PHD RESEARCH STUDENTS

Immunopathology and development of diagnostic test for early detection of Johne’s disease in cattle and sheep

Mr Ratna B Gurung
Research support: Endeavour Postgraduate Award, 2009 (EPA 2009)
Supervisors: Professor R Whittington, Dr D Begg, Dr A Purdie

Johne’s disease also known as paratuberculosis mainly in cattle and sheep is a chronic condition affecting intestines. It has worldwide distribution with varying prevalence in different countries. Dairy industries are badly affected in many developed countries. Due to the economic implications from loss of production it has become a concern for all. Although many diagnostic tests are available, they have their own limitations. Tests with low cost, as well as better sensitivity and specificity for early detection of disease are needed to improve the currently available diagnostic approach. Early detection of the disease will benefit farm profitability and welfare of subclinically affected animals.

In pursuit of identifying potential candidate antigen for use in diagnostics as well as vaccine development, this study will focus on various antigens from the causative agent genome. Detailed study of immunological values will be done on the identified antigens that will be used for future diagnostic tests for early detection of disease. This study is also prospecting collaboration between international institutions for some parts of the research component. The established research facility at the Faculty of Veterinary Science at Camden within the Johne’s disease projects supported by MLA, will be the main research station for the entire study.

Immunogenic and pathogenic aspects of Mycobacterium avium. Subsp. paratuberculosis specific cell wall Lipopentapeptide

Ms Shyamala Thirunavukkarasu
Research Support: University of Sydney World Scholars Award
Supervisors: Professor R Whittington, Dr K de Silva, Dr K Plain
Submitted: 2012

Paratuberculosis caused by Mycobacterium avium subsp. Paratuberculosis (Map) is one of the most important causes of morbidity in ruminants leading to huge economic losses worldwide. Control of mycobacterial infections requires the development of a Th1 type T cell response. The innate immune responses are believed to be triggered by pattern recognition receptors, such as toll like receptors (TLR). Several studies have shown that mycobacterial components act as TLR agonists. Lipopentapeptide is component found only in the cell wall of Map and is absent in the cell wall of other mycobacterial species, hence it is unique to Map. This project will study the immunogenicity of lipopentapeptide and the interaction of lipopentapeptide with TLR and the resultant impact it has on the pathogenicity of the organism. Studying this would be useful in understanding the pathogenesis of Map as well as to determine if this Map specific lipopentapeptide could have any putative diagnostic and therapeutic value.
Iridoviruses of fish

Ms Anneke Rimmer
Research support: University of Sydney Postgraduate Scholarship in Iridoviruses in the Murray Darling Basin
Supervisors: Professor R Whittington, Dr J Becker

Viruses within the family *Iridoviridae* have emerged as a major threat to the aquaculture industry and native finfish of Australia. Recently there has been a growing concern regarding the introduction of exotic ornamental fish viruses, in particular dwarf gourami iridovirus (DGIV) to Australia via the transmission pathway of imported ornamental fish. Iridoviral diseases are known to be important in aquaculture, with DGIV having caused significant losses of farmed Murray cod fingerlings in Victoria in 2003. The range and effect of DGIV and other iridoviruses on wild populations of native fish in Australian waterways is largely unknown. Accordingly this research project aims to increase the knowledge of iridoviruses which may be present in Australia’s Murray Darling river system through the development and evaluation of tools for studying iridoviruses of fish, determining the range and effect of iridoviruses in Australia and determining the properties of DGIV. The outcomes of this research will be beneficial to industry, inform policy and facilitate the necessary ongoing protection of the Australian aquatic environment through conservation management and assessing the quarantine risks associated with iridoviruses and imported ornamental fish.

