our environment and in our communities.

It’s a common problem. The head of a conservation centre in an American University recently said to me that Graduate Students entered his faculty determined to make a difference to the environment, but by the time the faculty had finished with them, they were just seeking the safety of a quiet academic job somewhere. In Australia, the problem can be acute: a quiet undergraduate who has succeeded in a highly-specialised science degree can enter a PhD program that is 100% based on their technical thesis. For a few students, this won’t be a problem at all and they’ll find it natural to lead teams, give public talks or develop policy papers. Others will adapt and learn quite adequately. But all will benefit from at least some additional training and networking and this is what we have tried to deliver in The Balanced Scientist Program.

The concept is relatively simple. Over a three-four year PhD program we have encouraged students to undertake 80 days of training outside the immediate area of their PhD topic. We encourage 40 days of formal training and 40 days of experiential training; we try to ensure a “balance” of self awareness, teamwork, skills training and community sensitivity. In the formal training we provide a networking camp annually and mentoring throughout the program. Each student keeps a Professional Development Plan, tailored for them individually and we have recognised achievement of the program.

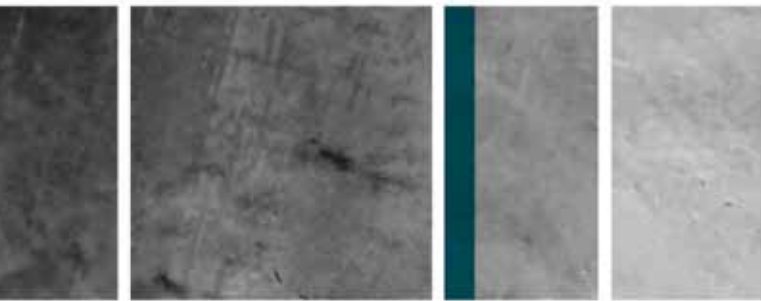
As Cooperative Research Centres by their very nature are transient organisations, they tend to employ ephemeral contract staff within their education programs. Many of these staff, including program leaders and coordinators, though often drawn from academia or the broader education sector, lack specific experience on how to set up and run various components of a CRC education program. Rather than being forced to continually reinvent the wheel with each incarnation of a new CRC, the purpose of this manual is to produce a guide, on how to set up and run an enhanced PhD program aimed at producing the next generation of leaders and industry professionals. The guiding model for this manual is the Invasive Animals CRC Balanced Scientist PhD Program in Research Leadership and Management.

This was conceived and developed by Prof. Tony Peacock, Prof. Stephen Sarre, Dr. Nina Jenkins, and Dr. Thomas Heinsohn with input from other IACRC staff and participants, the IACRC board, students, and members of the broader education and academic community, including the Institute for Applied Ecology, University of Canberra. Judging by the number of peer to peer “how to” requests received from newly appointed program leaders and coordinators, we are confident that this guide will become an invaluable tool and fill a gap within the CRC sector and broader tertiary education and R&D community.

This guide is not intended to be highly prescriptive. We expect any organisation applying the program would adapt it for their own use, but we hope that the guide provides many ideas and shortcuts. We would welcome feedback on any aspect of the program you may choose to use.

Professor Tony Peacock
Chief Executive Officer
Cooperative Research Centre Association

Former Chief Executive Officer, Invasive Animals
Cooperative Research Centre



Preface

The Education Program of the Invasive Animals Cooperative Research Centre (IA CRC) has run the Balanced Scientist Program (BSP) for postgraduate students since 2005. When we started, there was little in the way of information from previous CRCs about how to develop and coordinate these sorts of programs, or even what should be in them. We hope to remove that impediment from future CRCs and to provide a template for other postgraduate training programs. This guide has arisen from our experiences and from the feedback received from participating students. We do not aim to be prescriptive but to provide a starting point from which other organisations may create a similar beneficial experience for their students.

The BSP is a cross-institutional program, based around a single theme (invasive animals). Our students come from Universities across Australia and the UK, however this program could easily be run by the academic community for students within or across Universities. Although this program has a number of unusual features, the two that stand out for Australian academic communities are the workplace connections which are aimed at creating a lasting benefit to both the students involved and the industry partners and the thematic nature of the program (in this case invasive animals).

The BSP does require a substantial investment on the part of the institutions involved, with an active commitment in terms of time, money and people. CRCs are uniquely placed in this regard, however we believe that this commitment is worth it and will therefore be of interest to postgraduate programs outside the CRCs. We envisage a learning experience that prepares PhD graduates more fully for both academic involvement and the industry workforce which is becoming further available to them.

Professor Stephen Sarre

Education Program Leader, Invasive Animals CRC
Institute for Applied Ecology
University of Canberra

Acknowledgements

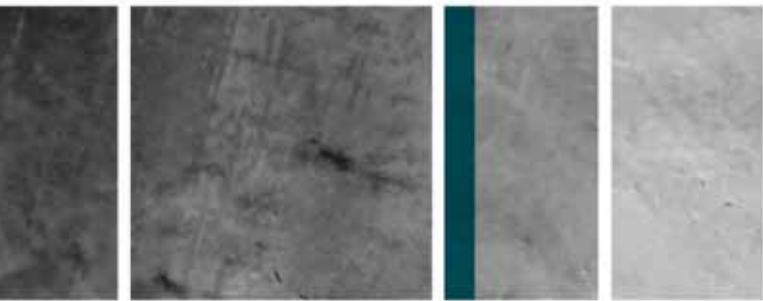
The development and production of this guide would not have been possible without the help and work of the program coordinators over the years. We especially thank Nina Jenkins, Tony Buckmaster, Tom Heinsohn and Oliver Berry who contributed many of the ideas contained within. We are also particularly grateful to Keryn Lapidge, Wendy Henderson and Glenn Conroy for their editorial comments and guidance and to Susan Duson who has contributed much to finding ways through the labyrinth that is University student funding. We also thank Dr Kirsty Bayliss (CRC for National Plant Biosecurity) and Yvette Cuningham (Cotton Catchment Communities CRC) for reviewing a draft of this guide.

Most of all, we would like to thank those students who participated in the Balanced Scientist Program. We acknowledge their critical input into the development of the training camps and feedback on the program more generally.



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Summary

The Balanced Scientist Program (BSP) prepares graduates for leadership roles in industry by providing postgraduate education opportunities outside of those traditionally available in universities. The aim is to produce market-ready, balanced and exceptional graduates, who in addition to their specialised PhD research experience, also emerge with broad skills in areas such as research leadership and management, stakeholder and community engagement, project management, innovation and development, effective communication and media awareness.

The program has several critical elements. Most important among these is the placement of students within industry, where industry includes government and non-government organisations. Students work in projects that contribute to the goals of the parent organisation while learning to conceive, plan and carry to completion a substantial piece of original research in a specialised area of academic study. They do so under the supervision of at least one industry professional, in addition to their university based, primary supervisor.

“The Balanced Scientist education program is outstanding - something from which all CRCs could learn and benefit.”

A second key component to the program is providing training for students in leadership, management, business and entrepreneurial skills. These skills complement sound research training in their chosen field and are selected, in consultation with each student, and placed within a learning plan that details 80 days of training conducted over four years. An additional six-month scholarship enables the students to commit to the training without risking their thesis completion. Students attain a Certificate in Research Leadership and Management in recognition of this training.

The program is designed to assist students to better prepare for the industry workplace, develop networks before graduation, improve employment prospects and match research efforts with industry priorities.

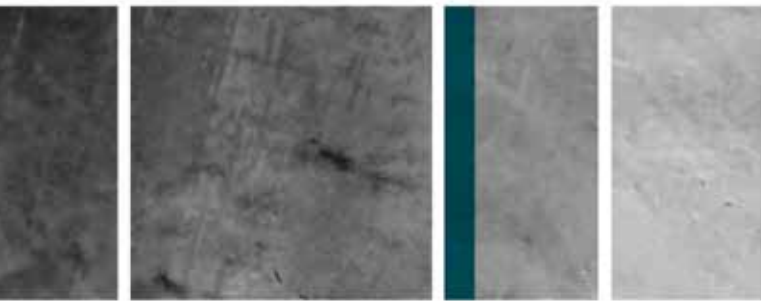
This guide details the structure for running a BSP, and draws heavily from the authors’ experiences running this program through the Invasive Animals Cooperative Research Centre (IA CRC).

“The Balanced Scientist education program is outstanding - something from which all CRCs could learn and benefit. It is attracting excellent postgraduate candidates who appreciate the value added by the CRC, which is making them better prepared both to deliver a good thesis and for their on-going training”

IA CRC third year review, December 2008

Independent review panel members

Andrew Campbell, Sharon Brown, Andrew Burbidge and Keith Steele



1 Introduction

The primary goal for the Balanced Scientist Program (BSP) is to set a benchmark for postgraduate education programs by producing multi-skilled industry-ready PhD graduates. These graduates have professional, strategic and vocational skills, knowledge, networks and contacts that go beyond those gained in a typical research based PhD program and which are acknowledged through a Certificate in Research Leadership and Management.

For graduates to function effectively in employer organisations, they must know how industry functions and the pivotal role of policy, planning and community involvement in bringing about successful solutions. Students must have skills in communication, team and project management, financial management, experimental design and analysis. They must also have a positive attitude towards the value of networking and collaboration in achieving success in an increasingly complex world, toward mobility and the value of experiencing a range of workplace environments, and toward their profession and the professional ethics that drive its integrity.

The Balanced Scientist Model

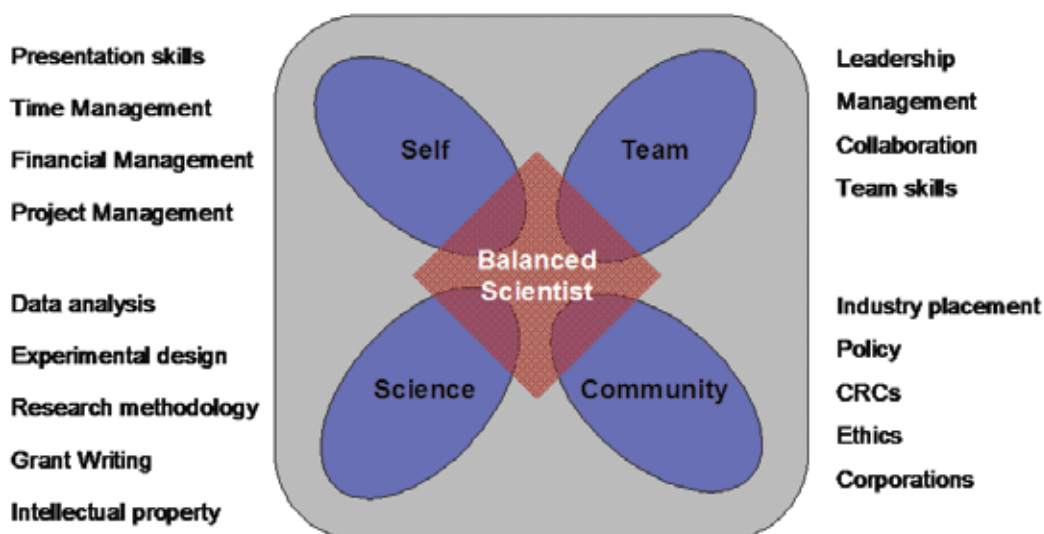
The Balanced Scientist Model is made up of four attributes considered important to helping students develop skills required to make them both better scientists and more employable. These attributes are self awareness (Self), teamwork (Team), basic science skills (Science) and community sensitivity (Community) (Figure 1).

Self awareness

Self awareness is considered an important quality for effective problem solving in science (Hollingworth and McLoughlin 2001). Self awareness allows for 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

Figure 1. Balanced Scientist Model





scientist model because metacognition encompasses everything that 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 (Figure 1).

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 scientist model focuses on teaching skills to individuals that will better prepare them for the collaborations in a teamwork environment.

Science

Specialised scientific methodologies are needed by students to allow them to complete both their current research projects, to prepare them for future work in their chosen field of study, and to guide them in the application of scientific principles in their working life. The balanced scientist model therefore supports the attendance of students at courses that teach scientific skills over and above what is learnt in undergraduate work.

The balanced scientist model recognises that although traditional PhD programs will provide for such programs of study they do not necessarily acknowledge the extra workload this requires of the student whilst completing their PhD research. To facilitate the learning of specialised scientific skills, the balanced scientist model is based on a fully funded four-year timeframe in comparison to the conventional three and a half.

Community sensitivity

Community sensitivity, in the balanced scientist context, refers to making students more aware of the community in which they participate. This means giving them an understanding of the structure, purpose or aims and policies of the university, department, industry partner or corporation in which they are embedded.

