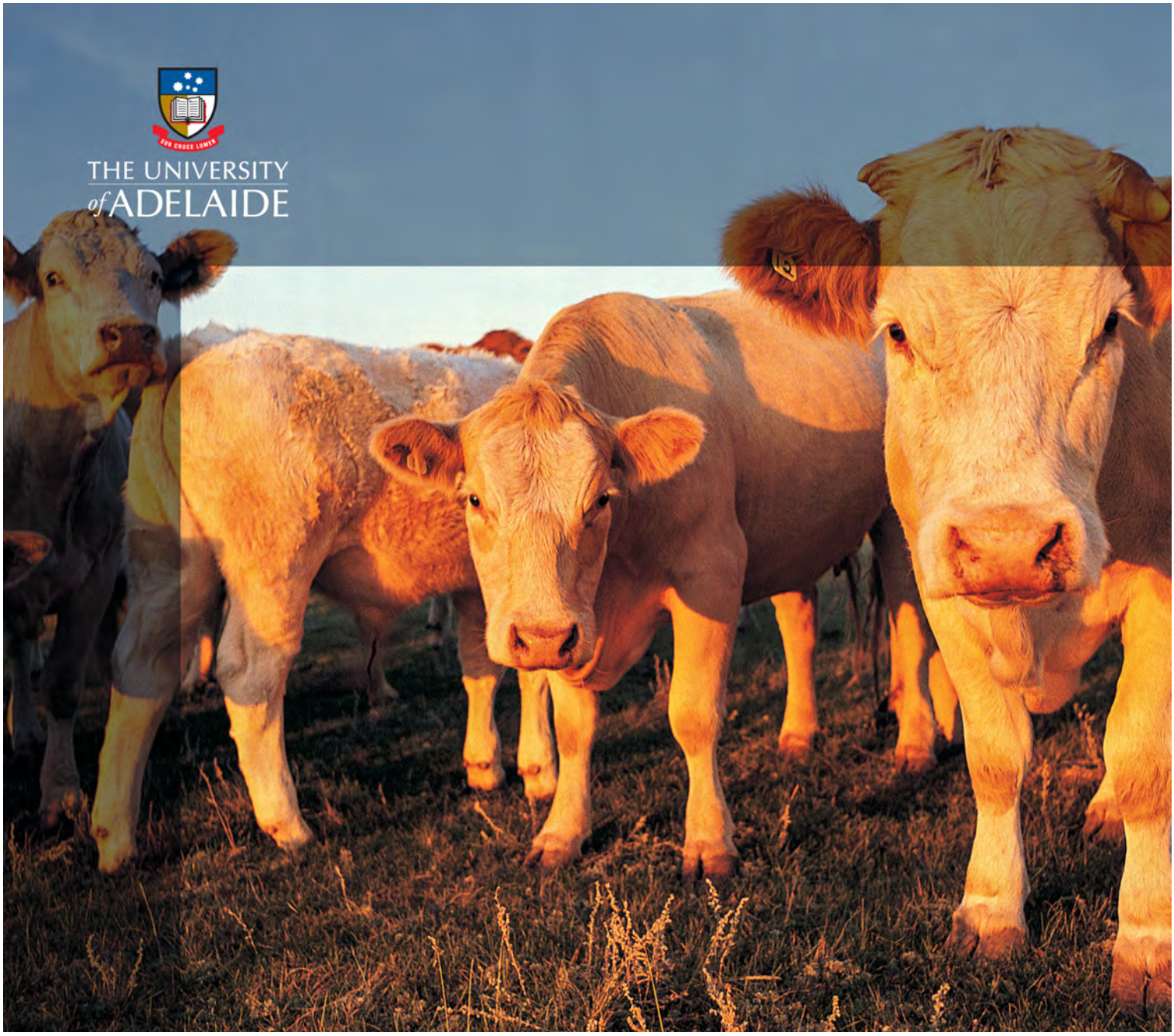

HONOURS IN ANIMAL SCIENCE

Faculty of Sciences
School of Animal & Veterinary Sciences

adelaide.edu.au

CRICOS Provider Number 00123M

HONOURS IN ANIMAL SCIENCE

Honours Coordinator

Dr Bec Forder

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School Overview

The School of Animal and Veterinary Sciences hosts a range of research activities on the Roseworthy Campus of the University of Adelaide. Research within the School covers a variety of animal groups, including livestock, equine, companion animals, laboratory animals and wildlife. The research interests of the School include areas of anatomy, physiology and nutrition, animal reproduction and genetics, animal health and welfare, infectious diseases and public health, and animal and veterinary science education.

Facilities and training opportunities

A range of facilities are available on the Roseworthy Campus. The labs have advanced scientific instrumentation for analytical research, while the Roseworthy Farm gives access to animal research facilities. The Veterinary Health Centre at the Roseworthy Campus houses veterinary clinics and hospitals for Companion, Equine and Production Animals, the Veterinary Diagnostic Laboratory (VDL), teaching laboratories and skills suites.

The School of Animal and Veterinary Sciences has a range of industry, research and teaching partners. These partnerships will assist students in gaining industry experience and in developing contacts within their areas of chosen specialisation.

Co-location partners on the Roseworthy campus include the South Australian Research and Development Institute (SARDI), the Department of Primary Industries and Resources South Australia (PIRSA), the SARDI Marine Biosecurity Facility, and Martindale Holdings (the Roseworthy farm management). Research collaborations are strong between these groups.

The School is also involved in various Cooperative Research Centres and various academic staff members are involved in other research institutes within the University of Adelaide.

More information: www.adelaide.edu.au/vetsci

Honours in the School of Animal and Veterinary Sciences

What is honours?