Iridoviruses of ornamental fish and implications for Australian marine species

Mr Jeffrey Go
Research Support: Australian Post Graduate Award and Vice Chancellor’s Research Scholarship
Supervisor: Professor R Whittington

Iridoviruses, particularly those of the genus *Megalocytivirus*, have been associated with mass mortalities in a range of cultured finfish species throughout Asia. Additionally, this group of viruses have been reported from a range of fish species in the ornamental fish trade. In 2003, a *Megalocytivirus* associated disease outbreak occurred in a Victorian Murray cod farm. This represented the first occurrence of this viral group in Australian aquaculture, although the outbreak was contained and the disease subsequently eradicated from the facility. The extremely close genetic relationship between the viral isolate involved in this outbreak, and *Megalocytivirus* isolates from ornamental fish suggests that the ornamental fish trade was the most likely origin of this virus. Recent research also suggests that marine fish may be susceptible to infection with *Megalocytivirus* isolates from the ornamental fish trade, which could have severe implications for Australian marine ecosystems and emerging Australian marine aquaculture industries.

A research project is currently underway to further characterise the nature of *Megalocytivirus* infections and to test the susceptibility of a number of Australian marine finfish using material originating from the ornamental fish trade. The project will also aim to develop improved diagnostic tests for this group of viruses including in situ hybridisation, and serological tests such as enzyme linked immunosorbent assay.
Host response of Australian native fish species to Nervous Necrosis Virus

Ms Diana Jaramillo Martinez  
Research support: Fisheries Research & Development Corporation, ALA AusAID Scholarship  
Supervisors: Professor R Whittington, Dr P Hick

Viral Nervous Necrosis (VNN) has become one of the most important health challenges facing marine fish farming. This disease, seen worldwide, causes high mortalities of up to 100% in young populations when outbreaks occur. In Australia, barramundi farms have been particularly affected by the condition as supply of fingerlings has become uncertain and the cost of biosecurity measures is impacting the profits of the sector. Since the agent was reported for the first time in 1989, the virus has been well described and studied. However, our understanding of the epidemiology and pathogenesis of the disease is still very limited. This is compounded by the various international research groups focusing on different strains of the virus and species of fish, making it difficult to draw conclusions out of the results that could be applicable for the local situation. Addressing the importance of an integral understanding of the disease, this research project is focused on studying the host response of native Australian fish species affected by the virus. Specific aspects include transmission, immunology and diagnosis. Thus, the outcomes of the research are expected to contribute to the construction of more informed biosecurity policies and more effective disease control and prevention measures.

Transmission factors of Ostreid Herpesvirus-1 in the Pacific Oyster (Crassostrea gigas)

Ms Olivia Evans  
Research support: Australian Postgraduate Award and Fisheries Research and Development Corporation scholarship  
Supervisors: Professor R Whittington, Dr I Paul-Pont

Pacific oyster mortality syndrome (POMS) is a complex, multi-factorial disease arising from the interaction of oysters, pathogens and environmental parameters. POMS, as the name suggests, causes severe mortality in the Pacific oyster (Crassostrea gigas), affecting predominantly oyster spat and juveniles with mortalities of 100% and 40-100% respectively. Ostreid herpesvirus 1 (OsHV-1), the sole member of the family Malacoherpesviridae within the order Herpesvirales, has been identified in Australia and abroad as one of the key pathogens causing POMS. The disease, which first appeared in Australia in the Georges River in November 2010, has been documented and investigated in a range of countries worldwide including France, New Zealand, Spain, the United Kingdom and the Republic of Ireland. POMS poses a serious threat to the Australian C. gigas industry (2007-08: $53 million), with a potential to cause dramatic economic loss to producers nationwide. Within the current literature there exists a significant degree of research on crucial OsHV-1 diagnostic methodologies, however very little information exists surrounding the issue of OsHV-1 transmission factors. Little is understood about where this virus actually exists in the environment surrounding commercially produced C. gigas, how the virus infects a host and what environmental parameters trigger these outbreaks. Thorough investigation into where, when, and how this virus operates is crucial to understanding the disease cycle of POMS and vital to creating practical and economically viable recommendations for producers on how to deal with future POMS outbreaks, so as to limit the economic loss to industry associated with the disease.
Investigation of various aspects of ovine footrot control by specific vaccination

Mrs Vidya Bhardwaj
Research support: Australian Wool Innovation
Supervisors: Dr O Dhungyel, Professor R Whittington
Submitted: 2012

A research team based at the University of Sydney has been established to achieve eradication of ovine footrot by specific vaccination. Ovine footrot is caused by many different serotypes of the bacteria *Dichelobacter nodosus*. Effective immunity is provided by vaccinating against two serotypes only at a time. To achieve eradication of disease, a flock is serotyped and a specific vaccination used to eradicate that serotype.

