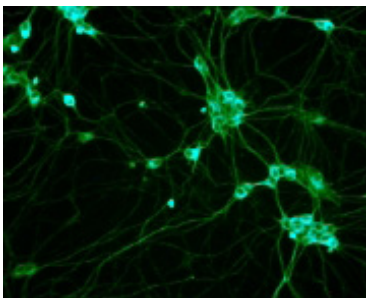


1. CITATION

For developing effective research supervision practice in immunology, making the student research experience individual, exciting, and highly successful

2. SUMMARY

Medical research is a rapidly moving and very exciting field. For PhD students in immunology, the pace of progress and the rate of publication of new findings can be daunting. Students find it difficult to contribute in such a context. The experimental work on which discoveries depend can also be difficult to learn and manage. My own research on stem cells in immunology depends on a wealth of experimental expertise developed within the lab, which is passed on to generations of research students who participate in an ongoing focussed research program. As an experienced and well-published immunologist, my strength as a supervisor stems from my own enjoyment of research and scientific achievement. My



goal is to teach the research process, and how to focus on excellence, creativity and innovation, by sharing discoveries and successes with students. Having supervised 19 PhD students to completion (7 as sole supervisor), as well as 13 Honours students, and 10 undergraduate research students, and with a further 8 PhD students under current supervision, I actively pursue student supervision as a critical facet of my research career. I treat each student as an individual with their own unique skills and abilities, and enjoy the challenge of discovering and developing those strengths. I emphasise my own professional development to keep my laboratory research program exciting and productive so students enjoy the excitement of success in research. I maintain strong

student-supervisor relationships, and mentor students individually for success in both experimentation and publication. I emphasise flexible planning and management of projects, and professional development and achievement. By involving students early as members of the lab, their success builds on the lab's reputation and perpetuates and strengthens my own research endeavour.

As one of Australia's premier research universities, ANU emphasises research training at all levels, and particularly the PhD student experience. In 2004, I received the inaugural *Vice-Chancellor's Award for Excellence in Supervision* at ANU, and the citation for the award read: *The selection committee was impressed with your extremely professional approach and breadth of your supervision responsibilities, and your well considered approach to supervision with consequent successful student outcomes.*

3. SELECTION CRITERIA

Approaches to the support of learning and teaching that influence, motivate and inspire students to learn

Students look to their supervisor as a role model. It is therefore essential in terms of my capacity to supervise effectively that I maintain a high level of research activity, and remain competitive in terms of publication. I actively pursue new, novel and interesting research work, and recent promotion referees attest to this: *your work is very unique and of top quality, and [your] work on the stromal cell environment in dendritic cell generation is now internationally recognized as extremely interesting and innovative.* I use role modelling to teach students about project planning, and management of experimental outcomes for success. Students recognise and appreciate the high standards I set for myself and for them. The report of a PhD student focus group run by CEDAM (ANU Centre for Educational Development and Academic Methods) in 2004 read: *the students said they believed Prof O'Neill to be an excellent researcher and complimented her on her creative approach to the research process. They also indicated that Prof O'Neill's support for the creative work of students is a strength of her research supervision.* My goal has always been to induct students into research practice, and to share their enjoyment of creative endeavours. I emphasise two elements important in maintaining active research: networking with colleagues, and adapting new technological advances. Research is an interactive activity, and training students to be the next generation of colleagues and collaborators is central to the research process.

Students under my supervision join a lab group of individuals who work together maintaining a high level of shared laboratory experience and knowledge, but with each having their own separate project. Students enjoy the laboratory environment that I foster: *You command a great lab and I'm proud to have been part of it* (Honours student 2007). Student thesis topics are central to my own conceptual and intellectual work. There are major advantages in assigning projects to students that are central to my own research. Keeping up to date with the literature and current paradigms then becomes an automatic part of my own endeavour, placing me in the best position to provide intellectual guidance. To manage many concurrent projects, I keep a comprehensive research diary to note ideas, experimental plans and discussions. It lists goals agreed upon during

student meetings, and is an essential record of guidance given to students. Reference to past entries allows me to evaluate progress and serves to focus student learning since it formalises a contractual obligation between student and supervisor. Students also feel comfortable that I am continually monitoring their progress.