Honours is a 1-year program consisting of a research project and associated theoretical work. An Honours year provides professional training in a chosen area of specialisation and experience in scientific research. It also enables students to learn new research techniques and broaden their skill base. The Honours experience is also the foundation year for entry into postgraduate research degrees in Australia.

Students who reach a sufficient standard of achievement in their undergraduate courses are eligible to apply for admission to Honours. To be eligible to apply for Honours in the School of Animal and Veterinary Sciences you will require Credits or above in at least two relevant Level III subjects.

As an Honours student you will be a member of a research team. The research project is carried out either in a research group in the School or in a closely affiliated research group. A list of available Honours research projects is provided in this booklet, and additional projects may also appear on the School's website. Students who are considering Honours are encouraged to discuss potential research projects with the supervisor of the projects.

What does honours involve?

As an Honours student you become a member of the School and a research group. For the first time, you become responsible for the outcome of your own work. Honours students also partake in all aspects of the academic and social life of the School.

What are the benefits?

The Honours degree gives students a thorough training in research methodology and a detailed insight into a specific problem in the area of research that they pursue. The approach to problem-solving, maturity and self-discipline gained during the Honours year equips them for a wide variety of careers. An Honours year also helps to develop your written and verbal communication skills, ability to work independently and as a team member, and analytical thinking; skills that are relevant to all fields of employment. Many of our students also elect to continue in the research domain by enrolling in the School's PhD programs.

How to Apply

https://sciences.adelaide.edu.au/study/honours

Find a project and supervisor

Students who are considering Honours within the School should look at the list of prospective projects to see what projects are currently available. If you are having trouble choosing a project, arrange a meeting with the Honours Co-ordinator who will be able to suggest some potential supervisors based on your areas of interest.

When you go to talk with your potential supervisor, you should take a copy of your academic record so that they can determine if you have completed an appropriate range of courses. Students from the University of Adelaide can use an unofficial copy of their record; students from another University will need to provide an official copy of their record.

You are asked to nominate 3 potential supervisors or projects when completing the Faculty of Sciences Honours Expression of Interest form.

Once you have found a project and supervisor

If you are a domestic student (from any University) or an international student who has been studying at the University of Adelaide you will find the Expression of Interest form at: https://sciences.adelaide.edu.au/study/honours

Nominate the 3 preferred supervisors and/or 3 projects and submit the form. The form will be automatically submitted to the Faculty of Sciences office for consideration.

Each year there are two cohorts of Honours students: Semester 1 (commencing in February) and Semester 2 (commencing in July). In some cases, the nature of your project may determine the best time of year to start. Your potential supervisor can advise you on this.

Due dates for submission of honours expression of interest: https://sciences.adelaide.edu.au/study/honours

Offers of admission into Honours are made as soon as possible after exam results are finalised (e.g. mid December).

If more than one student chooses a specific project as their first choice, final allocation of projects is made by the supervisor in consultation with the Honours coordinator.

Honours Scholarships

Honours students within the School of Animal and Veterinary Sciences are eligible to apply for a range of scholarships. Each scholarship pays a stipend to the student. Some scholarships also have operating money which is used by your supervisor to support the project.

Examples of honours scholarships include:

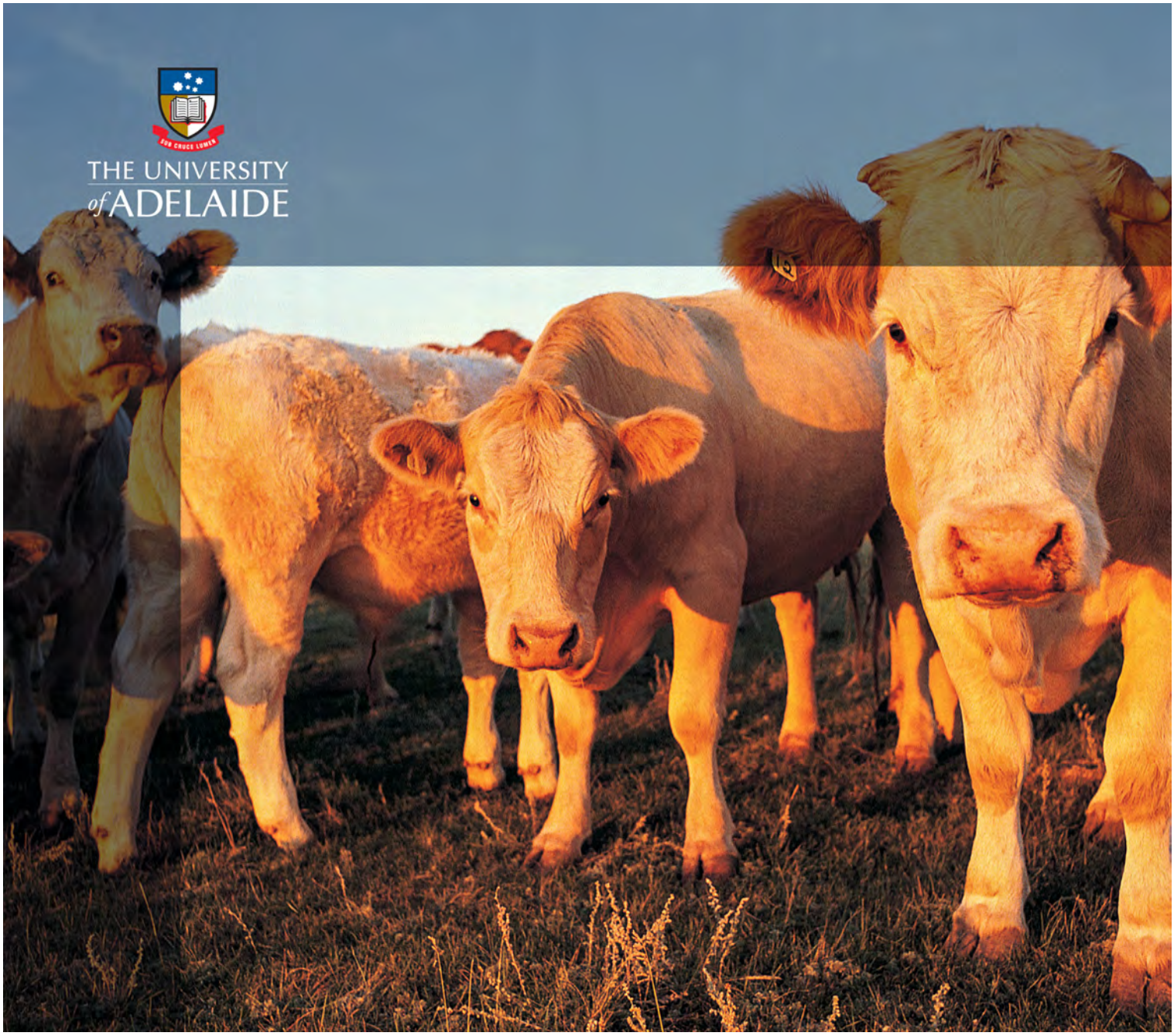
- School of Animal & Veterinary Sciences Honours Scholarship (Value: $3500)
- John Ridley Memorial Scholarship (Value: $9000)
- Pork CRC Honours Scholarship (Value: $5000)
- The Ronald J Lienert Memorial Scholarship (Value: $9000 plus research money)
- RSPCA Australia Alan White Scholarship for Animal Welfare Research (Value: $8364)
- RSPCA Australia Scholarship for Humane Animal Production Research (Value: $8364)
- The J.R. Barker Scholarships (Value: $4000)
- Lower Murray Lot Feeders Honours Scholarship (Value: $5000)