Currently, a small percentage of sheep in a flock fails to respond to the vaccination. Our studies will investigate if this failure to respond is due to the host immune status or due to the nature of the footrot vaccination. Footrot is manifested either as a benign form or a more virulent one in a herd. A study of the protein structure of virulent bacteria is expected to show significant differences from the benign strains. This can then serve as a diagnostic tool to predict the severity of an outbreak. Evaluations of various sample sizes will show the smallest number of animals that are required for sampling to give a statistically significant result.

The Use of Topical Analgesia for Improving the Welfare of Livestock Following Invasive Husbandry Procedures

Ms Crystal Espinoza
Supervisors: Professor P Windsor and Dr G Cronin

Animal husbandry procedures such as castration, tail-docking and dehorning are routinely performed on millions of animals worldwide each year. Such procedures are performed for varying reasons including animal health, for facilitating management and for the safety of farm workers. While the conduct of these surgical procedures are important in commercial animal production, the procedures cause pain and distress and are traditionally performed without anaesthesia or analgesia. The main limitation to currently available pain relief options is that they involve too much time, expense and labour and thus are not be economically viable for commercial production.

An alternative solution may be the use of topical local analgesia in the form of a liquid substance containing local anaesthetics, which is applied during or immediately after a surgical procedure. Topical analgesia is more practical and affordable than current options and has the potential to be fast-acting and highly effective. Topical analgesia has recently been found to alleviate the pain associated with castration and tail-docking in lambs and calves, and mulesing in lambs. It is hypothesised that its application can be successfully expanded to surgical procedures applied to other production species. Findings from this research have the potential to improve the welfare of production animals, which has become a critical issue in modern society.
Foot and Mouth Disease (FMD) and Biosecurity in northern Lao PDR

Mr Sonevilay Nampanya
Research Support: John Alwright Fellowship, AusAID
Supervisors: Professor P Windsor

Foot and Mouth Disease (FMD) is endemic in the Mekong region of SE Asia and a SEACFMD roadmap (South East Asia and China FMD) for possible control and eradication of the disease has been developed by the OIE (world organisation for animal health) office in Bangkok that aims to coordinate FMD activities of countries in the region.

However little is known of the epidemiology of disease transmission or the socioeconomic impact of FMD and farmer, trader and extension worker knowledge of the role of vaccination and biosecurity in disease management is severely deficient in Lao PDR. Sonevilay is conducting a range of studies that address these questions in addition to cattle productivity research that explores whether sustainable FMD vaccination and biosecurity can be incorporated into village-level smallholder systems.

A risk assessment and simulation modeling framework for exotic disease prioritisation in the Australian pig industry

Ms Viki Brookes
Research support: Australian Pork Limited
Supervisors: Professor M Ward, Dr M Hernandez-Jover, Dr B Cowled, Dr T Holyoake

The domestic pig population in Australia is free from over thirty diseases that can adversely affect pig production, the production of other livestock species (such as foot and mouth disease), or human health (such as Nipah virus). Although Australia’s geographic isolation and biosecurity practices protect from disease incursions, the entry of equine influenza in 2007 highlighted that protection from risk cannot be complete.