As a supervisor, I continually adapt my practice to the needs of individual students, each with unique strengths, needs and pace of learning. PhD student-supervisor relationships can be difficult to 'get right', and I work hard to establish effective communication and a good working relationship with each student. I block out one day a week in which I schedule a lab meeting followed by hourly meetings with each student. This is their hour to discuss issues important to them, a concept that gives them not only responsibility, but also supervisor contact and feedback. In 2004, a PhD focus group at CEDAM reported that: *Prof O'Neill is able to adapt to the requirements of different projects and the different learning styles of students. ...she was very good at striking a balance between enabling students the freedom to define their own work and providing necessary guidance.* I maintain an open but professional relationship with all PhD students, and I represent them in career development and in discussions with university administration.

My approach with new students is to rapidly integrate them into the PhD program. I quickly negotiate a project to reduce uncertainty and anxiety. I facilitate a detailed plan for a main project as well as a backup project, so work can easily be redirected if the main project proves unachievable. I teach students to prepare for the unexpected finding, to reassess direction continuously, and to be flexible in scientific thinking and interpretation. The project plan is reviewed and rewritten at strategic points, including annual reviews. Advanced students often update the outline themselves and ask for feedback. At write-up stage, the project plan then becomes a thesis template. The outcome of continuous planning is that almost all my students have submitted within 3.5 years.

I specifically teach scientific writing as a vital skill underpinning intellectual aspects of research. This is probably one of my strengths and also greatest pleasures. I emphasise from the outset that progress occurs through publication, and that writing papers is a core activity for all researchers. I encourage students to plan their thesis in terms of papers as individual chapters. I work closely with students in writing papers, and particularly their first paper. After we discuss a plan for the paper, I assist them through the writing procedure step-by-step. At each step in the process I set clear deadlines, and then heavily edit both logic and English expression and grammar. I generally promote the writing process in my lab, and publications by students in the middle of their program are an indicator of successful skills acquisition. For all students this has been successful in terms of publication ahead of graduation, leading to greater opportunity and success in obtaining fellowships, employment and travel awards to attend conferences. Many students, including some not under my supervision, have approached me to assist with thesis writing, and international students in my school have enlisted me extensively as an editor. One student who needed assistance wrote: *Helen was not on my panel, but her past PhD students had told me how precisely and efficiently she could point out flaws in argument and steer you in the direction to fix it.*

Comments made by thesis examiners are an excellent measure of success in supervision. These comments reflect as much on supervisors as on students, as my Head of School wrote in 2009: *[Mr X's] thesis reports...are excellent. It's a great result, and a great credit to you both.* The recommendation was for award of the degree without correction. Some examiners have provided evaluation which ranks students in relation to other universities: *I am confident in saying that Mr X's thesis is comparable or better than the majority of doctoral theses that I have evaluated. The quality and scope of the work is consistent with a thesis project from any high quality [American] university* (PhD thesis report, 2008). Many examiners have commented very favourably on thesis preparation, reflecting the emphasis I place on writing skills. All of my students have had their theses accepted with only minor or no change.

- *This thesis is extremely well written, illustrating thorough and excellent thought processes* (2003)
- *The student should be congratulated on putting together an extremely good thesis* (August 2006)
- *Overall this is an excellent PhD thesis. The student shows a clear and thorough understanding of the subject area and was able to identify the deficiencies in the experimental approaches* (August 2006)
- *[This] thesis is extremely well written, illustrating thorough and excellent thought processes by the applicant. Even more impressive was the ability...to think beyond the immediate research project...*(2003)

Respect and support for the development of students as individuals

Support – intellectual and pastoral – is a normal activity for one who enjoys supervising PhD students. To me, students are junior staff and I give them the same respect as colleagues. I value the individual contribution of each student, and allow students freedom to work individually to achieve their potential. An Honours student in 2007 wrote: *...[Helen's] enthusiasm for seeing students succeed prompted me to seek her out first as a supervisor for a mini research project and later as my supervisor during my Honours year, both of which I enjoyed immensely... she helped me develop as a more rounded*

student. I nurture creativity by reporting student achievements and discoveries whenever possible. A PhD graduate wrote in 2008: *Helen... has a rare talent for bringing out the best in her students, and isn't that what a university should be striving for?* I value the contribution of students of all nationalities and work to understand how each works and thinks. Thesis writing can be difficult even for those with good English skills, and language differences can lead to conceptual as well as textual difficulties for international students.