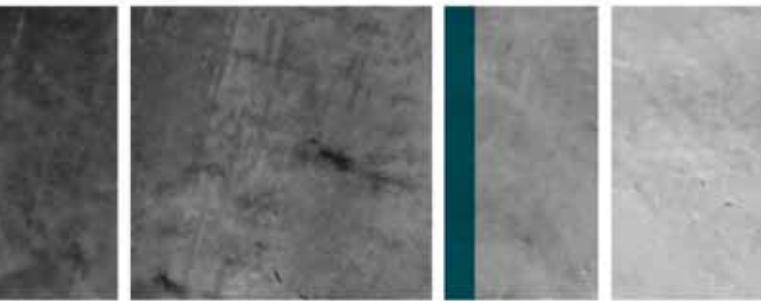
To participate effectively in any organisation whether it is academic or industry requires an understanding of the policy and procedures in these organisations. The BSP has identified ethics, occupational health and safety and risk management as some of these but this is by no means an exhaustive list. For example some students 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 BSP acknowledges this learning and supports it through its four year program.

Aims of the Balanced Scientist Program

Our aim is to provide comprehensive training and development programs for postgraduate students that result in highly-skilled graduates with a broad knowledge of issues applicable to their discipline and experience in industry settings relevant to their area of expertise.

Our goal is to produce graduates that can move between industry and academia providing the vital links between these critical components of the infrastructure of Australasia. Graduates from this program attain a Certificate in Research Leadership and Management and will be, we hope, more attractive to employers and able to make a contribution to their field of research beyond that which would have been possible with conventional, thesis-only based training.

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. In so doing, the candidate



is expected to extend their chosen field of study by contributing to knowledge in that field or by reworking existing knowledge to provide new insights.

An additional central objective of the BSP is to prepare graduates for leadership roles in industry. This is accomplished by providing leadership, management, business and entrepreneurial skills, in addition to the sound research training designed to improve the knowledge base upon which research decisions rest. These additional educational opportunities are accommodated by funding students into a fourth year of study.

In this way, graduates emerging from the BSP will be fully equipped with the knowledge and skills to take up key positions in research and industry. These individuals will likely become key players in the future of research and the BSP training program will have prepared them for this challenge.

“Graduates emerging from the BSP will be fully equipped to take up key positions in research and industry”

Learning outcomes

Given the aims of the program, we expect students to achieve learning outcomes beyond that seen in standard thesis-based training. We outline these below in relation to the Balanced Scientist Model.

Self

BSP 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.

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

Students will have the capacity to work effectively in a team environment and will have the knowledge to initiate and participate in professional collaborations.

Students will be able to provide constructive feedback to peers and to be able to receive and evaluate constructive criticism from peers in their professional field.

Science

Students will be able to design and implement a research program, inclusive of budget, research proposal, research ethics application and timeline to completion.

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.

Students will be able to identify intellectual property rights and comprehend the commercialisation of research process for both their own, and other organisations.

Community

Students will have a comprehensive understanding of the organisational and management structure of Cooperative Research Centres.

Students will have a critical understanding and knowledge of research ethics and obligations including the preparation of applications for ethics boards where appropriate.

Monitoring and evaluation

Inherent in any program is the need to determine whether it is fulfilling its goals. This is achieved through monitoring students as they progress through the program and following their careers after they graduate. The measures of success should include a comparison of the submission and completion rates of BSP students against the national averages.



Evaluating the success of the program against its intended outcomes allows the program to evolve with the changing needs of both the students and the workplace they are entering after they graduate. The process for this to occur needs to be developed at the time the program is designed rather than as an *ad hoc* addition towards the end of the program. The approach adopted by the IA CRC is covered in Section Nine.

Implementing the Balanced Scientist Program

The BSP assists students through a structured training and development program in which students are helped to engage with industry partners through collaborations and strategic placements.

The program begins through the identification and matching of PhD projects appropriate to the goals and existing programs of the parent organisation and with suitable university and industry based supervisors (Figure 2). This phase is critical and requires significant input from the Balanced Scientist Program Leader to ensure that all parties are in agreement with the proposed project directions.

Students are selected for each of the projects following advertisement. In the case of the IA CRC, this enabled bulk advertisements to be issued with web-based links to potential projects and supervisors. Students selected through this process, were invited to apply for an Australian Postgraduate Award (APA), or similar, scholarship and, if successful, received an offer from the IA CRC to join the BSP. Students unsuccessful in their application for an APA, were then considered for a full CRC scholarship on the basis of merit and subject to available funding. The program then supports the students through a four year (eight semester) program with the final semester fully funded by the program.

As a condition of involvement in the program, students develop a fully budgeted project proposal which is used as the basis for the allocation of operational funds. These funds complement other funding that candidates may receive from their respective home universities or other sources.

An additional BSP training budget is also made available and is accessed on a case by case basis through application against training needs identified in advance by the student in a Postgraduate Development Plan (PDP) completed at the beginning of their candidature and updated throughout their candidature. These additional training funds support attendance at short training courses, workshops, field days, seminars, conferences, and industry placements considered relevant to the candidates own aspirations.

The PDP logs all training completed by the student as part of the BSP. This includes the industry placement required as part of the BSP. Students who complete 80 days of training, including their industry placement, are awarded a Certificate in Research Leadership and Management.

The BSP also provides a yearly camp, which all students are expected to attend. The camp includes a symposium for students to present and share their work and provides customised training courses that are not normally available through the students host institutions. The topics for these training courses are identified through feedback from PhD candidates.

Running a BSP requires approximately one year's preparation time before the first students are enrolled (Table 1). This timing is tailored to the academic year; in Australia the cut off for APA scholarship applications is 31 October and so all steps are based around this date.

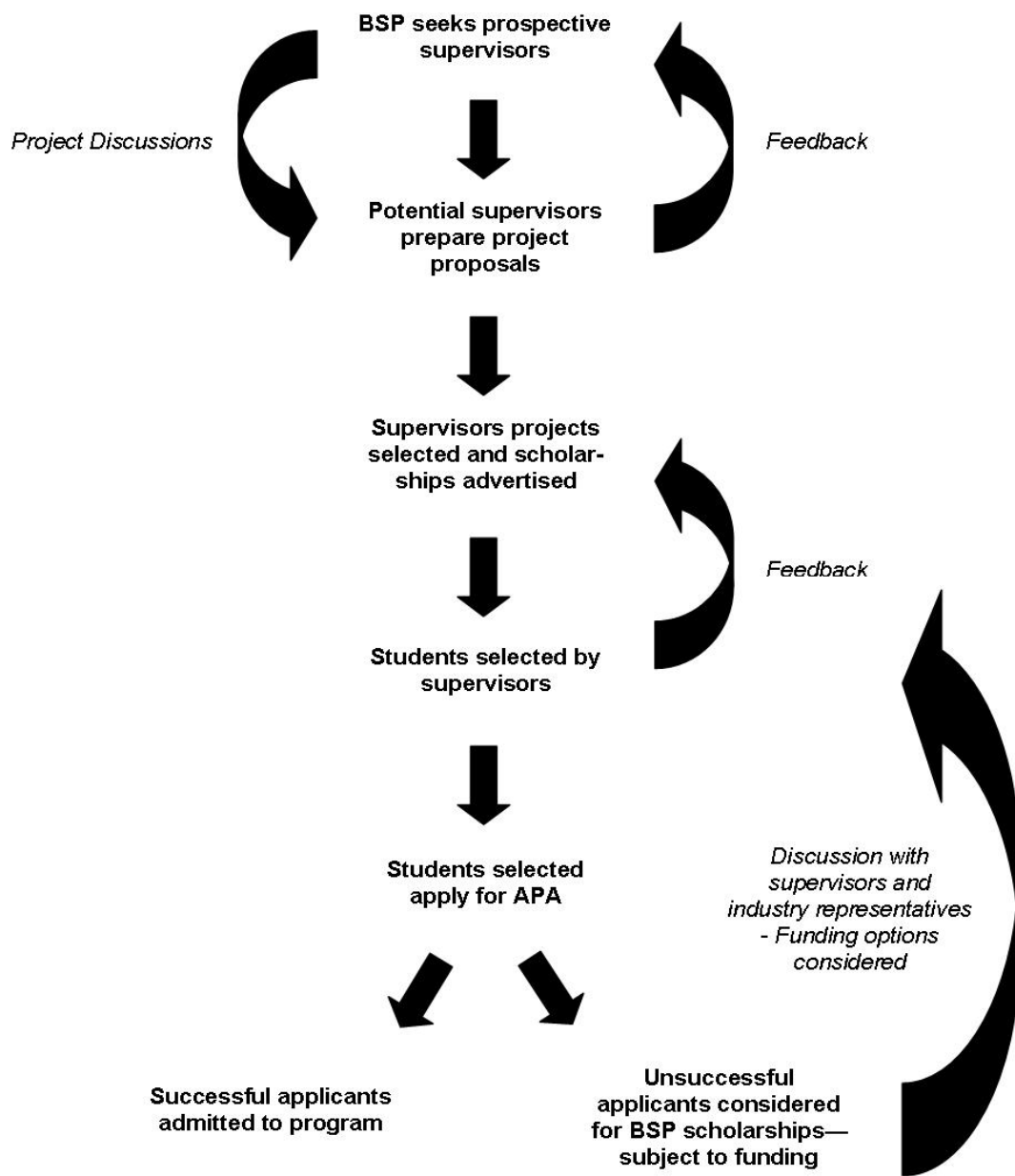
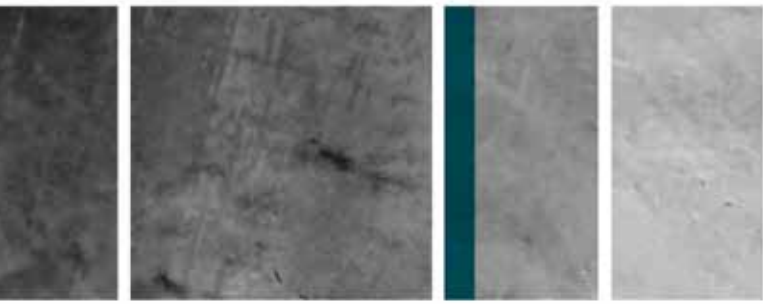


Figure 2: The key decision points (and their feedback loops) for implementing a Balanced Scientist Program



Table 1: Proposed schedule for implementing the Balanced Scientist Program.

Preparation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Solicit prospective supervisors for projects												
Select projects and supervisors												
Advertise for students												
Interview and select students												
Students to apply for APA or University Scholarship												

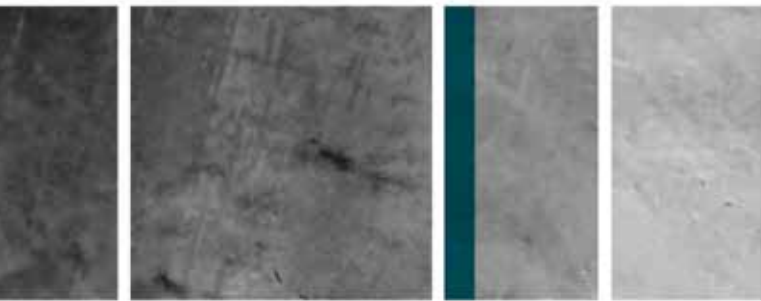
Four-year program framework

In the general Australian university population approximately 30-35% of PhDs may not complete (Bourke et al 2004, Martin et al 1999). 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). Completion times in particular have been the focus of study with the standard allotted time for an Australian PhD being three years although the majority of students finish in four or more years (Bourke et al 2004).

The BSP acknowledges that most Australian students take longer than three years to complete their studies and, because the BSP requires 80 days of training additional to the research work, ameliorates the risk of failure to complete by funding a four year program. This includes additional stipend support for candidates. We believe that this additional stipend support is an important component in the high compliance rate (100%) observed among IA CRC students.



IA CRC Balanced Scientist students Tarnya Cox and Tony Buckmaster talking to the kids at Wee Jasper school during the 2007 student camp (Image: Nina Jenkins).



2 Projects, recruiting and supervisory panel

The BSP attracts students through the quality of the projects and supervision on offer, its coordinated training and development program and its additional stipend. Students enjoy the opportunity to undertake applied research with the potential for real-world outcomes. Many are attracted by the possibilities for making a difference beyond conducting an elegant piece of research.

Projects

Attracting students to the program first requires the scoping and selection of appropriate PhD 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 the host organisation.

Project proposals (Appendix 1) are used to identify projects available for PhD students by the Balanced Scientist Program Leader.

“Students enjoy the opportunity to undertake applied research with the potential for real-world outcomes”

The call for projects is the first step and adequate time is required to receive proposals. We recommend this occur 12 months out from the expected students start date (Table 1).

Project proposals must then be evaluated for inclusion in the program. We rated projects on a simple one to three scale (one = poor, two = satisfactory and 3 = excellent) against four criteria:

1. Does the proposal coincide with the programs objectives?
2. Does the proposal have scientific rigor and well defined questions?
3. Are there supervisors available to oversee the project?
4. Are the supervisors proposed 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 inclusion in the program.