The aim of this project is to enhance exotic disease preparedness, response and recovery in the case of an incursion, for the three highest priority diseases for the Australian pig industry. Multi-criteria decision analysis was used as a decision aid to determine the highest priority diseases according to potential disease impact and stakeholder opinion regarding the importance of areas of impact. Stakeholders selected African swine fever, porcine reproductive and respiratory syndrome (highly pathogenic strain), and Japanese encephalitis. Further investigation of these diseases will include quantitative risk analysis and spatial disease modeling.
**Shiga Toxin producing *E. coli***

**Mrs Karen Williams**  
Research Support: Meat & Livestock Australia  
Supervisors: Professor M Ward, Dr O Dhungyel, Dr K Plain, Professor R Whittington

Cattle are a reservoir of the human pathogen *E coli* O157 which ‘colonises’ the intestinal tract of the animal and is shed in the faeces. The nature of this shedding is heterogeneous with regards both level and duration of shedding. This variation between animals and more specifically the phenomenon of super-shedding is poorly understood with significant public health implications.

This project involves a longitudinal study of cattle to monitor the levels of O157 excreted by cattle over time in the course of natural infection. This will provide a clearer picture of shedding levels and variability. The project will be looking at the patterns from an epidemiological point of view and aiming to identify risk factors that affect the level or duration of shedding.

*In vitro* studies to assess the nature of bacterial attachment to the bovine gastro-intestinal tract (GIT) will further investigate the nature of differential shedding. The use of primary bovine cells isolated from the GIT will be used as a model for adhesion trials.

**Assessing pig movement and associated risk of Classical Swine Fever transmission in Eastern Indonesia**

**Miss Edwina Leslie**  
Research Support: Australian Centre for International Agricultural Research (ACIAR), Pork CRC, Dinas Peternakan, Kupang (West Timor)  
Supervisors: Dr J-A Toribio, Professor M Ward and Dr M Geong  
Submitted: 2012

ACIAR has developed a project to improve understanding of livestock movement and the risk of spread of transboundary animal diseases. The component in which PhD student Edwina Leslie will be involved focuses on Classical Swine Fever (CSF) in Eastern Indonesia, specifically Nusa Tenggara Timor (NTT). Hog Cholera, as it is locally known, was first confirmed in NTT in 1998. Since its introduction, this virus has produced high mortality rates for the pig populations across most of this province. Pigs have a significant cultural role within this area and thus there has been a severe economic impact for local communities as a result of this disease.

Formal movement of pigs will be investigated through interviews with pig sellers and pig buyers in markets. Informal movement of pigs will be investigated through village interviews with pig farmers. Risk assessment and social network analysis of their movement, in addition to identifying key pig management techniques, is expected to contribute to the development of government policy to minimise and control spread of CSF.
Epidemiological investigations into the 2007 equine influenza outbreak in Australia

Mr Simon Firestone
Research Support: Australian Biosecurity Cooperative Research Centre for Emerging Infectious Disease, Rural Industries Research and Development Corporation
Supervisors: Dr N Dhand, Dr J-A Toribio, Professor M Ward
Completed: 2012

This project is designed to investigate the characteristics of the 2007 equine influenza (EI) outbreak in Australia in order to improve our understanding of the factors contributing to the spread of the outbreak and contribute to preparedness for future incursions of animal diseases in Australia. The research team, based at the University of Sydney, includes partners from government (NSWI&I, QDPIF & DAFF) and industry (RIRDC).

A case-control study is underway, involving collection and analysis of data from 200 horse premises from highly affected regions of New South Wales. The aim is to investigate risk factors for the spread of EI onto premises, in particular non-compliance with biosecurity measures as recommended by animal health authorities at the time of the outbreak. This will be followed by an in-depth analysis of the features of the epidemic using spatial epidemiological approaches to compare the intensity of transmission of EI between several geographic regions, under different management conditions and operation types. The project also involves network analysis of data of horse movements during and after the outbreak. It is envisaged that the project will help refine guidelines to assist disease control authorities make informed decisions in the event of a future incursion of EI in Australia. Detailed analysis of the spread of EI may also yield critical insights into the ecology and transmission of influenza viruses in general in naive populations.