PhD students can be insecure about their performance unless they achieve a measure of success within their program. I attempt to raise enthusiasm for achievement from the beginning. With each new student, a list of conferences is drawn up for presentation of their work. I draw their attention to travel awards, Young Investigator prizes and any opportunities for training and fellowships. Conference attendance by PhD students is essential for networking with other researchers, and can lead to future job opportunities. The result is that my students plan ahead and position themselves to win many of these prizes. One student was recently selected for funding as a participant of the *Riken Centre for Allergy and Immunology International Summer Program* (2008) in Yokohama, Japan. I facilitate meetings and collaborative arrangements for students. A collaboration involving one PhD student was established with Stanford University. The value of this arrangement was recognised by the Australian Academy of Science who awarded funding in terms of their program for *Scientific visits to the USA for Young Australian Researchers*.

I treat students with respect as emerging colleagues, and wherever possible induct them into professional practice. When opportunities arise, I incorporate students into teaching programs to develop their skills in teaching and supervision in order to pursue an academic career. I have mentored several PhD students in course coordination, management of student issues, examination and assessment, running tutorials, and providing feedback to students. Two PhD students were able to take over course coordination when I took personal leave, and another took a more sustained role during a period of study leave. Four of my students have lectured to undergraduates, and I assisted them in lecture preparation and delivery, acted as a mentor, and provided instruction and feedback on lecturing style. The students embraced this opportunity, and one PhD student who participated in the *Teaching Swap Program* 2008, run by the College of Science at ANU, wrote: *Helen provided me with the opportunity to be a lecturer for the 'Living Cells' unit. I am one of the few PhD students to be offered such an opportunity! I had no idea that Helen would become a mentor to me both as an...accomplished researcher but also as an inspiring example of what teaching should be.* Several students have delivered outstanding lecture performances, and were lauded in student evaluations.

Many students have written acknowledgements in their theses of my contribution to their individual PhD experience. Many comments refer to the support and encouragement I give students. I attempt to provide a lofty platform on which students can work to their best.

- *My heartfelt gratitude...for her encouragement, positive support and for helping me to find my wings in scientific research.* PhD student 1998
- *Thank you... you have been a wonderful source of knowledge, support and motivation. I would never have been able to reach the fullest of my potential without your help.* Honours student 2006
- *I cannot thank you enough, without your guidance none of this would have been possible. Remember, you are an awesome supervisor.* Honours student 2007

One of the biggest challenges of my supervisory role has been to find solutions for everything that goes wrong during a PhD, both in terms of project outcomes and student progress. My ability to think laterally, and my belief in turning unexpected outcomes into new 'positive' opportunities, has turned potential failure into success and allowed me to succeed as a supervisor. Students continue to point out my positive outlook.

- *Thank you for your advice, encouragement and support, and the positive attitude you instil on the people around you.* Honours student 1999
- *This work would not have been possible without the supervision of Helen O'Neill. I am particularly grateful for the positive outlook you have had throughout this...overall enjoyable PhD experience* PhD student, 2003
- *I would like to say my biggest thankyou to Helen O'Neill for being my supervisor, for simply helping me so much, for always having a positive attitude, for lots and lots of things that I don't have space to mention* PhD student, 2004

4. STATEMENT

The ANU recognised my success in producing high achieving PhD graduates when they awarded me the *Vice-Chancellor's Award for Excellence in Supervision* in 2004. I have also been recognised for my contribution to enhancing the environment for research students at ANU by invitations to give lectures to staff on professional development related to supervision. I am

regularly invited to give lectures to graduate students across the wider university on project planning and management, and I organise and chair induction workshops for intending and beginning PhD students. I am an advocate of integrating the latest technology into research and teaching, and have for many years been a participant of large equipment bids within ANU, and chair of the School Research Committee. I have held administrative positions of responsibility involving graduate student education, as a member of the College *Higher Degree Research Committee*, as convener of graduate studies in Biochemistry and Molecular Biology, and as a convener of the PhD lecture program in the John Curtin School of Medical Research at ANU. My leadership in teaching and supervision reflects the contribution I make to graduate education at ANU.