Project Identification

The Invasive Animals Cooperative Research Centre ran the Balanced Scientist Program and selected projects based on the four programs that made up the CRC research arm:

Terrestrial Products and Strategies, Freshwater Products and Strategies, Detection and Prevention, and Uptake of Products and Strategies.

Many of the projects were suggested by industry personnel and required the identification of University supervisors. In most cases, the matches that emerged involved collaboration with research leaders in the field that would not have occurred without the involvement of the IA CRC.



Supervisory panel

Guidelines for the supervisory panel must be set well in advance.

In addition to the normal supervisory requirements of the university hosting the student, all students in the program are required to have a supervisory panel containing a primary, university-based supervisor and at least one industry-based supervisor. This split is recommended in the program so that there are clear industry ties available to the student through which they may look for industry placements and develop valuable contacts for future work.

Recruitment of PhD candidates

The BSP's role is to help the supervisory panel find candidates.

Advertising

To attain the best students available, the BSP and scholarships are widely advertised in print or online (see Appendices 2a-2c for examples as used by the IA CRC) and through letters sent to industry partners (Appendix 2e) or other university colleagues to solicit for persons interested in attaining a PhD. Where the short-listed projects are advertised individually (see Appendix 2d) advertisements should provide contact details to the prospective supervisors.

“The BSP and scholarships are widely advertised in print, on-line and through industry partners”

Application

Prospective students interested in one or more of the projects being offered are advised to make contact with the listed supervisor to discuss the project and the possibility of supervision. If after this process, the student remains interested in the project, they are asked to apply to the BSP by submitting the information below with sufficient time to enable evaluation by the deadline for Australian Postgraduate Awards (usually 31 October). The IA CRC

set the submission date at 31 July (Table 1).

1. A cover letter of no more than two pages stating which project they are interested in applying for, and also 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.
2. A *curriculum vitae* plus contact details of three referees.
3. An academic record.
4. Contact details.

If a student wishes to apply for more than one project

Australian Postgraduate Award (APA)

Description

Australian Postgraduate Award (APA) scholarships are awarded to students of exceptional research potential undertaking a Higher Degree by Research (HDR). APAs are provided to assist with general living costs. Part-time APAs may be awarded under exceptional circumstances only. These are usually related to the applicant having significant caring commitments or a medical condition.

Support Type

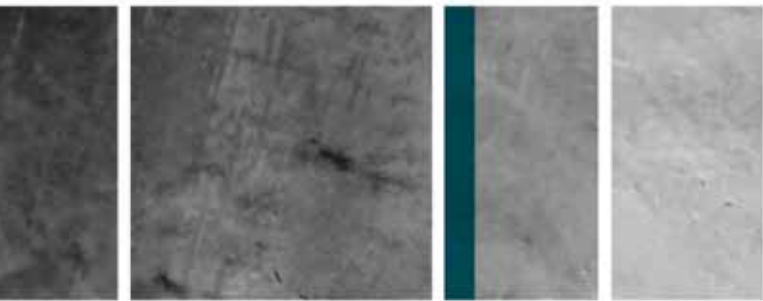
Allowance

Application Closing Date (usually)

31 October

Eligibility

The awards are open to Australian citizens and permanent residents or New Zealand citizens, who hold a bachelor degree with honours class I or IIA or an equivalent qualification. 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.



Professor Mike Thompson (University of Sydney) discussing publishing scientific papers at the 2009 camp. (Image: T. Heinsohn)

they are asked to send separate applications for each.

Selection

Candidates are selected by the supervisors as APA competitive and suitable for the project on offer, they are then invited to apply for an APA. An effort must be made to receive an APA as part of the condition of receiving funding from the program however

receiving the scholarship is not a requirement. Clearly, the more students funded through the APA program, the greater the total number of students that can be supported through the BSP. The target for the IA CRC was 24 students in three intakes.



3 Scholarships

A candidate’s ability to receive an external scholarship allows the BSP program to expand. For each candidate attaining an external scholarship such as an APA, the value of that scholarship is freed up from the BSP budget to provide top-up scholarships for additional candidates.

Candidates identified for PhD positions apply at their nominated university for an APA and for any available University Scholarships (eg University Postgraduate Awards) for which they might also be eligible. Although obtaining a scholarship of this nature is not a prerequisite for entering the BSP, the willingness to apply is an indicator of the drive and resourcefulness of the student, and, if awarded, provides evidence of the quality of the student to the BSP as well as future employers. Should the student be unsuccessful in obtaining an APA or university scholarship, then the BSP can consider providing an APA equivalent scholarship.

Scholarship packages offered by the BSP are based on the current Australian Postgraduate Award Industry (APAI) value. A full scholarship (for those students unsuccessful in achieving an APA or other scholarship) is to this value while a top-up to various full or partial industry or university scholarships will bring the students funding to a level equivalent to an APA plus top-up. An additional operational fund also needs to be made available to the student (see Section Four).

“The eighth semester is fully BSP funded, providing compensation for the 80 days of approved training”

The BSP scholarship (full or top-up) is available to the student for six semesters (the usual length that an APA or University Scholarship is available). Each candidate then has available to them, the option of obtaining an additional year of scholarship on application (see below).

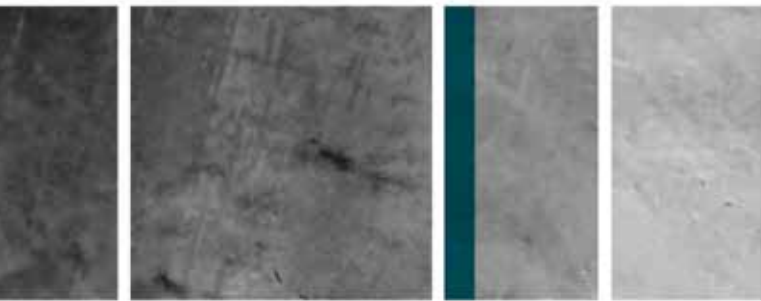
Scholarships

Table 2: Invasive Animals CRC scholarship mix over three years of enrolments

Scholarship Arrangement	Number of scholarships	Percentage
Full IA CRC	6	21%
APA + top-up scholarship	10	36%
UPA + top-up scholarship	5	18%
APAI equiv + IA CRC operational fund	1	3.5%
Private industry + top-up scholarship	2	7%
University + top-up scholarship	3	11%
CRC linked PhD + program involvement	1	3.5%

Seventh and eighth semester extensions

Balanced Scientist Program full PhD scholarship holders and top-up PhD scholarship holders are not automatically entitled to a fourth year extension. They are required to apply for seventh and eighth semester extensions, meeting specific criteria, and approved at the discretion of the BSP. A key criterion for extension consideration is a demonstrated participation in the BSP, including attendance at annual training camps and completion by the end of seventh semester of 80 days of approved training activities in the candidate’s Postgraduate Training Log, including a period of industry placement. Indeed, extensions are intended as compensation for time that the students have dedicated to the BSP in competition with time devoted to their PhD research and writing. Criteria for the eighth semester extension is more stringent than that for seventh semester, as the eighth semester is fully BSP funded even for top-up scholarship holders and provides direct compensation for the 80 days of approved training activities recorded in student’s Postgraduate Training Logs.



Students listening to a local invasive animal scientist on Kangaroo Island as part of their 2008 camp. (Image: T. Heinsohn)

Seventh semester extension

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

- a letter formally requesting the extension
- a letter of support from supervisor indicating adequate progress
- a letter from their university indicating they have applied for and received a seventh semester extension on their APA or University scholarship where available (applies to top-up scholarship holders only)
- a timeline to completion within four years of commencing
- have all BSP periodic reporting up-to-date
- be able to demonstrate active involvement in the BSP, including participation in annual training camps, and being on track to have 80 days of approved BSP training activities completed by the completion of the seventh semester.

Eighth semester extension

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

- a letter formally requesting the extension.
- a letter of support from supervisor indicating adequate progress towards timely completion (within the eighth semester)
- an updated timeline to completion, including thesis submission, within four years
- have all BSP periodic reporting up to date
- be able to demonstrate active involvement in the BSP over the course of PhD program, including participation in annual training camps and having 80 days of approved BSP training (including their industry placement) completed and recorded in their Postgraduate Training Logs prior to the commencement of the eighth semester.



IA CRC PhD student Alex Diment working with University of Sydney postgraduate student Alison Towerton. (Image: T. Heinsohn)

4 Operational fund

The operational fund is monies available to students for project costs. The IA CRC has identified two models under which the BSP can administer this money.

A merit-based application model

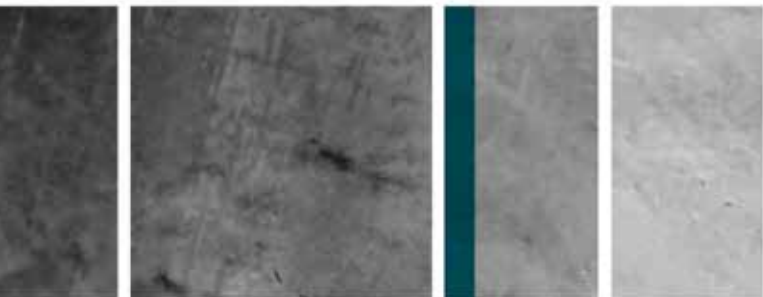
Under this model all students in the BSP produce a fully budgeted costing for their project. Students use this budget as the basis for an application for project operational funds. They identify in their budget where funding has been obtained from outside the BSP and the amount being sought from the BSP.

Under this model the BSP 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 IA CRC, a set price was agreed upon by those administering the BSP 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, then they are expected to obtain those funds from alternative sources or mount a case for further support from the BSP.



Certificate presentation to student, Tony Buckmaster (right) by Education Program Leader, Stephen Sarre. (Image: T. Heinsohn)

5 Certificate in Research Leadership and Management

Achievement of the extra training the candidates participate in must be acknowledged.

Candidates completing the BSP are presented with a Certificate in Research Leadership and Management in recognition of their engagement in a minimum of 80 days of short courses and industry or laboratory

placements over the four-year PhD as recorded in their Postgraduate Training Log (see section Seven and Appendix 3).

Certificates are generally presented at the annual training camps in recognition of the student's achievement or, if possible, at CRC reviews.



6 Postgraduate development plan

The aim of the BSP is to ensure that emerging PhD graduates are equipped with the skills required to move into their chosen field after their PhD studies. The BSP utilises the postgraduate development plan (PDP) to focus on the development needs of the students and to identify the priority training areas that may be provided by the education program. The PDP provides a framework for the student to ensure that their training activities are focused on areas that are most relevant to them.

A PDP, which must be submitted by all participants, is centred on the four core areas of the BSP: self awareness, teamwork, skills training and community sensitivity.

Common training needs in leadership, intellectual property and commercialisation, grant writing, ethics, team skills, career planning and other skills are provided at the annual postgraduate training camps (see Section Eight).

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

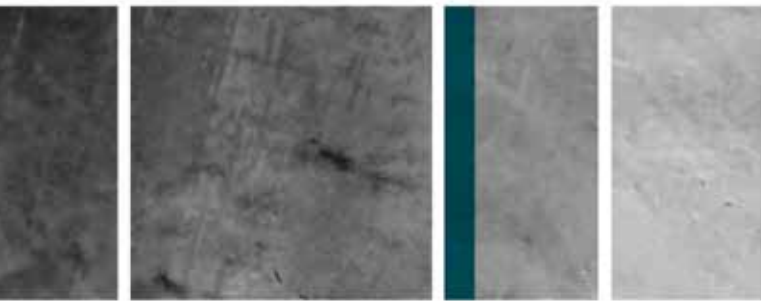
“Students are expected to spend a significant period of time working for an industry partner”

Ideally, the BSP will include a limited budget for individual students to attend specialised training courses. The BSP only provides funding for attendance at such courses if the specific training need has been identified in the PDP and no other source of funding support is available. Universities differ in their

allocation of training funds for postgraduates. All universities in Australia receive a standard level of funding from the Research Training Scheme (RTS) for each full-time PhD student enrolled at their institution. Currently (2011), this amount is around \$32,000/yr for each of three years for high-cost (laboratory or field-based) research. 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 BSP 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 a significant period of time working with an industry partner. These partners might include Government Departments and Agencies, Research Institutes and Commercial 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 interests. The BSP facilitates this process and assists with organising placements.

Attendance at scientific meetings is considered an important development activity. The operations budget provided to the student (through their budgeted project proposal) can be used (with the agreement of their supervisor) to support attendance at conferences. The student’s university may also support attendance at a relevant conference to present their work. Other sources of travel funding can be found on the Joint Academic Scholarships Online Network database (<http://www.jason.edu.au>). The BSP supports attendance at one conference towards



the end of the student's studies to enable them to present their work and benefit from 'networking' with other scientists in their field.