The 2007 outbreak of Equine Influenza in Australia- an investigation of policy implementation and horse owners’ biosecurity behaviours

Ms Kathrin Schemann
Research Support: Australian Postgraduate Award, Rural Industries Research & Development Corporation, NSW Department of Industry and Investment
Supervisors: Dr N Dhand, Dr J-A Toribio, Dr M Taylor, Professor M Ward
Completed: 2012

In 2007 Australia experienced its first outbreak of Equine Influenza (EI), causing substantial financial and emotional hardship to horse owners and industry participants. The use of biosecurity measures represents a major means of control for highly infectious diseases. This project aims to investigate horse owners’ biosecurity perceptions and the factors driving their biosecurity behaviour in light of the 2007 outbreak. The information gathered during this project will inform extension activities targeted at the horse industry to improve disease awareness and biosecurity practices.

In addition, the project will investigate the implementation of the EI AUSVETPLAN, the national policy document describing the Australian approach and proposed control measures to manage an outbreak of EI. We will investigate factors influencing policy implementation, such as epidemiological information available at the time of the outbreak, media coverage, logistics, economics, animal welfare and lobbying. Elucidation of these factors will inform disease control authorities on how to improve policy development and implementation for potential future outbreaks of exotic infectious diseases.
Understanding the risks of Foot-and-mouth disease to Australia: modeling disease spread in feral and domestic animal populations

Mrs Katherine Negus
Research support: University of Arizona
Supervisor: Professor M Ward

Our ability to detect and appropriately respond to emerging and exotic diseases is critical for Australia’s biosecurity. However, there remain large gaps in our knowledge of the potential spread and areas of greatest risk for such disease occurrences, thus limiting our preparedness. Considerable effort, particularly recently, has been applied to modelling animal disease spread via livestock movements. However, the disease threat from wild animal (feral and native) and unfenced livestock populations that might form disease reservoirs has received comparatively little attention; such uncontrolled animal populations can represent a considerable proportion of the entire susceptible animal population for a variety of diseases. These populations can exacerbate outbreaks, form reservoirs of disease, and might allow novel diseases to become endemic.

Specific key outcomes – improve our understanding of the potential spread of FMD in Australia by using a spatial disease spread model within a geographic information system framework; and identify critical risk factors that predict the outcome of FMD incursions, in order to improve surveillance and control strategies. Research components – disease risks maps will be developed to illustrate criticality of locations to incursions of FMD by performing a semi-quantitative risk analysis; population surfaces for susceptible animal populations will be developed; a series of targeted simulations will be run to identify the possible spread from likely disease initiation points; those conditions (environmental and population) that can lead to larger outbreaks of disease will be characterized and the model used to evaluate different management strategies to mitigate disease spread.

Framework for evaluating economics of the decision making processes related to the development of animal health emergency plans and policy in Australia

Ms Sarah-Jane Wilson
Research support: Australian Government Department of Agriculture, Fisheries and Forestry, Australian Pork Limited
Supervisor: Professor M Ward

Literature will be reviewed, including the history of emergency animal diseases, the new livestock revolution, globalisation, and the drivers of animal health policy. Policy making in Australia related to emergency animal diseases (government and industry perspectives) will be explored, via a survey of current attitudes and approaches to decision making and policy development, focused on members of the CCEAD and peak industry body representatives. Follow up interviews with participants will then be undertaken. A gap analysis will be used to identify areas of commonality or divergence. Current methods used for decision making in policy development will also be considered. Examples in cost-benefit analysis, linear programming, partial equilibrium analysis, input-output models and social accounting matrices. Sociological assessments (political, moral and ethical) will also be considered. Event analysis will be used to understand what paradigms we have about what methods we currently use, reasons for a focus on technical frames of analysis, and the issue of cost recovery and emergency cost mitigation (versus compensation). Relevant AUSVETPLANs will be examined. The resulting framework(s) development will be validated using case studies on disease emergencies that represent a range of issues - such as actual versus theoretical incursions, industry type, trade, environmental concerns, zoonotic disease threats and consumer benefit. Case studies will be undertaken on foot-and-mouth disease, Varroa, equine influenza and Hendra virus.
Australian National Surveillance System for Animal Health (ANSSAH)