One of the strongest measures of my success as a supervisor has been the career path taken by my PhD students after completion of their degree. All have gone on to exciting careers in academia, medical science or medicine. One holds a prestigious *Peter Doherty Fellowship* in Medical Research from the National Health and Medical Research Council of Australia; another became a postdoctoral fellow at Ecole Normale Supérieure de Lyon in France, and then recently was placed 6th out of 210 applicants for an independent fellowship (13 given) from the Fonds de la recherche en Santé du Québec. A recent graduate won an independent postdoctoral fellowship from the Japan Society for the Promotion of Science sponsored by the Australian Academy of Science. A clinician who did a PhD under my supervision now holds a hospital teaching and research position in Hematology. One student now holds a clinical teaching and research position in the Northern Territory studying infection and immunity in indigenous populations. Five former PhD students have studied medicine for future academic careers in medical research. Six students hold senior government positions in policy areas of science and medicine. Two others have taken further study in data analysis and statistics, and expanded their research careers to include bioinformatics and genomics. Eight PhD students still work under my supervision.

Another measure of my success as a supervisor is reputation, and I am regularly sought after as a supervisor of both domestic and international students. The number of students I supervise is only limited by my ability to accommodate them in the laboratory. One reason for my popularity relates to my clear success with student completions and my reputation as a supervisor students want to work with. For students who have done their project work within my lab, completion times to submission average 3.5 years which is lower than other areas in my school, and lower than the national completion rates in Natural Sciences where <50% finished in 3-4 years across 1990-1997. All of my students have been successful in thesis submission and each will author or co-author an average of 7 papers from work done in their PhD. Student publications in *Proceedings of the National Academy of Sciences*, *Blood*, *Stem Cells* and *Science* reflect work at the very top of the field. Comments made by thesis examiners continue to refer to excellence in research methodology, and production of original work at the forefront of the field. These comments are evidence of the high standards that I foster through close supervision and as a role model for students, and the subsequent huge contribution that my students make to the research output of my lab.

- *...with potential publications, the study adds substantially to the international literature* (2001)
- *I was particularly impressed with the breadth of the research and technology covered* (2002)
- *I would like to congratulate H... It is a very interesting and important topic based on a system developed in the O'Neill laboratory... the study adds substantially to the international literature* (2002)
- *This is an excellent body of work and a substantial and original contribution to the field of dendritic cells. The student has done an excellent job bringing together what is currently known and not known about the... dendritic cell subsets. This is a rapidly moving field at the centre of modern immunology because of the importance of these cells for initiating and regulating immune responses* (2002)
- *She has an excellent grasp... of haematopoietic cell development, which is an exceptionally complex, difficult and indeed controversial one. She has developed both independence and the ability to innovate at the experimental level... an impressive body of work for three years* (2003)

Comments like these are indicative of the success I have had in teaching students to achieve excellence in their research, to think critically, to experiment and write with precision, and to become highly successful future colleagues and collaborators.

Publications on research practice

1. My reflections on Research Supervision practice have been published by the Centre for Educational Development and Academic Methods (CEDAM) on the ANU website: *Supervising Biomedical Science Students*. Online at: <http://researchsuper.cedam.anu.edu.au/reflections/helen-oneill>
2. A seminar entitled *Dilemmas for supervisors*, prepared for presentation at a supervisor workshop is also published on the ANU site. Online at: <http://researchsuper.cedam.anu.edu.au/reflections/helen-oneill>
3. As part of the CEDAM course on University Teaching and Learning I wrote a paper entitled: *Use of thesis writing contracts for foreign postgraduate students* (now in preparation for publication).