Formulating a Postgraduate Development Plan

The Postgraduate Development Plan (PDP), is personalised to each student and outlines the specific areas that they feel are important for their development within the four key areas of Self, Science, Community and Team. A number of subjects from each of the four areas have been designated as 'core' subjects (Table 3); these are the areas of development that are essential for graduates of the BSP. Training in these areas is provided via a residential course, attended by all the students.

The PDP is an active document and can be updated and modified at any stage during the student's PhD. Ideally, the student should discuss their PDP with his or her supervisor every six months and take the opportunity to assess progress in addressing their training needs as well as communicating any changes to the BSP. Students and supervisors should be encouraged to do this.

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

How it works

Students are asked to briefly outline their current understanding/state of knowledge for each of four attributes of a balanced scientist (as outlined in Table 3), the kind of training or development activity that they feel would be most appropriate and where possible suggest a course provider or other activity that will address this development need.

Students are asked to select headings from the columns in Table 3 to construct their personalised development plan. With the exception of the core training areas (written in uppercase bold), these

headings are indicative only. Students should use only those that they feel are relevant to them and add further headings to their personalised plan as required.

The lowercase non-bolded suggestions were sourced from job selection criteria to encourage students to consider which path they feel they would like to take after their PhD studies (eg University/Academia, commercial company, Government etc). It is important that the BSP coordinator look into current job opportunities for the students and modify these suggestions to those selection criteria that are relevant to the discipline of concern and that they are updated to reflect the changing market.

As students identify their preferred areas of training and development, they add them to the appropriate development needs table (Self, Science, Team or Community, Table 4 below). Students are asked to briefly outline their current understanding/state of knowledge for each attribute, the kind of training or development activity that 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 through background research. Yet other areas may be covered as part of their industry placement.

The PDP is returned to the BSP coordinator following completion 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 the each student. An example PDP, used by the IA CRC, is included in Appendix 4.



Table 3: The four attributes of a balanced scientist and their subject areas. Subject areas in uppercase bold are considered core areas by the BSP.

SELF	SCIENCE	TEAM	COMMUNITY
PRESENTATION SKILLS	DATA ANALYSIS AND SYNTHESIS	LEADERSHIP	POLICY
TIME MANAGEMENT	EXPERIMENTAL DESIGN	MANAGEMENT	CRCs
FINANCIAL MANAGEMENT	RESEARCH METHODOLOGY	COLLABORATION	ETHICS
PROJECT MANAGEMENT	WRITING (PUBLICATIONS)	TEAM SKILLS	Corporations/commercial companies
Personal communication	WRITING (GRANT APPLICATIONS)	Reporting	Not-for-profit organisations
Interpersonal skills	INTELLECTUAL PROPERTY	Networking	Government departments
Prioritisation	Commercialisation	Listening	Local Government
Motivation	Knowledge in specific science areas (specify as many as relevant)	Supervision of students (eg Honours, demonstrating)	Rural and regional Australia
Creativity/innovation	Critical review skills	Project development	Occupational health and safety
Driving licence	Publication record	Budget management	Risk management
IT skills	Modelling	Managing conflicts	Environmental protection
Teaching/lecturing skills	Database management	Negotiating	Resource management
Foreign languages	Record keeping	Building teams	Agricultural extension
Career planning	Ethics		Legal system
Working style	Research management		Economics
	Philosophy of science		Social science
	Problem solving		Stakeholder Management
	Critical thinking		
	Current knowledge/literature		
	Development of theoretical concepts		

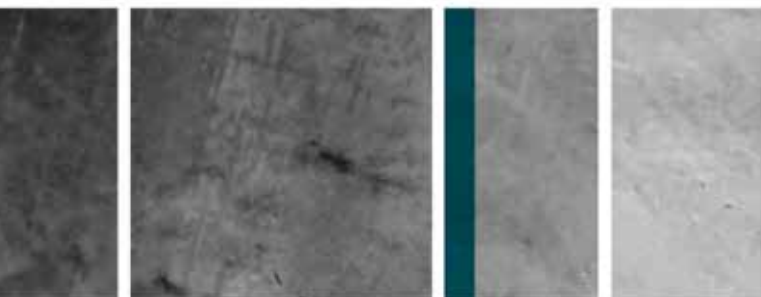


Table 4: An example of a Development Needs table as completed by a student. These tables are included in the student Postgraduate Development Plan.

SELF

Positive Attributes	Current Standing	Training Needs - course/experience	Suggested Provider BSP/Uni
Presentation skills	Some undergraduate training, have given presentations within the department and at one conference	Would like more formal training in presentation style	University run a course in June each year - will enrol next year. BSP 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

Positive Attributes	Current Standing	Training Needs - course/experience	Suggested Provider BSP/Uni
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 BSP to apply for special funding or alternative course provision

TEAM

Positive Attributes	Current Standing	Training Needs - course/experience	Suggested Provider BSP/Uni
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 on Uni leadership course -BSP will cover leadership at training

COMMUNITY

Positive Attributes	Current Standing	Training Needs - course/experience	Suggested Provider BSP/Uni
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 BSP for guidance in this area. Look into possibility of taking up a placement in a relevant Government department as part of the BSP training program	Check internet for suitable placements. Ask supervisor/BSP for any suggested contacts



7 The postgraduate training log

Keeping track of training is important for both the BSP and student.

To record and track their professional, technical and vocational training activities, including industry placements, students are required to keep a Postgraduate Training Log (PTL) (Table 5). Eighty days recorded in the PTL during the course of their PhD program enables candidates to qualify for the aforementioned fully-funded eighth semester. The PTL also serves as a tool for building and/or enhancing a professional resume.

Eighty days training activities is also the minimum requirement to qualify for the Certificate in Research Leadership and Management. An example of a completed PTL can be seen in Appendix 5.

It is the responsibility of the BSP coordinator to make sure that students are up to date with reporting on their completed training. These records in combination with the PDP will help the identification of the most appropriate training courses for the camps. They can also help with the assessment of the suitability of particular courses to other students in the program.

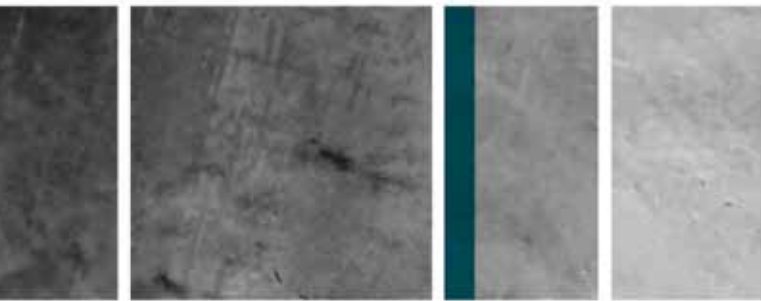
“It is the responsibility of the BSP coordinator to make sure that students are up to date with reporting on their completed training.”

Table 5: Postgraduate training log

Postgraduate training log								
Training event	Date		No. Days	Running Total	Training provider	Source of funding	Cost	Notes
	From	To						
				0				
				0				
				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, BSP 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



8 Annual group training camp

A significant component of the BSP is a week-long annual training camp where specialist facilitators and BSP staff run intensive courses and workshops. These may be augmented by field excursions depending on the field of study.

Training in the core units for all students is generally undertaken as part of the regular residential training camps. Other content of the training camps is driven by feedback from the development plans. The BSP coordinator must identify common areas for training and development and introduce these aspects into the training camp program. The BSP runs one training camp per year and students are expected to attend at least two camps within the course of their studies. All travel and associated expenses are covered by the BSP.

The annual camp encourages the building of current and future collaborative networks through all-student gatherings. Candidates are encouraged to develop a professional identity with their BSP body as associated researchers and to feel a part of an elite cohort with a special focus on issues related to the organising body.

Example camp

The Invasive Animals CRC ran four such camps between 2007 and 2011 (Wee Jasper, Kangaroo Island, Kioloa (twice)). A theme of the camps was attractive, but remote, locations that provided the opportunity for high levels of interaction between participants. The Wee Jasper camp is presented here as an example:

Wee Jasper training camp 2007 (case study)

The Wee Jasper training camp was run over seven days between 3 and 11 March at Cooradigbee shearers' quarters and homestead. The camp was attended by 22 of the 23 postgraduate students then undertaking their PhD studies with the IA CRC. The first and last days of the camp were purely travel days with six days of training events programmed.

The objectives of the training camp were to provide an opportunity for all the CRC sponsored students to meet with each other and create networks for collaboration both now and in the future. The camp aimed to foster a sense of belonging to the CRC and to understand the role of the BSP in providing training and support. At the camp, students were provided training and development activities in key areas identified as essential in the balanced scientist model. Students were also presented with an opportunity to meet some of the key players in the field of invasive animal management and ecology.

Training activities were based on the core skills and competencies identified within the Balance Scientist Model, these included team development and team management, personality profiles, communication, grant writing, intellectual property (IP), commercialisation, environmental ethics, strategic pest management and career development.

The venue

The training camp was held at Cooradigbee, Wee Jasper, using accommodation at the Shearers Quarters and conferencing facilities at the nearby Homestead. The centre provided an ideal environment for the training activities planned and was fully catered, with morning and afternoon tea and lunch fully prepared. Evening meals were planned and partially pre-prepared. The students completed the meal preparation at the Shearers Quarters as part of their teamwork activities.

“The annual camp encourages the building of current and future collaborative networks.”



The training schedule

Training activities were scheduled for each day of the camp and involved a mixture of externally contracted trainers, CRC staff and participants and guest speakers from the wider scientific community. Table 6 provides a summary of the scheduled training activities.

Team development, communications and creativity/innovations

A professional workshop director 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 three days during the training camp covering; team development, leadership, personality and interpersonal skills, assertiveness and conflict management, communication skills, creativity and innovation and career development. Students were divided into four groups in preparation for their team work activities, which included developing

an understanding of their team dynamics, a grant writing task and general cooking and kitchen duties at the Shearers quarters.

Grant writing

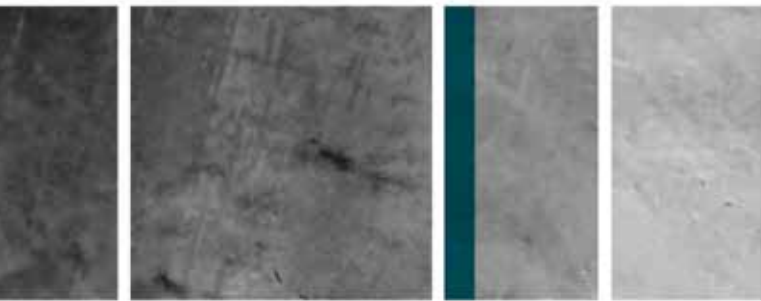
Grant writing highlighted the essential aspects of preparing a grant application and 'tricks of the trade'. This session provided an introduction to the teamwork exercise in which the groups were asked to select a project for development as a proposal for Agriculture and Food Research Council (AFRC) funding. This aspect of training was expanded upon in a later camp.

Intellectual property and commercialisation

The CRC's Commercialisation Manager within the Uptake Program put together a small team of trainers to cover 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.

Table 6: Wee Jasper training camp schedule (dark shaded areas are breaks).

Time	Sunday 4th	Monday 5th	Tuesday 6th	Wednesday 7th	Thursday 8th	Friday 9th	Saturday 10th
8.00							
9.00	Team Development	Grant Writing	Communications	Student Presentations	Hypothetical Horse	Creativity/ Innovation	PDPs
10.00						Careers	
11.00							
11.30		IP and Commercialisation			Environmental Ethics		Excursion
12.00							
1.00							
2.00		Commercialisation			IA CRC Research Examples		Guest Speaker
3.00							
4.00							Fun event
4.30		Team Projects					
5.00							
6.00	Food Prep	Food Prep	Food Prep	Food Prep	Food Prep	Food Prep	Food Prep
7.00							
8.00					Guest Speaker	Guest Speaker	Guest Speaker



Commercialisation

Two commercial participants of the CRC gave a businessman's perspective on appreciating the value and methods of protection of IP.

IA CRC Research examples

A ranger for Environment NSW, responsible for wild dog and fox control field trials in the South West Slopes Region gave a dynamic presentation on the story of how their program got off the ground and the key elements of its success. In a second session the ranger gave an overview of some novel instruments and techniques for dog control from his trip to the United States. The ranger also stayed for dinner and spent time chatting to students about their work.

A University based educator with many years experience in vertebrate pest management, development and implementation of policy for sustainable resource management and sustainable management of resources presented a fascinating history of pest animal control in Australia and best management strategies. This contributor stayed on and spoke to most students individually, discussing their projects and offering advice.