For a complete list of scholarships see https://sciences.adelaide.edu.au/study/student-support/scholarships

Application deadlines for Honours scholarships vary. Some scholarships (e.g. Ron Lienert Memorial Scholarship, Pork CRC scholarships) have application deadlines in November-December. We recommend that you familiarise yourself with the scholarship list early in the Honours planning process.

The School of Animal and Veterinary Sciences offers 6-8 scholarships valued at $3500 each per year. All students who enrol full-time in Honours within the School are eligible for these scholarships. Selection is based on academic merit and there is no application; all students are automatically considered for the School Scholarships. Students who hold other scholarships are not eligible for the School Scholarships.

The John Ridley Memorial Scholarship is also awarded through the School. Students who have completed the third year of their Bachelor of Agriculture or Bachelor of Science (Animal Science) full time and are undertaking an Honours degree at the Roseworthy Campus are eligible. Selection is based on academic merit.



HONOURS IN ANIMAL SCIENCE

Research Projects

Supervisors with available projects are listed in the following pages. Project titles, aims and a brief background have been provided, and it is recommended that you contact the supervisor for more information on their projects.

Some supervisors have provided a description of their general research area, rather than specific project titles. If you are interested in their research you should talk with the prospective supervisors to discuss potential projects. In addition, if you are interested in a particular area of research you can talk with the Honours Coordinator to determine whether other opportunities to develop an Honours project may exist.

The School of Animal and Veterinary Sciences is based on the Roseworthy Campus. A number of co-located research partners are also based on the campus. In addition, we collaborate with other University departments and research partners located off campus. Projects being offered by our collaborators are also included in the list.

School Departments and Research Areas

- Animal and Veterinary Bioscience
- Companion Animal Health
- Equine Health
- Pathobiology, Infectious Disease and Public Health
- Production Animal Health

Animal and Veterinary Bioscience

GENERAL INFORMATION	
Contact details	Dr Rebecca Forder G11 Davies Building 8313 7602 bec.forder@adelaide.edu.au
Overview	The effects of nutrition and bacterial colonisation on intestinal cellular morphology, specifically goblet cell and mucin dynamics in poultry, pigs and aquatic species. My research interests relate to gastrointestinal physiology and its application to provide a better understanding of gastrointestinal function and development of animals as a means to enhance life-long productivity.

PROJECT INFORMATION		
PROJECT 1	Title of the project	Do gut microbes promote migratory fattening in shorebirds?
	Co-supervisor names	Brianne Addison (Deakin University)
	Aim of Project	To determine if gut microbes promote migratory fattening in shorebirds, using commercial broiler chickens as a model.
	Background information	Commensal microflora have been shown to have a role in metabolism and fattening in humans and bears, among other models. Migratory birds undergo rapid fuelling prior to migration, with some species even doubling in mass in about 10 days prior to migration departure. The potential role of microbes in this rapid fattening phase is unknown. We will inoculate young chickens with the gut microflora community of a fuelling shorebird and measure the effects on weight gain, body composition, metabolism, and gut morphology. The honours student will focus on the effects on metabolism and gut morphology, working in a team of researchers from Roseworthy and Deakin University in Geelong. This information will be incorporated into a larger project looking at gut microflora profiles of shorebirds, and their role in growth, migration, and susceptibility to disease. It also links into a project looking at the role of commensal bacteria in the health and productivity of poultry. The student will gain lab skills relevant to health, animal science, and comparative physiology, and utilise theoretical constructs in evolutionary ecology.
	Methodology to be used	The honours student will use histology to characterise the gut morphology of treated and untreated chickens, and measure fat metabolites and enzymes in liver and blood tissue.