Mrs Emma Fuller  
Research support: Australian Biosecurity Cooperative Research Centre for Emerging Infectious Disease  
Supervisors: Dr N Dhand, Dr M Hernandez Jover, Dr A Cameron, Mr I Langstaff

The aim of Australian National Surveillance System for Animal Health (ANSSAH) project is to enhance Australia’s capacity to provide timely information on animal health status. This will be achieved by drawing on innovative methodologies to develop a national system for the collection, storage, analysis and reporting of health information. The project will draw on the current National Animal Health Information System (NAHIS) and incorporate existing and potential data sources for surveillance that have varying degrees of utilisation. Stakeholders will be consulted about their specific requirements of surveillance information are what data is needed to meet those requirements. The ultimate outcome of the project is to implement a system that takes an active role in disease detection and surveillance data analysis and better positions Australia to address future animal health surveillance challenges in relation to livestock productivity, market access, public health, food safety, wildlife health and biodiversity.

Cambodian field veterinary services and bovine health, with an emphasis on improved FMD control

Mr John Stratton  
Research support: Australian Biosecurity Cooperative Research Centre for Emerging Infectious Disease, Australian Centre for International Agricultural Research  
Supervisor: Professor P Windsor

The descriptive component comprises visiting Cambodian village animal health workers who are semi-skilled para-veterinarians responsible for delivering village veterinary services. Also involves analysing information on village animal health-worker training, their contact with farmers and the government, and their knowledge and experiences of the two most important diseases of Cambodian cattle and buffalo, haemorrhagic septicaemia and FMD, both of which are endemic by utilising village animal health workers to field trial FMD vaccination in the face of outbreaks.

Bluetongue Viruses and biting midges

Mr Matt Van der Saag  
Research Support: NSW Centre for Animal and Plant Biosecurity  
Supervisors: Professor M Ward, Dr A Nicholas and Dr P Kirkland

Bluetongue viruses (BTVs) are a group of economically important, insect borne viruses that affect ruminants such as sheep and cattle. BTVs are endemic in Northern parts of Australia and Northern NSW is the farthest south that BTVs have been known to occur. Certain species of biting midges, belonging to the genus Culicoides (Diptera: Ceratopogonidae) are the vectors of BTVs, and, the main focus of this project. Specifically, our main aim is to develop a suite of tools that can be used to study the vector capacity of any given biting midge for BTVs. This includes the development of a laboratory blood feeding system that facilitates the infection of wild caught midges with BTVs. Other areas of research include the development and application of rapid diagnostic qPCR assays for the identification of vector midge species and their blood feeding habits. At the conclusion of this project it is hoped that the tools and methods developed will be applicable and relevant for the surveillance of BTVs and their vectors in Australia.
Aspects of the pathogenesis of *Mycobacterium paratuberculosis* infection in sheep
Mrs Kate Bower (nee Goldsmith)
Research support: Meat & Livestock Australia
Supervisors: Professor R Whittington, Dr D Begg
Completed: December 2011

Apoptosis in sheep with *Mycobacterium paratuberculosis* infection
Ms Sally Browne
Research support: Meat & Livestock Australia
Supervisors: Dr K de Silva, Associate Professor D Emery
Completed: December 2011

A study of the biological and financial impact of OJD in affected sheep flocks in NSW
Mr Russell Bush
Research support: Meat and Livestock Australia.
Supervisors: Dr JA Toribio, Dr P Windsor, Dr S Webster
Completed: December 2005

Healthy Dogs Healthy Communities - Approaches to knowledge sharing education to sustain dog health initiatives in remote Indigenous communities
Ms Sophie Constable
Research Support: Australian Postgraduate Award, Australian Research Council Linkage Grant
Supervisors: Dr RJ Dixon, Dr RM Dixon, Dr G Brown, Dr J-A Toribio
Completed: 2012