Environmental ethics

We had an introduction to environmental ethics from a researcher in the areas of community based environmental education and rural extension.

Horse Hypothetical game

This was a session based on the 'Horse Hypothetical' game used to illustrate the relative roles of 'value judgements', political decisions and scientific judgements in pest management.

Guest speakers

Our invited guest speakers gave fascinating overviews of their careers 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.

The then CEO of the IA CRC gave presentations on his own career journey and advice on career paths. He also gave out three books; *The 7 Habits of Highly Successful People* (S.R. Covey), *Six Thinking Hats* (E. de Bono) and *Rich Dad, Poor Dad* (R. Kiyosaki) to each of the students. He also spent a lot of time chatting to individuals and groups adding a human element to the IA CRC.

Student presentations

A full day of student presentations is scheduled in all camps. Every student was required to present their research. Students were separated into sessions based on their cohort (number of years underway with thesis) and presentations could be proposals (5 mins) or presentations of results (10 mins) as appropriate.

“Guest speakers gave fascinating overviews of their careers and provided insights into the life of a scientist.”

Fun event: Voyeurhythmic

Finally, to finish of the training camp with a 'bang', Voyeurhythmic joined the camp for a two hour group lesson on 'djembe's', shakers and bells and got the group working together to create a complete African arrangement.



The evaluation

Course evaluation was conducted using daily feedback forms (Appendix 6) to assess the value and content of each day's materials and then a final evaluation of the training camp overall. Daily evaluation forms asked students to rate the day's activities in the areas of content (relevance to their role in the IA CRC, clarity of presentation, progress towards objectives of the training camp), structure (mix of information/activity, mix of small and large group discussion, time management) and process (freedom to express views, exchange of experiences, performance of presenters). A scale between 1 (very poor) and 7 (excellent) was used for all categories and an additional section for written comments was provided.

The results of the daily feedback were presented to the students each day and where possible any concerns or comments were addressed immediately. All other feedback will be taken into account for the next training camp.

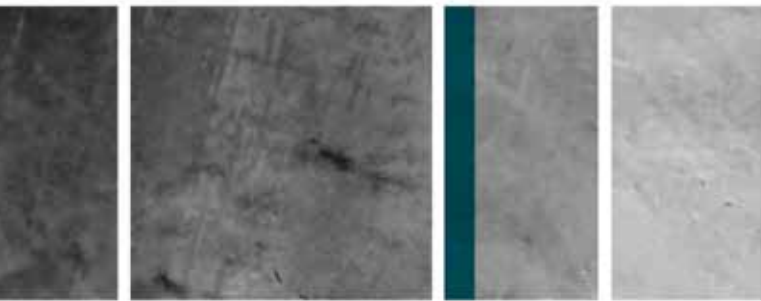
Conclusion

Overall, the training camp was a great success, with all the objectives of the camp achieved to some measure. A key element in the success of the camp was the venue and catering, which provided a solid platform on which the training activities were built. The high quality of the trainers and guest speakers created a recipe for success.

Although positive, student evaluations from this camp also recommended that they should be shorter in duration and contain a greater variety of activities. A break in the middle of the week was also to be included in future programs. The location of the camp has to be carefully considered so as to require the minimum of travel for most students.



Students learning to play dejembe at the Wee Jasper camp 2007. (Image: Nina Jenkins)



9 Monitoring and evaluation

In the last 20 years there have been increased calls for doctoral education to include more emphasis on the development of generic/transferable skills (Pritchard et al 2009, Walsh et al 2010). 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, and to prepare students for careers paths other than academia and potentially multiple careers in their life time (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. "However, 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).

"It is imperative that there is evaluation of the BSP to assess the impact it has on its participants as individuals, as well as on their studies and careers"

The BSP is one such transferable skills program that prepares graduates for leadership roles in the invasive animal 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 evaluation of the BSP to assess the impact it has on its participants as individuals, as well as on their studies and careers.

By undertaking a critical analysis of the benefits of additional industry and academic training for PhD students it will be possible over time to better tailor the BSP for the changing needs of students and their future employers. In the case of the IA CRC BSP, we are assessing our learning outcomes (see Section One) and addressing four key questions:

1. Did the Balanced Scientist Program (BSP) influence student's choice of degree or topic?
2. Did the BSP influence students' ability to complete their degree?
3. Are the linkages offered to the students instrumental in influencing their career paths?
4. What improvements can be made to the program that will better benefit participants?

The evaluation is currently (October 2011) underway and takes the form of an anonymous online survey of all participants (see Appendix 7) followed by interviews with students and other stakeholders. The online survey is aimed at assessing the attitudes to the program of participating students, as well as unpicking some of the less obvious emergent properties of the program (such as opportunities for collaboration, funding, and employment). The interviews comprise a broad range of questions that explore an understanding of stakeholder perceptions of the Balanced Scientist Program. Their function is to clarify and explore areas of strength and identify where improvement is required.

The semi-structured interviews will be wide ranging but the core questions will be:

- What is your overall evaluation of the Balanced Scientist Program?
- What core skills do you think a Balanced Scientist needs?
- Is the Balanced Scientist Program an aid in the successful completion of the PhD? If so how? If not why not?

- Do you think the Balanced Scientist Program 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 questions will enable a discussion around the current program whilst canvassing wide-ranging thinking on the potential for improvement.

The IA CRC has engaged a social scientist to complete the evaluation, to ensure that the risk of bias from those providing the program itself is minimised. It is also important to realise, that such assessments, especially if they are to be completed over time or to be published in some form, will require human ethics approval.

At the completion of the evaluation, the results will be made available through internal reports to the Invasive Animals CRC and through publication in appropriate peer-reviewed journals.

Completion rates of IA CRC BSP students

At the time of writing this guide, 10 out of 11 (92%) of Cohort 1 students had completed their studies and submitted theses for marking. Of those theses submitted, all except one had been accepted with the remaining thesis still being marked. The completion rate for this cohort of BSP students is far above the reported national average of 64% overall and 75% in Natural Sciences (Sinclair 2004). Similarly, 6 out of 11 (55%) of Cohort 2 students have completed their studies and submitted theses for marking with the remainder of the students making strong progress towards completion. All Cohort 2 students are expected to complete their studies and submit theses for marking. Only one student has withdrawn from the IA CRC BSP. This was as a result of chronic illness rather than unwillingness on their part to complete their studies.

“Completion rate for this cohort of BSP students is far above the reported national average of 64% overall and 75% in Natural Sciences”

Employment rates of IA CRC BSP students

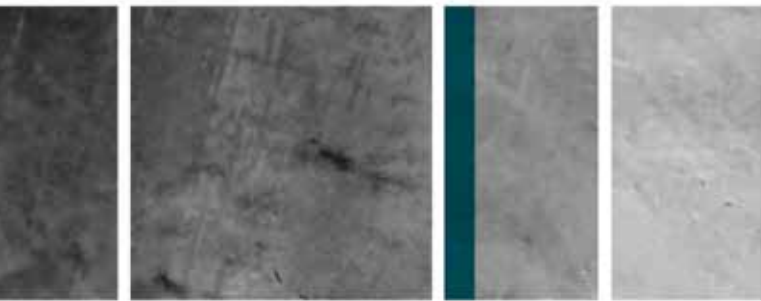
Students who have graduated from the BSP are encouraged to advise the IA CRC of their career paths post thesis submission. All of the IA CRC BSP students that have graduated from the program have successfully entered the workforce. The range of careers that the students have entered includes Australian research, Australian industry, international research, international industry and academia.



Training at the student camp in 2009. (Image: T. Heinsohn)

CRC Annual Report and MDQ

All Cooperative Research Centres are required to submit annual reports and complete Management Data Questionnaires (MDQ) as part of their reporting requirements to the Department of Innovation, Industry, Science and Research (DIISR). Accurate records of the number of students enrolled, the number who have submitted theses and the number who have been awarded their doctorate need to be maintained as part of the BSP to fulfil these reporting requirements. Additionally these data are important for determining the success of the BSP in terms of student completions compared with the national average rate of PhD completion.



10 Concluding notes

We have outlined the structure and processes for running a BSP in the hope that you will be able to adapt it to your organisation and students. The BSP is the culmination of integrated training and scholarship management to create an experience for students that will compliment the more traditional PhD training on offer to date in Australia.

The BSP is designed to create linkages between students as well as between the program itself and its progenitors, and the students as they enter into the workforce. Linkages and collaborations are believed to lead to bigger discoveries as well as breakthroughs and can result in greater successes as measured by publication output (Olson et al 2008). As students depart the program for jobs in industry or academia it is important to maintain these linkages.

Keeping in touch

Keeping an up to date record of email addresses is essential for this purpose. In particular it is up to the coordinator to contact the students regularly to keep up to date with their progress and any changes in contact details. We have discovered that as thesis submission looms or moves to a new job occur,

students become preoccupied and may not contact the program coordinator to provide updates. A list of supervisors and their contacts for each student is essential at these times to keep supervisors up to date on funding related matters and to allow the BSP to track student progress effectively.

“As students depart the program for jobs in industry and academia, it is important to maintain links with them.”

The advent of social networking sites provide new opportunities for maintaining such links. In particular we recommend the formation of an online network group for your students such as Facebook or MySpace (Figure 3). These enable contact with students to continue well beyond their thesis submission and into their time as professionals. It is likely that as these accounts become permanent for many people, they will enable the tracking of students for their entire, post-university career.

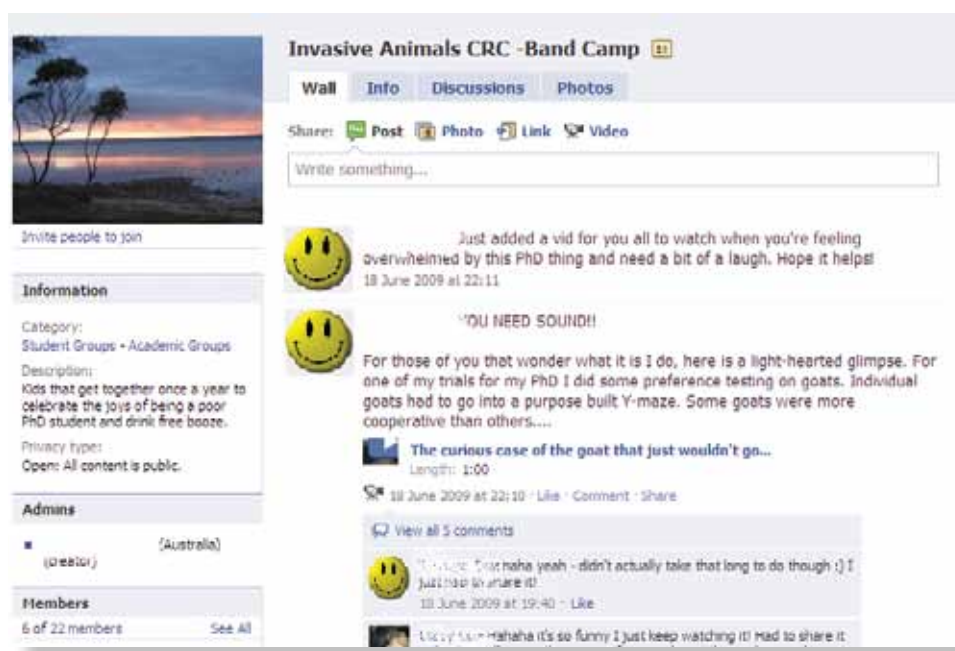


Figure 3: Facebook group page for IA CRC students



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Appendices

Appendix 1: Form for prospective supervisors outlining their PhD project

Appendix 2: Examples of advertising used by the IA CRC to recruit students for the Balanced Scientist Program

Appendix 3: Example Certificate in Research Leadership and Management

Appendix 4: Example postgraduate development plan

Appendix 5: Example postgraduate training log

Appendix 6: Camp feedback forms



Balanced Scientist student Andrew Bengsen checking a remote monitoring camera at his field site in the Daintree, QLD. (Image A. Bengsen)



Appendix 1: Form for prospective supervisors outlining their PhD project

Prospective supervisors. Please use the form below to summarise your PhD project. Please return to XXX by 31 May 20XX (Email address here)	
Project Title.	
PhD or Honours?	
Anticipated supervisor(s) and affiliation(s).	Name both the university and industry supervisors and provide a brief description of their expertise and the contribution they will make to the project and student supervision
University at which the student will be enrolled.	In the case where this is restricted, list those Universities that apply.
Other participants and their affiliations.	
Summary of project.	Maximum of 200 words
Main objectives.	List as many as necessary
1. 2. 3. 4.	
Methodology.	Include a brief description of the background, aims, approach and methodology, and the key skills involved in the project (max of 2 pages).
Allied projects	State the program within which this project will reside (for cases where you are aligning your projects with programs within your organisation)
Expected operating costs and sources of revenue	Provide a breakdown of expected operating costs
Co-investors and sources of revenue.	Provide details of university, industry or other funding that will cover the operating costs outlined above. A contribution up to \$XXXX is available from the Balanced Scientist Program. This money will need to be applied for as part of the student's initial proposal.
Other information.	