GENERAL INFORMATION		
Contact details		Cynthia Bottema Davies Building, Roseworthy Campus 8313 7641
Overview		Molecular genetics of livestock, particularly beef cattle, with an emphasis on fat and energy metabolism; use of biotechnologies to improve livestock production
PROJECT INFORMATION		
PROJECT 1	Title of the project	Identification of genes controlling marbling in cattle
	Co-supervisor names	Wayne Pitchford
	Aim of Project	Identification of genes controlling the deposition of the intramuscular fat (that is, marbling) in beef cattle to better understand fat metabolism and to provide genetic markers for selection to improve beef quality
	Background information	Marbling or intramuscular fat in beef is highly prized in some export markets, such as Japan and Korea. Since a premium is paid for intensely marbled meat in these markets, producers seek to control intramuscular fat deposition in cattle through nutrition. Long term grain feeding on diets low in beta-carotene will increase marbling in some cattle breeds. However, in other cattle breeds long term grain feeding merely increases the amount of subcutaneous fat. Thus, it is clear that there is both a nutritional and a genetic component to intramuscular fat deposition. However, the genetics underlying intramuscular fat deposition have not been determined. One of the issues is that the process of marbling is not well understood. It is not clear if the process involves increasing the amount of lipid filling in mature adipocyte fat cells (hypertrophy) OR whether the process involves increasing the actual number of mature adipocyte fat cells (hyperplasia). It is also not known whether the process may involve other factors, such as vascularisation, which may affect lipid deposition in specific locations. Previous work in our group suggests that other factors such as vascularisation may be fundamental to the ability of specific breeds and animals to deposit intramuscular fat in muscle. To explore this possibility, the project will examine the correlation between vascularity and marbling. In addition, specific genes related to vascularity will be analysed to determine if they also affect marbling.
	Methodology to be used	Images of marbling in different breeds will be analysed in relation to their fat deposition in muscles and the vascularisation of the muscle. In addition, new regions of the cattle genome controlling intramuscular fat deposition have been identified. Based on the results, new candidate genes will be selected for sequencing and genotyping to determine if they control marbling by affecting the vascular system.
	Any other information	
PROJECT 2	Title of the project	Effect of colostrum components on ruminant health and performance
	Co-supervisor names	Kiro Petrovski, John Williams
	Aim of Project	Determine best feeding strategy of newborn calves for lifetime production
	Background information	A calf receives colostrum from its dam very shortly after birth. This first meal is important, not only in a nutritional sense but also because colostrum passes immunoglobulins from the mother that transfer passive immunity to the calf. However, the full effects of colostrum and its various other components are not fully understood. The

		quality of the colostrum which may have a lasting effect on health and performance. The effect of insufficient colostrum volume/quality intake is poorly understood in cattle.
	Methodology to be used	The project will use samples from calves that received colostrum from their natural dams, calves that received colostrum from a surrogate dam and calves that received 1 bottle of pooled colostrum from several cows as is standard dairy practice. These calves will be followed during the first few years of life to observe the lasting effects of the colostrum that they received directly after birth. Measurements will include growth rates and levels of proteins, microRNA and microbes that were transferred through the colostrum to the calves to determine which of these are important for calf health and performance.
	Any other information	

GENERAL INFORMATION	
Contact details	Professor Stefan Hiendleder Roseworthy Campus, JS Davies Bldg. Room G05, stefan.hiendleder@adelaide.edu.au, Mobile: 0421054046
Research focus	We focus on identification of nonmendelian genetic and epigenetic components in the molecular architecture of quantitative traits. We uncover novel epigenetic and genetic effects on prenatal growth and their interactions with environmental factors. This allows us to identify and to develop new (epi)genetic markers and approaches to achieve optimal programming outcomes at birth that impact on postnatal health and performance.

PROJECT INFORMATION		
PROJECT 1	Title of the project	The imprinting status of type III iodothyronine deiodinase in cattle as QTL candidate for birthweight
	Co-supervisor	Dr. Karen Kind
	Aim of Project	To determine if the bovine type III iodothyronine deiodinase gene (DIO3) is imprinted (i.e., is expressed only from the paternally inherited allele as described for mouse) and analyse effects of imprinted DIO3 alleles on birthweight in a Droughtmaster resource population.
	Background information	Thyroid hormones are essential regulators of pre- and postnatal growth and development. Three deiodinases, type I, II, and III, contribute to activation and inactivation of the initially released hormone precursor T4 (thyroxine) into the biologically active T3 (triiodothyronine) or the inactive rT3 (reverse triiodothyronine). Inactivation of T4 by conversion into rT3 is particularly important during prenatal development. Type III iodothyronine deiodinase (DIO3) converts T4 into rT3 and is pivotal for fetal growth regulation. The DIO3 gene in cattle is localised in a QTL region for birth weight and the gene is subject to genomic imprinting with expression from the paternal allele only in mouse. Our real-time qPCR data from fetal tissue of purebred and reciprocal cross Angus and Brahman fetuses show genetic effects consistent with imprinting of DIO3, but allele-specific imprinted expression has not been demonstrated. A SNP that can be used to track parent-of-origin specific allelic expression, i.e., demonstrate imprinting, and test QTL effects on birth weight and other traits in our Droughtmaster resource population has been identified.
	Methodology to be used	The candidate will gain an understanding of endocrine factors and (epi)genetic mechanisms controlling prenatal growth and its impact on postnatal outcomes. Standard molecular tools such as PCR and restriction enzyme digests as well as more advanced techniques such as pyrosequencing will be applied to obtain data. Allelic effects will be validated and quantified using linear models in SPSS or SAS.
	Any other information	Eligible to apply for the JR Barker Scholarship @ $4,000
PROJECT 2	Title of the project	Effects of mitochondrial DNA haplotype on metabolic response to experimentally induced intrauterine growth restriction
	Co-supervisors	Dr. Kathy Gatford, Dr. Karen Kind
	Aim of Project	To determine effects of mitochondrial DNA haplotype on extent and response to placental restriction in sheep.
	Background information	Mitochondrial DNA (mtDNA) is maternally inherited and contains essential genes for cellular energy production, cell signalling and growth and development. Based on its major function in metabolism, mitochondrial DNA sequence variation has been associated with a