Identification of risk factors for OJD infection-level in sheep flocks
Mr Navneet Kumar Dhand
Research support: University of Sydney International Postgraduate Research Scholarship, Meat and Livestock Australia.
Supervisors: Dr J-A Toribio, Professor R Whittington
Completed: 2007

Reducing antibiotic usage in pig herds: controlling *Lawsonia intracellularis* by vaccination, housing and hygiene.
Ms Meg Donahoo
Research Support: Australian Research Council Linkage Grant, NSW Department of Primary Industry, Boehringer Ingelheim
Supervisors: Assoc Prof D Emery, Dr T Holyoake, Dr A Collins.
Completed Masters: 2009
In vitro survival and dormancy of *Mycobacterium paratuberculosis*
Mr Sanjeev Gumber
Research support: University of Sydney International Postgraduate Research Scholarship and Meat and Livestock Australia.
Supervisors: Professor R Whittington, Dr D Taylor
Completed: December 2006

Modelling the emergence of avian influenza in the Australian poultry industry
Mr Sam Hamilton
Research support: Australian Biosecurity CRC for Emerging Infectious Disease, Department of Agriculture, Fisheries and Forestry
Supervisors: Dr J-A Toribio, Dr G Garner
Completed: 2009

Application of molecular diagnostic techniques to epidemiological investigations of Viral Nervous Necrosis (VNN) in barramundi aquaculture
Mr Paul Hick
Research support: Australian Post Graduate Award (Industry), Australian Research Council Linkage Grant, Northern Territory Government, Darwin Aquaculture Centre and Berrimah Veterinary Laboratory
Supervisors: Professor R Whittington, Dr D Taylor and Dr J Humphrey
Completed: March 2010

Detection of *Mycobacterium avium*, Subsp. *paratuberculosis* in sheep faeces by direct Quantitative PCR
Ms Satoko Kawaji
Research support: Endeavour Japan Post Graduate Research Scholarship, University of Sydney, International Post Graduate Research Scholarship and Meat and Livestock Australia.
Supervisors: Professor R Whittington, Dr D Taylor
Completed: December 2009

Investigating role of wildlife and wild canids in transmission of *Neospora Caninum*
Ms Jessica King
Research support: Invasive Animal Cooperative Research Centre
Supervisors: Professor P Windsor, Dr J Ellis, Dr P Fleming and Dr D Jenkins
Completed: 2010

Topical anaesthesia in livestock- reducing pain and stress and enhancing wound healing and production
Ms Sabrina Lomax
Research support: Jean Walker Fellowship Fund (APA equivalent), Australian Research Council Linkage grant, Animal Ethics Pty Ltd, Bayer® Australia.
Supervisors: Professor P Windsor, Professor P Wynn, Dr Meredith Sheil
Completed: December 2011
Comparison of the S and C strains of *Mycobacterium paratuberculosis* at genome and proteome levels
Mr Ian Marsh
Research support: Meat and Livestock Australia, NSW Department of Primary Industries
Supervisor: Professor R Whittington
Completed: March 2006

Ovine Johne’s disease – investigating mortality rates, disease transmission and control
Ms Helen McGregor
Research support: Meat & Livestock Australia, NSW Stud Merino Breeders Association, CSL and proprietors of the study properties
Supervisors: Professor P Windsor, Professor R Whittington
Completed: 2008

Genomic and phenotypic comparison of isolates of *Mycobacterium sp.* that contain IS900–like elements
Mr Martin McLoon
Research support: Meat and Livestock Australia, NSW Department of Primary Industries
Supervisor: Professor R Whittington
Completed: December 2007

The sheep/ *Haemonchus contortus* relationship
Ms Kate McMaster
Research support: Meat and Livestock Australia.
Supervisors: Associate Professor N Sangster, Dr K Bosward
Completed.