Appendix 2: Examples of advertising used by the IA CRC to recruit students for the Balanced Scientist Program

Appendix 2a

What are the advantages of an IA CRC PhD?

The Invasive Animals Cooperative Research Centre (IA CRC) is offering a range of very exciting postgraduate opportunities. If you want to conduct cutting-edge, practical research in a stimulating and supportive intellectual environment we encourage you to consider applying for an IA CRC scholarship.

The topics covered by IACRC students cover disciplines as varied as ecology, economics, veterinary science, psychology, business and mathematical modelling. Management of invasive animals is a complex process that requires people with differing goals to work towards common conservation and or agricultural outcomes. Management of wildlife or pest species can involve highly technical science, but also requires people skills, business acumen and many other aspects.

Our PhD students will receive scholarship support for up to four years, rather than the more usual three. This will enable them to conduct longer-term studies and also to undertake customised skills training in areas such as leadership, experimental design and analysis, communications and intellectual property management.

Our PhD students will enjoy a scholarship at the upper end of those available (A\$ 25,616 tax free in 2007). Their projects are supported financially and logistically by existing CRC research programs. They have supervisors from industry as well as their host University (CRC Partner Universities listed below) and at least once a year they come together to share their experiences.

In many cases our scholarships are supported directly by industry. With industry support, CRC mentoring and more skills training than their peers, we expect our postgraduates to be highly competitive in the job market and to become the research leaders of the future.

Appendix 2b

Invasive Animals
Cooperative Research Centre



Invasive Animals Cooperative Research Centre

PhD Scholarship Opportunities

The Invasive Animals Cooperative Research Centre (IA CRC) is offering exciting postgraduate opportunities to participate in creating solutions for one of Australia's most significant environmental issues. Tax-free scholarships of \$25,000 per annum are available. Projects will be supported financially and logistically by existing CRC research programs and many scholarships are supported directly by industry.

Approximately 20 projects are being offered spanning disciplines as varied as ecology, economics, veterinary science, psychology, business and mathematical modelling. These projects offer a choice of locations across Australia, as well as significant opportunities to work overseas.

If you want to conduct cutting-edge, practical research in a stimulating and supportive intellectual environment we encourage you to consider applying for an IA CRC Ltd scholarship. Applications for study commencing in 2006 must be received by 31 August 2005. Go to <http://www.pestanimal.crc.org.au/education.htm> for full details.



PhD student Kate Garrock with school students at an IA CRC National Science Week display. (Image: IA CRC)



Appendix 2c

PhD Studentships available from Invasive Animals Cooperative Research Centre

The Invasive Animals Cooperative Research Centre (IA CRC) is offering exciting postgraduate opportunities to participate in creating solutions for one of Australia's most significant environmental issues. The IA CRC combines the scientific expertise of virtually every agency dealing with invasive animals to develop solutions for their management and control in the field.

Postgraduate students play a very important role in Cooperative Research Centres. In the IA CRC, students are attached to projects that contribute to one of our 13 operational targets. Our PhD students will enjoy an industry level scholarship (A\$25,000 tax free in 2006) and projects will be supported financially and logistically by existing CRC research programs.

In addition, we will assist you with strong skills-based training in areas such as leadership, experimental design and analysis, communications and intellectual property management. IA CRC PhD students will receive scholarship support for up to four years, enabling them to conduct longer-term studies and time undertake customised skills training

With industry support, CRC mentoring and more skills training than their peers, we expect our postgraduates to be highly competitive in the job market and to become the research leaders of the future. Around 12 projects are being offered spanning disciplines as varied as ecology (freshwater and terrestrial), molecular biology, veterinary science, economics, sociology, business and mathematical modelling. These projects offer a choice of locations across Australia, as well as significant opportunities to work overseas.

If you want to conduct cutting-edge, practical research in a stimulating and supportive intellectual environment we encourage you to consider applying for an IA CRC Ltd scholarship. Full details are available at <WEBSITE ADDRESS>.

Applications for study commencing in 2007 must be received by 31 July 2006.

Appendix 2d

PhD opportunities within the Invasive Animals CRC Education Program (for Cohort 3)

Applications are invited from prospective PhD candidates to work on one of four Invasive Animals CRC (IACRC) funded projects.

The CRC Education Program offers top-up scholarships of \$6,000 pa and additional project operating funds of \$5,000 pa to students who are successful in obtaining an APA.

Invasive Animals CRC postgraduate students also benefit from 80 days training as part of our 'Balanced Scientist' program. This training develops skills in self-awareness, team building and specific research skills. The CRC organises industry placements and annual training camps, during which students attend workshops and participate in team building activities. Students also benefit from the social opportunities presented by the CRC and develop networks of contacts that will likely benefit their future careers.

Unlike most PhD programs, the Invasive Animals CRC supports its postgraduate students for up to four years of study in recognition of the additional time spent in training and development activities.

Please click on the hyperlinks below for a detailed description of the projects available for commencement in 2008. All prospective candidates should contact the lead supervisor directly to discuss the project ASAP - informal enquiries are welcome in the first instance. Applications for study commencing in 2007 must be received by 31 July 2006, we anticipate that candidates will be selected by mid September to enable the successful candidate for each project to prepare their APA application - the deadline for APA submission is the 31st October.

Evaluation of the effects of single-shot Gonadotrophin Releasing Hormone (GnRH) vaccine on the fertility of macropodid marsupials. (Dr XXXX)

Investigating the role of parasites (the lungworm, *Rhabdias* cf *hylae*) in controlling cane toad populations. (Dr XXXX)

Understanding the impact of Indian myna on biodiversity and potential population control methods. (Dr XXXX)

Development of fish specific biocide delivery mechanisms (Dr XXXX)

Appendix 2e

Mr XXXX
Managing Director
Industry Partner
Locked Bag 000
STATE
DATE

Dear Mr XXXX

I am writing to let you know about the new Invasive Animals CRC's innovative postgraduate training program commencing in 2006. Under this initiative we are trying to achieve several outcomes:

- build a spirit of a true **team approach** amongst postgraduates through a common intake point (January 2006, 2007 and 2008) and management of the group on a team basis
- ensure significant **addition of value** to all students through a program of structured coursework (for which they will receive a formal Certificate of Achievement) consisting of skill development, self-development and experiential learning (program outline is attached)
- facilitate learning in different labs, industry and in different cultural situations to provide a better-rounded training that **equips graduates for the future**.

I hope you may be able to support our initiative by ensuring relevant managers and researchers are aware that we are actively recruiting postgraduates; and letting me know about any opportunities for joint funding that might be of benefit to your organisation.

You may be aware that pest animals cause at least \$720 million to Australia annually. The Senate Inquiry into Invasive Species last year and the House of Representatives Inquiry into the Impact on Agriculture of Pest Animals this year have both discussed the difficulty of R&D funding for an issue that crosses so many industry and geographic boundaries. Our approach to this issue is to ensure that our postgraduate program will produce excellent scientists that are well equipped for leadership in the future and can focus on a range of industry issues.

Full details of the scholarships on offer are available on our website at: <WEBSITE ADDRESS>.

I welcome any comments you may have on the program.

Yours sincerely

Dr XXXX
Chief Executive Officer
Invasive Animals Cooperative Research Centre

Appendix 2f

Dear Sir/Madam

I have enclosed a Flyer advertising PhD Studentships currently on offer by the Invasive Animals CRC.

We are looking to attract students interested in the fields of ecology (freshwater and terrestrial), molecular biology, veterinary science, economics, sociology, business and mathematical modelling to take up PhD research in Invasive Animal control. I would be very grateful if you could place the poster on an appropriate notice board(s) in your area.

Our studentships are well funded and offer skills-based training in areas such as leadership, experimental design and analysis, communications and intellectual property management. We also support students for up to four years, enabling them to conduct longer-term studies and time to undertake customised skills training.

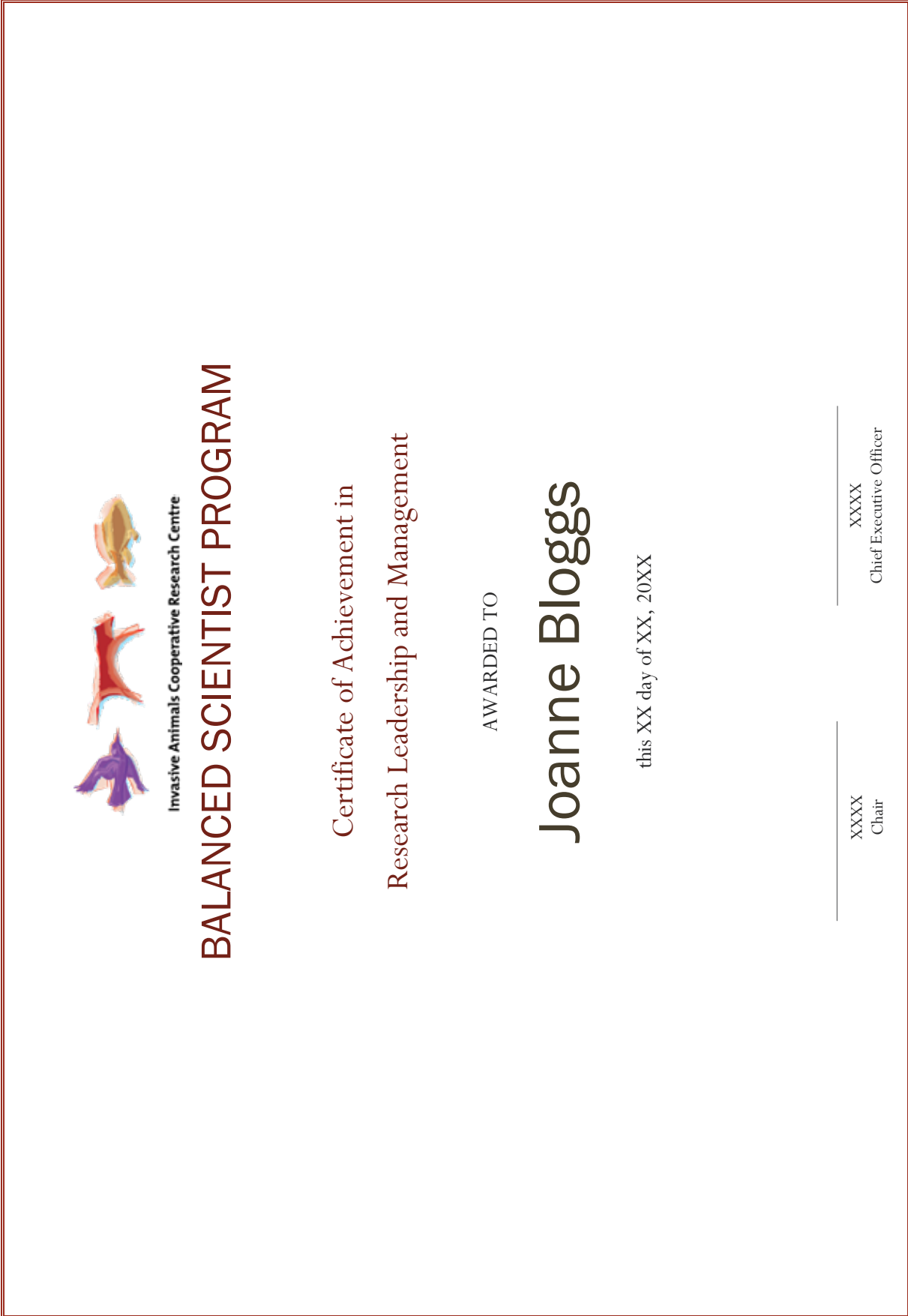
We feel that these studentships will be very attractive to students who are interested in continuing their studies to PhD level.