		range of metabolic parameters and disorders, including type 2 diabetes. We have previously established a reference mitochondrial genome for sheep and subsequently demonstrated that domestic sheep show 5 major mtDNA variants or haplotypes that are not breed-specific (Hiendleder et al. 1998, J Mol Evol 47:441-8; Meadows et al. 2011, Heredity 106:700-6). Individuals who grew poorly before birth are at increased risk of diabetes, partly because they have reduced insulin sensitivity compared to individuals who were of normal size at birth. In this project, we are exploring whether sheep with different mtDNA haplotypes respond differently to experimentally induced placental and thus fetal growth restriction and whether these growth-restricted individuals differ in level of insulin sensitivity and glucose control. This experiment is expected to provide basic non-mendelian genetic information for livestock production and human health alike.
	Methodology to be used	The candidate will extract total cellular DNA from frozen tissues and assign animals with a full phenotypic record (e.g., birthweight, postnatal growth performance, insulin sensitivity) to mtDNA haplotype groups by RFLP analyses and/or DNA sequencing. Haplotype information will be used to test for mtDNA effects on phenotype in statistical models using SPSS and/or SAS.
	Any other information	Eligible to apply for the JR Barker Scholarship @ $4,000

GENERAL INFORMATION	
Contact details	Dr Todd McWhorter Eastick Building 1.11, Roseworthy Campus todd.mcwhorter@adelaide.edu.au Phone: 8313 7896
Research Focus	Comparative physiology- gastrointestinal and renal, nutrition, heat tolerance/stress; Physiological ecology; Conservation physiology. Physiology of heat stress in birds.
Honours Projects	Students with a particular interest in these areas are welcome to contact Todd to discuss project ideas.

GENERAL INFORMATION	
Contact details	Dr Hayley McGrice Davies Bld, Roseworthy Campus. Phone: 8313 7640 hayley.mcgrice@adelaide.edu.au
Research focus	Hayley's education research interests focus on team-based learning and the introduction of the small groups discovery experience (SGDE). Students' perceptions of team-based and peer-assisted learning and the effectiveness of the SGDE are of particular interest.

PROJECT INFORMATION		
PROJECT 1	Title of the project	Enhancing learner engagement and fostering peer-assisted learning through Team Based Learning at the University of Adelaide
	Co-supervisors	Dr Susan Hazel (SAVS) and Dr John Willison (School of Education)
	Aim of Project	This project aims to qualitatively assess learner engagement during team-based and small group learning activities and also to gauge students' perceptions of group work and peer assisted learning through surveys and small focus groups.
	Background information	It has long been known that students construct and acquire in-depth knowledge by participating in discussions, debating, questioning, inquiring and explaining, which leads to active and engaged learning. In recent years, the principles of team-based and peer assisted learning have been implemented in several courses at the University of Adelaide with the aim of improving learner engagement and hence enhancing learning outcomes. With such a strong emphasis on team-based and small group learning, this project is designed to assess whether this style of teaching is actually increasing learner engagement and being well received by the undergraduates from a range of degrees with varied career interests.
	Methodology to be used	Qualitative assessment of student behaviour and engagement, survey, interviewing focus groups, statistical analysis

GENERAL INFORMATION	
Contact details	Dr Alex Whittaker alexandra.whittaker@adelaide.edu.au Phone: 8313 7868
Research focus	My research interest is in animal welfare and law. Whilst my interest focus is primarily in research animals I have studies of other species in welfare projects. Main research focus is on procedural/husbandry improvements that can refine animal use in this area.

PROJECT INFORMATION		
PROJECT 1	Title of the project	Validation of the real-time mouse grimace score
	Co-supervisors	Prof. Gordon Howarth
	Aim of Project	The mouse grimace score (MGS) has been widely used to evaluate pain in laboratory mice. The published method generally requires retrospective analysis of video material. However, in laboratory animal practice, in order to implement pain relief it would be more beneficial to be able to use real-time scoring. This project will validate a real-time scoring method of mouse grimace scoring against video retrospective analysis.
	Background information	Pain assessment in laboratory animals is important from an animal welfare and ethical point of view. The MGS has been widely used but results are retrospective and therefore of most value as a research tool. In order to be used for welfare assessment and implementation of humane endpoints a real-time method needs to be validated.
	Methodology to be used	Behavioural analysis

GENERAL INFORMATION	
Contact details	Alex Whittaker
Overview	Animal welfare and law. Main research focus is on procedural/husbandry improvements that can refine animal use in this area. We generally use techniques for assessment of positive welfare state for example cognitive bias testing.

PROJECT INFORMATION		
PROJECT 1	Title of the project	Validation of a Novel Method of Judgement Bias Testing in Rats
	Co-supervisor names	Dr Tim Barker, Ms Laura Latimer-Marsh
	Aim of Project	To validate a shortened method of judgement bias testing in rats.
	Background information	We have performed the cognitive bias task multiple times in our laboratory (see Barker et al 2016, 2017) and feel confident in the ability for the test to work. However, training times are long and labour intensive (around 60 days). A recently published paper (Brydges and Hall 2017) describes a shortened method of training in this task using the same apparatus (learning of the task took 4 days). This study will validate this new method of training through administration of a pro- and anti-depressant drug.
	Methodology to be used	Judgement bias behavioural testing
	Any other information	This project is part of a larger grant-funded project examining miRNA's as a method of welfare assessment.