Specialised management of gilts and their progeny
Ms Yvette Miller
Research support: Australian Pork Ltd
Supervisors: Dr T Holyoake, Dr A Collins, Mr R Smits
Completed: 2008

Understanding and mitigating domestic pig and wildlife interactions
Miss Hayley Pearson
Research support and funding: Australian Pork Limited
Research support: Invasive Animals CRC
Supervisors: Dr J-A Toribio, Dr S Lapidge
Completed: 2012

Peri-urban regional surveillance for biosecurity for pigs in eastern Australia
Mrs Nicole Schembri
Research support: Australian Biosecurity CRC for Emerging Infectious Disease
Supervisors: Dr T Holyoake, Dr J-A Toribio
Completed: 2009
Remote area syndrome surveillance systems for cattle
Mr Richard Shephard
Research support: Meat and Livestock Australia, Australian Biosecurity CRC
Supervisors: Dr JA Toribio, Dr Peter Thomson, Dr Angus Cameron
Completed: November 2006

The Spatio-Temporal Epidemiology of Rabies in Bhutan
Mr Tenzin
Research support:
University of Sydney International Scholarship, Australia
Supervisors: Professor M Ward, Dr N Dhand
Completed: 2012

Studies of the Epidemiology and Risk Factors Involved in the Pathogenesis of Acorn Calf Disease in Australia
Mr Peter White
Research Support: Australian Post Graduate Award, Meat and Livestock Australia
Supervisors: Dr J-A Toribio and Professor P Windsor
Completed: March 2010

Genetic and proteomic differentiation of stages of Mycobacterium paratuberculosis infection
Mrs Ling Zhong
Research support: Meat & Livestock Australia
Supervisors: Professor R Whittington, Dr D Taylor, Dr L Di Fiore
Completed: December 2008
BACHELOR OF SCIENCE (VET) RESEARCH THESES

2008

Ms Emily Drayton
Research Support: The Faculty of Veterinary Science
Supervisor: Professor Richard Whittington

Emily’s research extended the investigations that were conducted by Richard Whittington prior to 1991. With the statistical and epidemiological genius of Navneet Dhand in the background, and highly competent survey methods, Emily was able to discover biologically significant factors that are associated with captive breeding and improved welfare for captive platypus. The project will have significant benefits for future husbandry of the platypus. Emily was awarded 1st Class Hons.
Masters of Veterinary Public Health Management - Graduates

2005
Katherine Clift
Anand Deo
Paul Freeman
Peta Hitchens
Jane Littlejohn
Luzia Rast
Raphael Zwijnberg
Ian Langstaff
Robert Williams

2006
Ben Madin
Wing Ka Au
Andrea Murray
Catherine Taragel

2007
Jaimie Frazer
Jim Kerr
Iain McLaren
Helen Walker
Karen Nicoll
Bronwyn Burns

2008
Francette Dusan
Eric Tai
John Phelps
Christopher Morley

2009
Julie Johnson
Malcolm Anderson
Jamie McNeil
Elizabeth Parker
Warwick Smith
Jill Mortier
Geraldine Luk
Sarah-Jane Wilson
Raana Asgar
Andreas Van Halderen
Michele Cotton
Kirsty Richards
John Alexander

2010
Debbie Eagles
Robyn Schipp
Ainslie Brown
Grant Clarke
Joanne Devlin
Kylie Higgins

2011
Brant Smith
Lincoln Broad
Allen Bryce
Sarah Mitchell
Mary Carr
Jennifer Davis
Louise Sharp
Noel Ritson-Bennett
Lynette Gallimore
Gerald Hauer

2012
Tamira Ford
Rachel Gordon

Graduate Certificate in Veterinary Public Health

2007
Timothy Grindell

2012
Bhumika Limbu
Christine Andrews
Michael Hwang Byung-Mo

Graduate Diploma in Veterinary Public Health Management

2009
Binendra Pratap
Paul Nilon
Penelope Cain

2010
John Moody