With many thanks for your assistance

Dr XXXX
Education Program Coordinator



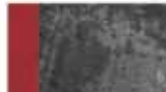
PhD student Carla Meurk during field work in the Daintree, Qld. (Image: A. Elledge)



Appendix 4: Example postgraduate development plan

SELF

Attribute	Current standing	Training needs - course / experience	Suggested provider CRC/Uni
Presentation Skills	No formal training in giving presentations. Many presentations of PhD project proposal and progress given No conference presentations given	Training in giving conference length presentations would be appreciated	Will try and source Uni provider
		Would like to attend conference to see what is like prior to presenting	Australian Vertebrate Pest Conference attendance. Support from Uni and CRC
Time management	Time management courses in previous employment	Update of knowledge would be beneficial	Will check University to determine if any available
Financial management	Managed budgets of tens of thousands of dollars in previous employment	Probably don't need much training in this area	
Project management	Office / staff management in previous employment. No experience in research project management on large scale	Would like training in research project management	Course available at University
Teaching / Lecturing skills	Have run tutorials in university subjects for past 4 years. Have run field class for past 3 years. Given one lecture for 2nd year ecology students	Would like more experience in developing and delivering lectures to students	Will continue to tutor ecology students and run field class at University Possible industry placement with University?
Thesis writing	have written honours thesis and reviewed several honours theses prior to submission	Would like formal training in thesis layout, construction and content	Course available at University
Chainsaw course	Used one for 20 years on a farm but need appropriate ticket	Need a ticket to use chainsaw on field work. All of the areas I do field work in are tall forest with trees continually falling across the road. This ticket is needed for both field safety and field work expedience	TAFE offers course. Support from Uni and CRC



SCIENCE

Attribute	Current standing	Training needs - course / experience	Suggested provider CRC/Uni
Data Analysis and Synthesis	Limited training (1st year unit) in undergraduate and self taught in honours	Would like training in nMDS methods of analysis esp with program PRIMER	
		Training in non parametric analyses and mid level parametric analyses required	University provided
		Population modelling (other than MARK) incl PVA would be beneficial but not essential to project	
Experimental design	Limited experience - designed undergraduate, honours and PhD experiments	Training in more complex types of experimental design including manipulation experiments	
Research methodology	Only what was taught during undergraduate and that gained from honours project	Training on designing and undertaking a complex multi layered research project would be beneficial	
Writing (publications)	No publications. Currently have two papers in prep for submission to journals	Scientific publication writing course would be beneficial	University
Writing (grant applications)	No experience	Training in all aspects required	CRC
Intellectual property	Undergraduate law unit involving intellectual property and copyright laws at UC plus experience in legal field	Only require training if IP law has changed since 2003	CRC
Geographical Information Systems	Undergraduate GIS unit plus usage in both honours and PhD project	Training in more complex aspects of GIS such as interpolation of genetic variability required	ESRI run on line through University
Current knowledge / literature	Have good understanding of current literature in my field but probably need better understanding of other relevant fields	Training on use of databases (eg Web of Science, CSA etc) would be good as I don't think I am using them to their full ability	University
Modelling	Attended workshops on CMR and program MARK. Have also done R course	Would like more in depth training in modelling techniques esp population and habitat modelling	
Database management	Majority of data has been contained in Excel	Training in other database programs such as MS Access etc	
Critical review skills / Critical thinking	Limited amount taught in undergraduate. Have reviewed several honours theses prior to submission as a favour for students but nothing formal	Would like experience in reviewing journal papers and other scientific documents	CRC and University

TEAM

Attribute	Current standing	Training needs - course / experience	Suggested provider CRC/Uni
Leadership	Lead teams of staff in previous work	Refresher course may be beneficial	University periodically runs courses on leadership for students. Will try and source one through these first
Management	Was responsible for the day to day management of staff in previous job	Team management within the research project framework, if different to that already done in previous job would be good	CRC
Collaboration	Limited experience with scientific collaboration. Collaboration with other PhD student involved in same project	Would like to be part of a collaborative approach to a scientific research project	Through CRC and University contacts
Team skills	Formed part of team in previous work. Worked in teams as part of undergraduate	Refresher course may be beneficial	CRC
Supervision of students	Have supervised students as part of field class and subsequent project writing Supervised 3 x 3rd year students on project	Would like training and experience in supervising students over longer period such as honours project	
Industry Placement	Have no experience in industry in this field	Placement with an industry partner or outside organisation engaging in a similar project would be beneficial	CRC

COMMUNITY

Attribute	Current standing	Training needs - course / experience	Suggested provider CRC/Uni
Policy	Not a lot of experience in drafting policy	Training in drafting policy documents - perhaps as work experience with a partner organisation	CRC
CRCs	Only experience is being part of one for this project	A better understanding of the workings of a CRC would be beneficial	CRC
Ethics	Have applied for and been successful with 3 animal ethics applications. Two prepared solely by myself for undergraduate and honours projects at University and jointly prepared application for PhD	Guidelines for ethical treatment of animals for research vary from organisation to organisation. Training in core issues may be beneficial but would be a low priority	
OH&S	Received OH&S training as part of previous employment and have recently completed OH&S approved 4WD course through University	Limited needs but details on CRC OH&S policy, especially in relation to working alone would be appreciated	CRC
Community interaction	Extensive interaction with members of community and community organisations through previous employment	Experience in dealing with specific community issues and disseminating information regarding project to community members would be good	CRC and University showcasing my project to the community



Appendix 5: Example postgraduate training log

NB: for privacy the funding source and training provider has been referred to as University, Industry or the IA CRC. In a real training log students are expected to be more detailed.

Postgraduate Training Log										
Training event	Date		No. Days	Running Total	Training provider	Source of funding	Cost	Notes		
	From	To								
Capture Mark Recapture workshop	14/03/2006	17/03/2006	4	4	University	University	Nil	Was good		
CRC social / economic and benchmarking	25/07/2006	25/07/2006	1	5	IA CRC	IA CRC	Unknown	Day following CRC review in Adelaide		
Modelling and program MARK workshop	2/08/2006	12/08/2006	7	12	Industry	Industry and CRC	Unknown	Exceptional course can recommend to CRC to run		
OH&S Driver training	2/11/2006	2/11/2006	1	13	Industry	University	Unknown	Safe driving techniques and emergency stopping		
Principles in Ecology (2nd year) field class - ran small mammal trapping field class	9/04/2006	13/04/2006	5	18	University	University	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	17/07/2006	17/11/2006	3	21	University	University	unknown	Ran 11 tutorials at 2 hours each (= 22 hours = 3 days) over the semester		
Lecture - Detection techniques and mammals lab session	29/09/2006	29/06/2006	0.5	21.5	University	University	Unknown	Delivered lecture then ran mammals lab. Ecology and Biodiversity (2nd year)		

Postgraduate Training Log										
Training event	From	To	Date		No. Days	Running Total	Training provider	Source of funding	Cost	Notes
Successful science writing and editing course	31/01/2007	21/01/2007	1		1	22.5	University	University	Unknown	Good course - can recommend for CRC
Statistics and Research design course	1/02/2007	1/02/2007	1		1	23.5	University	University	Unknown	Course did not meet expectations
Structuring and writing the research thesis course	5/02/2007	5/02/2007	0.5		0.5	24	University	University	Unknown	Needed to be science based to be more relevant but picked up a couple of points
Introduction to Project Management Course	7/02/2007	7/02/2007	1		1	25	University	University	Unknown	Excellent course. Was very useful for project
Increasing publication output course	8/02/2007	8/02/2007	0.5		0.5	25.5	University	University	Unknown	Not bad. Too many detours and sidetracks by facilitator
Analysis and display of quantitative data	8/02/2007	8/02/2007	0.5		0.5	26	University	University	Unknown	Good
Canid and Felid workshop	21/02/2007	22/02/2007	1		1	27	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
IA CRC Wee Jasper student training camp 1	3/03/2007	10/03/2007	7		7	34	IA CRC	IA CRC	Unknown	Overall was good

Postgraduate Training Log

Training event	From	Date		No. Days	Running Total	Training provider	Source of funding	Cost	Notes
		To							
Principles in Ecology (2nd year) Jervis Bay field class - ran small mammal trapping field class	31/03/2007	4/04/2007		5	39	University	University	Unknown	Industry placement
Program review	17/04/2007	19/04/2007		3	42	IA CRC	IA CRC	Unknown	Excellent to see other projects and progress on demo sites. Field trip to examine mesopredator project was very useful
R training course	2/07/2007	6/07/2007		4	46	IA CRC	IA CRC	Unknown	Good course
Wildlife Masters unit	1/08/2007	2/08/2007		2	48	University	University	Unknown	Industry placement. Training for running the course next year
Invited forum	21/08/2007	21/08/2007		1	49	Industry	Industry	Unknown	Presentation of project and some results
Resource Science Project. Sole supervision of 3rd year students and their project	3/09/2007	10/09/2007		7	56	University	University	Unknown	Industry placement. Was sole supervisor for 3rd year student field trip for 7 days. Supervised their project design, data collection and analysis
Lectures - Invasive carnivores and Herbivores	10/09/2007	17/09/2007		4	60	University	University	Nil	Industry placement. For preparation of lectures and delivering them to 2nd year students

Postgraduate Training Log										
Training event	From	To	Date		Running Total	Training provider	Source of funding	Cost	Notes	
			No. Days							
Animal handling and darting course	7/11/2007	9/11/2007	3		63	University	University	\$825.00	Training to use firearm tranquilizer and drug administration for S4 drugs on animals	
Fenner Conference on the Environment incorporating AWMS	2/12/2007	5/12/2007	4		67	Conference	University	\$300.00	Presented a talk at the conference	
Cat trapping techniques presentation	4/04/2008	4/04/2008	1		68	Industry placement	Nil	Nil	Industry placement teaching how to trap cats using soft jaw traps	
Field trapping cats as training exercise	11/04/2008	12/04/2008	2		70	Industry placement	Nil	Nil	Industry placement teaching how to trap cats using soft jaw traps	
Principles in Ecology (2nd year) ran small mammal trapping field class	14/04/2008	20/04/2008	7		77	Industry placement	Nil	Nil	Industry placement	
IA CRC student training camp 2	5/05/2008	10/05/2008	5		82	IA CRC training	IA CRC	IA CRC	Training in leadership etc	
AVPC Darwin	10/06/2008	12/06/2008	3		85	Conference	IA CRC and University	Approx \$2000	Presented paper at conference	

Postgraduate Training Log										
Training event	From	To	Date		No. Days	Running Total	Training provider	Source of funding	Cost	Notes
National Feral Cat workshop	13/06/2008	13/06/2008			0.5	85.5	workshop	Nil	Nil	Presented paper at workshop
Vertebrate Pest Management Unit. Planning and lecture writing					6	91.5	Industry placement	University	Nil	Planning of week long masters unit and writing lectures for the course
Vertebrate Pest Management Unit. Running week long course	28/07/2008	1/08/2008			5	96.5	Industry placement	University	Nil	Convening and lecturing a full unit for the Wildlife Health and Population Management course
Guest lecturing	22/09/2008	22/09/2008			1	97	Industry placement	Nil	Nil	Two lectures given on invasive animals
Distance sampling workshop	20/10/2008	22/10/2008			3	100	IA CRC	IA CRC	Approx \$3000	Excellent course. Has allowed better definition to my project and will really solidify some elements of the research
Principles in Ecology (2nd year) field class - ran small mammal trapping field class	14/04/2009	17/04/2009			4	104	Industry placement	University	Nil	Industry placement
IA CRC Kioloa student training camp 3	2/05/2009	9/05/2009			8	112	IA CRC	IA CRC	unknown	Papers writing course / mini seminar

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.



Appendix 6: Camp feedback forms

Appendix 6a

Daily evaluations

How did it go today?

Date:

1 = Disagree strongly

7 = Agree strongly

Content

1. The content and discussions were relevant to my role in the CRC.

1 2 3 4 5 6 7

2. Presentation of the concepts and their application was clear.

1 2 3 4 5 6 7

3. We made progress towards achieving the objectives of the training camp.

1 2 3 4 5 6 7

Structure

4. There was an appropriate mix of information, discussion and activity.

1 2 3 4 5 6 7

5. There was an appropriate mix of small group and full group discussion.

1 2 3 4 5 6 7

6. We did not waste time.

1 2 3 4 5 6 7

Processes

7. I felt comfortable about expressing my views or concerns when I felt the need.

1 2 3 4 5 6 7

8. The opportunity to exchange experiences with other participants was useful.

1 2 3 4 5 6 7

9. Questions or concerns were adequately addressed by presenters/facilitators.

1 2 3 4 5 6 7

Other Comments

.....
.....
.....



Appendix 6b

Evaluation of overall week

End of training camp evaluation

1 = Disagree strongly

7 = Agree strongly

1. The location of the training camp was appropriate given the geographical spread of the Postgraduate students.

1 2 3 4 5 6 7

2. The venue was comfortable and well suited for our training activities.

1 2 3 4 5 6 7

3. The catering arrangements were good and the food was delicious.

1 2 3 4 5 6 7

4. Any other comments with respect to food and accommodation?

.....
.....
.....

5. The training camp improved my ability to work as a team.

1 2 3 4 5 6 7

6. The training camp made an important contribution to the way I approach my PhD.

1 2 3 4 5 6 7

7. The training camp made an important contribution to the way I will approach my personal and career development.

1 2 3 4 5 6 7

8. I found the visits from the guest speakers and their reflections on their scientific careers valuable.

1 2 3 4 5 6 7

9. Please comment on any aspects of the presentations by, and discussions with the guest speakers that you found useful.

.....
.....
.....