Companion Animal Health

GENERAL INFORMATION	
Contact details	Dr Suong NT Ngo Office G9, Corridor Building. Phone: 83130660 suong.ngo@adelaide.edu.au
Research focus	Xenobiotic Metabolism in Australian marsupials.

PROJECT INFORMATION		
PROJECT 1	Title of the project	Xenobiotic Metabolism in Australian Marsupials
	Co-supervisor	Prof Ross McKinnon, Flinders University
	Aim of Project	To investigate the dietary effect of eucalyptus terpenes on drug metabolising enzyme CYPs and UGTs in Australian marsupials.
	Background information	While most animals tend to select food low in potentially toxic chemicals, several Australian marsupials rely on eucalyptus leaves as a major or only food source. In order to ingest and absorb such large quantities of toxic plant secondary metabolites in these leaves, specialist eucalyptus feeders such as the koala must have evolved highly specialised detoxification mechanism involved several liver enzyme systems. The findings will contribute to the knowledge of the metabolic capacity of Australian marsupials, especially at the molecular level that is limited at present.
	Methodology to be used	Enzymatic assay, gene cloning (RT-PCR, RACE), immune-blot, cell culture work

GENERAL INFORMATION	
Contact details	Dr Anne Peaston Phone: 8313 1926 anne.peaston@adelaide.edu.au
Research Focus	I have many interests, some of which are reflected in the projects below (cancer genetics and predisposition in dogs, unique features of cat biology). My major research project examines gene expression in cells predestined to become cancers, and what junk DNA has to do with the process of cancer formation.

PROJECT INFORMATION		
PROJECT 1	Title of the project	Kit gene mutations in canine mast cell tumours
	Co-supervisor names	Professor Allan Kessell, James Cook University
	Aim of Project	Develop a comprehensive picture of the prevalence of specific spontaneous mutations in c-Kit in an unbiased population of Australian dogs
	Background information	In the era of molecular diagnostics and molecular targeted cancer therapy, it is useful to know the probability that a particular tumour has a particular molecular characteristic. This ongoing project will provide such data for the Australian dog population.
	Methodology to be used	DNA extraction & purification, PCR, collection of demographic data.
	Any other information	This project has funding from the Australian Companion Animal Health Foundation
PROJECT 2	Title of the project	Why are cats so sensitive to the insecticide permethrin, unlike other mammals and birds?
	Co-supervisor names	
	Aim of Project	Compare specific features of feline voltage-gated sodium channels with those of other species to determine explain feline sensitivity to permethrin.
	Background information	Voltage-gated sodium channels are a major target of permethrin in insects and other species. Unlike insects, most mammals are very resistant to the effects of permethrin, but cats are easily poisoned.
	Methodology to be used	In silico analyses of protein structure and potential function; possibly cloning and sequencing mRNA from cat central nervous system.

GENERAL INFORMATION	
Contact details	Dr Anthony Nicholson Companion Animal Health Centre 8313 1931 anthony.nicholson@adelaide.edu.au
Research focus	Most of my research interests focus on sedation, anaesthesia and analgesia of domestic animals and wildlife.

PROJECT INFORMATION		
PROJECT 1	Title of the project	Efficacy of Trazodone as an anxiolytic in shelter dogs and an evaluation of possible haematological and biochemical changes
	Co-supervisor	Dr. Susan Hazel
	Aim of Project	To assess the safety and efficacy of trazodone as an anxiolytic in young healthy dogs.
	Background information	Trazodone is a unique type of anti-depressant for use in humans. It has been used in veterinary medicine to reduce anxiety in dogs prior to visits to veterinary clinics as well as to reduce aggression. It has also been used post-operatively as an anxiolytic in dogs that required long term cage rest following orthopaedic procedures. Little information is available in regard to other possible effects of trazodone administration.
	Methodology to be used	RSPCA dogs admitted to the CAHC for routine desexing will be split into a treatment and a control group on the day of arrival. Blood samples will be taken from at this time for haematological and biochemical analyses. Treatment dogs will then be treated with trazodone 3 times daily for the duration of their stay, approx. 3 days. Further blood samples will be taken for repeat analyses. Various behaviours will be observed and documented from both groups. Differences in behaviour and blood parameters will be assessed.
	Any other information	Eligible to apply for RSPCA Welfare Scholarship

Equine Health

GENERAL INFORMATION	
Contact details	Dr Sam Franklin Equine Health and Performance Centre Ph. 8313 7931 sam.franklin@adelaide.edu.au
Research focus	Sam's clinical and research interests relate to causes of poor performance in equine athletes, with a particular interest in cardiorespiratory disorders.
Honours projects available in 2017	Likely to offer projects related to: equine athletic performance cardiorespiratory disorders in equine athletes equine gastric ulceration

GENERAL INFORMATION	
Contact details	Dr Jose Len Equine Health and Performance Centre Phone: 8318 1977 (EH&PC main office) or 8313 0668 (my office). E-mail: jose.lenyin@adelaide.edu.au
Research focus	In vitro production of equine embryos. Focused on the improvement of equine oocyte maturation and intracytoplasmic sperm injection.

PROJECT INFORMATION		
PROJECT 1	Title of the project	Improvement of equine oocyte maturation rates in vitro
	Co-supervisor names	Karen Kind, Jen Kelly and Kirsty Gallacher
	Aim of Project	Increase in vitro maturation rates of equine oocytes with the addition of gonadotropins in the maturation medium
	Background information	Equine oocytes have lower rates of maturation in vitro compared to other species. Studies on equine oocyte maturation, fertilization and embryonic development are lagging compared to other species. Factors responsible for the lower in vitro maturation of equine oocytes may include: 1) difference in the hormonal stimuli during in vivo maturation in the mare compared to other species, 2) method of collection may cause partial or complete loss of cumulus cells, 3) lower number of recovered oocytes leading to less stringent selection criteria of oocytes for maturation and 4) high proportion of oocytes recovered have low meiotic competence.
	Methodology to be used	Oocytes from mare ovaries will be recovered, and matured in vitro in media containing different gonadotropins concentrations. After the maturation period, oocytes will be assessed for achievement of metaphase II of meiosis.
PROJECT 2	Title of the project	Improvement of equine oocyte maturation rates in vitro
	Co-supervisor names	Karen Kind, Jen Kelly and Kirsty Gallacher
	Aim of Project	Increase in vitro maturation rates of equine oocytes with the addition of growth factors in the maturation medium
	Background information	Equine oocytes have lower rates of maturation in vitro compared to other species. Studies on equine oocyte maturation, fertilization and embryonic development are lagging compared to other species. Factors responsible for the lower in vitro maturation of equine oocytes may include: 1) difference in the hormonal stimuli during in vivo maturation in the mare compared to other species, 2) method of collection may cause partial or complete loss of cumulus cells, 3) lower number of recovered oocytes leading to less stringent selection criteria of oocytes for maturation and 4) high proportion of oocytes recovered have low meiotic competence.
	Methodology to be used	Oocytes from mare ovaries will be recovered, and matured in vitro in media containing different growth factor concentrations. After the maturation period, oocytes will be assessed for achievement of metaphase II of meiosis.

PROJECT 3	Title of the project	Comparing the selection protocols of caprine cryopreserved sexed semen for in vitro fertilization (IVF)
	Co-supervisor	Dr Jen Kelly
	Aim of Project	Determine the best sperm selection protocol of cryopreserved sexed semen for IVF in goats
	Background information	Use of sexed semen has great benefits for producers as they can manage the sex the females within a herd will produce. The process of sexing an ejaculate is an expensive process and cause damage to the integrity of the spermatozoa. In addition cryopreservation will cause further damage to the spermatozoa resulting in a decrease number of cells fertilizing capabilities. Before thawed semen is used for IVF, a selection of normal and motile spermatozoa is performed. This step has the potential of causing further damage to spermatozoa.
	Methodology to be used	Caprine cryopreserved sexed semen will be thawed and selection of sperm performed using three protocols. Following selection, sperm motility, plasma membrane integrity and fertilization ability will be assessed.
PROJECT 4	Title of the project	In vitro capacitation of frozen-thawed equine sperm
	Co-supervisors	Drs Jen Kelly and Kirsty Gallacher
	Aim of Project	Determine the time required for frozen-thawed equine sperm to become hyperactivated.
	Background information	In vitro capacitation of equine sperm has proven difficult. Recently a promising capacitation protocol has been established resulting in sperm hyperactivation and tyrosine phosphorylation. The protocol was tested in fresh equine semen and the time required for sperm to become capacitated was 6 hours. For assisted reproduction (e.g. IVF) frozen semen is commonly utilized and during the cryopreservation process sperm suffer capacitation-like changes. Due to these capacitation-like changes, sperm may behave differently using the proposed capacitation protocol and time to hyperactivation may be less; however this is unknown.
	Methodology to be used	Frozen-thawed equine semen will be placed in capacitation conditions. At hourly intervals a sample will be obtained and sperm motility pattern, tyrosine phosphorylation and acrosomal reaction assessed.

PROJECT 5	Title of the project	In vitro quality of frozen-thawed canine semen using amides as cryoprotectant
	Co-supervisor	
	Aim of Project	To evaluate the effectiveness of dimethyl formamide as cryoprotectant for dog semen
	Background information	Amides have been successfully used to freeze sperm in other species (e.g. equine). Glycerol has commonly been used to freeze canine semen; however glycerol cause great osmotic stress to sperm cells due to its high molecular weight. Evaluating the efficacy of cryoprotectants that cause less osmotic stress to sperm cells may allow the improvement of canine semen freezing protocols.
	Methodology to be used	Dog semen will be collected and frozen using freezing extenders with glycerol and dimethyl formamide as cryoprotectants. The semen post-thaw quality (total motility, progressive motility, plasma membrane integrity and DNA integrity) will be assessed and compared.
PROJECT 6	Title of the project	The effect of freezing stallion semen without egg yolk
	Co-supervisor	
	Aim of Project	To determine if stallion semen can be frozen without the use of egg yolk as cryoprotectant
	Background information	Stallion freezing extenders commonly contain egg yolk as a non-penetrating cryoprotectant. Egg yolk is an animal product with the potential carrying transmissible diseases. Developing freezing extenders without animal products will eliminate the possible transmission of diseases and may facilitate frozen semen trading around the world.
	Methodology to be used	Stallion semen will be collected and frozen using freezing extenders with and without egg yolk. The semen post-thaw quality (total motility, progressive motility, plasma membrane integrity and DNA integrity) will be assessed and compared.