10. Please write down here any comments on what you regard as the strengths or positive aspects of the camp.

.....
.....
.....

11. Please write down here any comments of what you regard as the weaknesses or negative aspects of the camp.

.....
.....
.....

12. Please record your suggestions for an appropriate location for the next camp.

.....
.....
.....

13. Please record any suggestions for content and format of future camps.

.....
.....
.....



PhD student Tom Newsome with dingo pup, conducting field work in the Tanami desert, NT (image: T. Newsome)



PhD student Tarnya Cox during a work placement with the Game and Wildlife Conservation Trust in the United Kingdom, completed as part of the BSP vocational training. (image: T. Cox)



PhD student Jennyffer Cruz at her research field site, WA (Image: J. Cruz)



PhD students and research staff at a stakeholder meeting, NSW Wild dog demonstration site (Image: G. Ballard)



PhD student Danielle Stephens being interviewed by the media (Image: IA CRC)

Balanced Scientist Program Evaluation

1. Participant Information

PARTICIPANT INFORMATION

Project Title:

Balanced Scientist Program Evaluation

Researcher:

Project Aim:

This research aims to:

1. Undertake a critical analysis of the benefits of additional industry and academic training for PhD students.
2. Produce a template for the future conduct of supplemental training programs for PhD students.

We aim to address four key questions:

- 1) Did the Balanced Scientist Program (BSP) influence students choice of degree or topic?
- 2) Did the BSP influence students' ability to complete their degree?
- 3) Were the linkages offered to the students instrumental in influencing their career paths?
- 4) What improvements can be made to the program that will better benefit participants?

Benefits of the Project:

This research is designed to improve the Balanced Scientist Program. This will benefit both PhD students (especially if this Program is adopted in wider practice) and employers of people with PhDs. You, as a participant, can benefit from wide adoption of this program resulting in your certification gaining higher recognition in the employment market.

Those participants currently within the Balanced Scientist Program will benefit from improvements made as a result of comments received from the survey.

General Outline of the Project

The Invasive Animals CRC has 32 research students at participating universities. It has conducted a formal 80 day career training program within its HDR programs with participation a condition of top-up stipends. The program has included annual camps employing paper writing and career planning workshops; employer placement; and leadership/self development skills development.

We aim to evaluate the effectiveness of the Balanced Scientist Program for PhD students by administering an online survey to all participants in the program. This one off survey will ask about the training they received from the BSP and ask them to evaluate it. In addition questions are asked about linkages made as a result of their participation in the program and what outcomes resulted from these linkages.

The data will be collated electronically and statistically compared with data published on PhD students from the general populace. In addition we will be searching responses to indicate where improvements can be made to the program to better benefit participants.

The data is intended to be published as an Invasive Animals CRC report and a paper. The final report and paper from this survey data can be provided to you by sending a request to EducationIACRC@canberra.edu.au

Participant Involvement:

Once you have accepted the following consent form, you will be asked to complete an online questionnaire, which may be perused before final submission using a "done" button. The research will be administered from the University of Canberra, and the questionnaire will take no more than 30 minutes to complete and you will only be required to complete it once.

This survey is anonymous and all results will be analysed in an aggregated measure or quotes made using no identifiable material.

This questionnaire is a voluntary activity and you may, without any penalty, decline to take part or withdraw at any time without providing an explanation, or refuse to answer a question. This will have no adverse affect on your participation in the Balanced Scientist Program if you are still enrolled in it.

At the completion of the survey you will be asked to click the "done" button and your responses will be collated unidentifiably for analysis. If at any point throughout the survey you wish to withdraw, simply close the browser and do not click done.

Balanced Scientist Program Evaluation

Confidentiality:

Only the nominated researchers will have access to the transcripts and data for analysis.

Anonymity

Your anonymity will be preserved. The survey is anonymous, the link to the survey will provide us with information as to whether or not you have completed the survey but it will break any link as to which survey is yours.

Data Storage

During use the data will be stored at the Australia New Zealand Institute Governance (ANZIG) where it will be maintained in a locked filing cabinet or in password protected files on the computer.

At the completion of the project all paper and CD data will be stored in a locked filing cabinet at the University of Canberra. Files on the computer will be in a password protected file. Identifying material on the surveys will be stored separately from the responses.

Storage will be for a period of five years following completion of the project. At the end of this period the raw data will be destroyed.

Ethics Committee Clearance

This project has been approved by the Committee for Ethics in Human Research of the University of Canberra.

Queries and Concerns

Queries or concerns about this project can be raised via phone or email to:

*** 1. CONSENT STATEMENT**

I have read and understood the information about the research. I am not aware of any condition that would prevent my participation, and I agree to participate in this project. I have had the opportunity to ask questions about my participation in the research. All questions I have asked have been answered to my satisfaction.

- Yes, I agree to the above consent statement
- No, I don't agree to the above consent statement

Balanced Scientist Program Evaluation

2. Demographics

2. Gender

- Male
- Female

3. Which PhD cohort do you belong to?

- Cohort one (started 2006 or before)
- Cohort two (started 2007)
- Cohort three (started 2008)
- Cohort four (started 2009 or later)

Balanced Scientist Program Evaluation

3. Identifying with the IA CRC

4. Please rate the following statement:

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Being a part of the BSP has fostered a sense of belonging to the IA CRC	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The IA CRC's mission is:

To counteract the impact of invasive animals through the development and application of new technologies and by integrating approaches across agencies and jurisdictions.

5. Please rate the following statement

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I identify with the IA CRC and its mission	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

6. I use devices such as verbal or written acknowledgment, the IA CRC logo, or IA CRC power point template to acknowledge and promote my association with the CRC

- No, never
- 25% of the time
- 50% of the time
- 75% of the time
- Yes, always

Balanced Scientist Program Evaluation

4. Identifying with the IA CRC

7. Which devices have you used:

- Verbal acknowledgement
- Written acknowledgement
- IA CRC Logo
- IA CRC power point template
- Other

Other (please specify)

Balanced Scientist Program Evaluation

5. Collaborations

This section addresses collaborations as separate to linkages which will be addressed next.

PLEASE NOTE:

A COLLABORATION involves direct work with another person or body with the production or expected production of a grant application, paper, data collection or funding and is generally a medium to long-term interaction.

A LINKAGE involves association with another person or body resulting in access to already collated data, learning new skills or letters of support. The results from linkages are generally obtained in the short term.

8. Has being part of a cohort of IA CRC associated PhD candidates facilitated the creation of collaborations?

Yes

No

Balanced Scientist Program Evaluation

6. Collaborations

9. How many collaborations has it fostered?

 1 2-5 6-10 11+

Can you list the collaborators (e.g. fellow PhD candidates, researchers, organisations, institutions etc)?

10. What types of collaborations did you make?

 Grant applications Joint papers Data collection Funding Other

Other (please specify)

11. What kind of outcomes have you achieved from these collaborations?

 None yet Received grant(s) Completed paper(s) Attained data Other

Other (please specify)

Balanced Scientist Program Evaluation

7. Linkages

This section addresses linkages only.

PLEASE NOTE:

A COLLABORATION involves direct work with another person or body with the production or expected production of a grant application, paper, data collection or funding and is generally longer term.

A LINKAGE involves association with another person or body resulting in access to already collated data, learning new skills or letters of support and a result is generally received in the short term.

12. Has being part of a cohort of IA CRC associated PhD candidates facilitated the creation of linkages?

Yes

No

Balanced Scientist Program Evaluation

8. Linkages

13. How many linkages have you fostered due to being associated with the IA CRC?

 1 2-5 6-10 11+

Can you list the collaborators (e.g. fellow PhD candidates, researchers, organisations, institutions etc)?

14. What kind of outcomes have you achieved from these linkages?

 Access to collated data Learnt new skills Received support (or recommendation) Other

Other (please specify)

Balanced Scientist Program Evaluation

9. Professional and Personal Development

15. Please rate the following statements

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
My PDP has been a useful tool for identifying and prioritising additional training needs.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My Postgraduate Training Log is a useful tool for enhancing my professional resume.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The BSP has helped to make me more employment-market-ready.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I believe that the BSP Certificate of Achievement in Research Leadership and Management will enhance my credibility or competitiveness for future employment.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have benefited from the specialised courses and mentoring sessions provided at BSP annual PhD training Camps.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have benefited from the social aspect of the BSP annual PhD training camps.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Annual PhD training camps have provided a valuable opportunity to discuss and share issues and concerns.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The BSP has enriched my overall PhD experience.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The BSP has aided my professional development.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

16. Please rate the statement below

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
(Other than at annual PhD camps) I have benefited from additional training opportunities supported by the BSP	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Balanced Scientist Program Evaluation

17. This training (other than the annual camp) has included:

- Short courses
- Workshops
- Seminar attendance
- Conference attendance
- Other

Other (please specify)

18. I have received extra mentoring or supervision as a result of my association with the IA CRC and its industry partners.

- Strongly Disagree Disagree Neutral Agree Strongly agree

Balanced Scientist Program Evaluation

10. Professional and Personal Development

19. This additional mentoring and/or supervision has benefited me.

Strongly Disagree Disagree Neutral Agree Strongly agree

Balanced Scientist Program Evaluation

11. Professional and Personal Development

Below are a list of guests that have presented during the training camps:

- Mike Braysher
- Rob Hunt
- Charlie Krebs
- Frank Fenner
- Tony Peacock
- Steven Lapidge
- Pip Masters
- Karen Mow
- Tanja Strive
- Stephen Sarre
- Suresh Mahalingam
- Mike Thompson
- Sue Briggs
- Dan Janes
- Glen Saunders

20. Please select which of the presenters stood out for you

1	<input type="text"/>
2	<input type="text"/>
3	<input type="text"/>
4	<input type="text"/>
5	<input type="text"/>

What was special about this (these) presenter(s)?

Balanced Scientist Program Evaluation

Below are a list of courses offered as part of the BSP or where attendance by two or more students has been funded, at least in part, by the IA CRC BSP:

WEE JASPER

Leadership (Bob Marshall)

Team Development (Bob Marshall)

Career Development (Bob Marshall)

Communication Skills (Bob Marshall)

Personality and Interpersonal Skills (Bob Marshall)

Assertiveness and Conflict Management (Bob Marshall)

Creativity and Innovation (Bob Marshall)

Intellectual Property and Commercialisation (Simon Humphrys)

Grant Writing (Stephen Sarre)

Intellectual Property (David Dall)

Commercialisation (Greg Smith)

Environmental Ethics (Jenny Andrew)

KANGAROO ISLAND COURSES

Leadership (Bob Marshall and Leon Mann)

Stakeholder Mapping (Leon Mann)

Communication Skills 2 (Bob Marshall)

Decision Making (Leon Mann)

Careers in Research and Design (Leon Mann)

KIOLOA COURSES

Grant Writing (Karen Mow)

Paper Writing (Arthur Georges)

CANBERRA COURSE

Commercialisation (Genevieve Langbien)

OTHER

Modelling and Stats using R (Peter Caley and Dave Ramsey)

Information theoretic and MARK course (Anderson and White)

21. Please select which of the courses most stood out for you

1	<input type="text"/>
2	<input type="text"/>
3	<input type="text"/>
4	<input type="text"/>
5	<input type="text"/>
6	<input type="text"/>
7	<input type="text"/>
8	<input type="text"/>
9	<input type="text"/>
10	<input type="text"/>

What was special about this/these course(s)?

22. Have you participated in an industry placement as part of your BSP yet?

Yes

No

Balanced Scientist Program Evaluation

12. Professional and Personal Development

23. I have benefited from my industry placement or other work experience placement undertaken as part of the BSP in terms of:

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Enhanced knowledge and skills.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Networking and professional contacts.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



Balanced Scientist Program Evaluation

13. Outcomes of Four-Year Program

24. Have you submitted your thesis?

Yes

No

Balanced Scientist Program Evaluation

14. Outcomes of Four-Year Program

25. The BSP's four year timeframe (eight semesters) was a significant factor in:

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
...choosing a PhD with the IA CRC.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...enabling successful completion of my PhD.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

26. What do you consider to be the principal benefits if a four-year program? (Please list in order of importance)

1	<input type="text"/>
2	<input type="text"/>
3	<input type="text"/>
4	<input type="text"/>
5	<input type="text"/>
6	<input type="text"/>
7	<input type="text"/>
8	<input type="text"/>
9	<input type="text"/>
10	<input type="text"/>

Balanced Scientist Program Evaluation

15. Suggestions

27. What sort of additional training or knowledge transfer opportunities would you like to have included at future BSP annual training camps or other group training events? (Please list below)

28. How could the Balanced Scientist Program be improved? (Suggestions below).

29. We would also like to undertake follow up interviews. If you are prepared to be interviewed please either put your email address in the box below or else contact who will then make the arrangements. Thank you for your help.



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