GENERAL INFORMATION		
Contact details		Marco Lopes, MV, MS, PhD Equine Health and Performance Centre Phone: 8318 1977 (EH&PC main office)
Overview		Marco's main clinical and research interests: equine surgery, intensive care, lameness and gait analysis.
PROJECT INFORMATION		
PROJECT 1	Title of the project	Prevalence and significance of lameness in sports horses in training and/or competition
	Co-supervisor names	TBA
	Aim of Project	To investigate the prevalence of objectively detected lameness in one type of sports horses (Thoroughbred racehorses, Standardbred racehorses, jumpers or dressage horses) and its impact on performance during training and/or competitions throughout the season.
	Background information	Lameness is the most common clinical problems in horses and compromises performance and horse welfare since it is typically associated with pain. Continuous use of a lame horse in training and/or competitions can lead to aggravation of injuries. I.e., Potentially treatable lesions can become more difficult or even impossible to treat; Secondary lesions on another body part may occur due to the abnormal motion adopted by the horse with the aim of minimizing pain; Pre-existing lesions can result in catastrophic injuries (i.e., sudden breakdown of a structure or limb during exercise). The prevalence of lameness in sports horses appears to be high but has not been investigated yet in a well conducted study in the field using an objective method. Limited evidence based on horses with experimentally-induced lameness exercised on a treadmill indicates that lameness compromises performance of sports horses, but long term studies investigating the impact of lameness on a group of horses through an entire season has not been conducted yet.
	Methodology to be used	After obtaining written consent from horse owners, a portable inertial sensor-based system (PISBS) will be used to non-invasively detect and quantify lameness at the trot in 30 sports horses once a month over the entire season. All lameness evaluations will be recorded in digital video and the images will be used for subjective detection and quantification of lameness. Correlations between occurrence and severity of lameness and performance during training and competition will be investigated.
	Any other information	
PROJECT 2	Title of the project	Temporal variability of lameness in horses kept on pasture and not subjected to controlled exercise
	Co-supervisor names	TBA
	Aim of Project	To investigate the temporal variability of objectively detected lameness in horses kept on pasture and not subjected to controlled exercise.
	Background information	Lameness is the most common clinical problems in horses. Lameness compromises performance and horse welfare since it is typically associated with pain. Clinical observation suggests that lameness is quiet variable overtime, but well controlled studies investigating the temporal variability of lameness in horses are lacking. Even in horses not used for any kind of work, it seems likely that they may occasionally hurt themselves while exercising freely and/or fighting each other. These lamenesses unrelated to work likely persist, spontaneously resolve or are eventually changed (aggravated or masked by lameness in another limb) by more recent injury.

	Methodology to be used	A portable inertial sensor-based system (PISBS) will be repeatedly used to non-invasively detect and quantify lameness at the trot in 12 adult horses belonging to the University of Adelaide according to the following protocol: One lameness evaluation every hour for 6 consecutive hours; then one evaluation every 6 h for 36 consecutive hours; then one evaluation every 24 h for 6 consecutive days; then one evaluation once a week for 6 consecutive weeks; then one evaluation once a month for 6 consecutive months (total 30 lameness evaluations per horse). All lameness evaluations will be recorded in digital video and the images will be used for subjective detection and quantification of lameness. Temporal variability of the affected limb(s) and lameness severity will be quantified. Agreement between the 2 approaches for lameness evaluation (PISBS vs. subjective evaluation of videos) will also be quantified.

GENERAL INFORMATION		
Contact details		Dr Olivier Simon Equine Health & Performance Centre Ph 83132613 olivier.simon@adelaide.edu.au
Overview		Equine lameness and biomechanics Minimal invasive surgery
PROJECT INFORMATION		
PROJECT 1	Title of the project	An ex-vivo biomechanical testing of the effect of palmar annular volar ligament transection on the inter-sesamoid ligament on equine cadaver limbs
	Co-supervisor names	TBD – Potential collaborative work with Flinders University
	Aim of Project	Define the potential detrimental effect of the surgical transection of the palmar annular volar ligament on the inter-sesamoid ligament of athletic horses.
	Background information	The transection of the palmar annular volar ligament of the fetlock is regularly performed as part of the surgical assessment and treatment of non-septic tenosynovitis of the digital flexor tendon sheath in horses. There exists a controversy about this intervention as some consider this ligament as an important part of the stability between the two proximal sesamoid bones. The hypothesis of the project is that this very regularly performed intervention has no significant consequences on the stability of the proximal sesamoid bones between each other and no significant detrimental effect on the inter-sesamoid ligament as sometimes expressed as a contra-indication for the surgery.
	Methodology to be used	Separated cadaver legs will be assessed in an Instron Universal testing machine and the relative stability between the proximal sesamoid bones and stresses occurring on the inter-sesamoid ligament will be recorded before and after surgical transection of the palmar annular volar ligament. Each leg will be used as its own reference. The project will assess the biomechanical difference that may exist between the front and the hindlegs
	Any other information	Strong confidence that this project will lead to a publication in peer reviewed journal

Pathobiology, Infectious Disease and Public Health

GENERAL INFORMATION		
Contact details		Dr Ryan O'Handley ryan.ohandley@adelaide.edu.au 8313 7656
Overview		Parasites and parasitic diseases of livestock and companion animals
PROJECT INFORMATION		
PROJECT 1	Title of the project	Prevalence of the cat lungworm Aelurostrongylus abstrusus in domestic and feral cats in South Australia
	Co-supervisor names	
	Aim of Project	A survey to examine the prevalence of lungworm in cats in South Australia
	Background information	The feline lungworm Aelurostrongylus abstrusus is a metastonglid parasite of the cat's respiratory tract. It can cause acute or chronic respiratory disease and is transmitted to cats via a mollusc intermediate host. Recent anecdotal reports suggest the parasite may be common in cats in South Australia, however no work has ever been conducted in this area.
	Methodology to be used	Faecal samples will be collected from both domestic and feral/stray cats and the Baermann technique will be used to diagnose the infection in cats. The prevalence between feral and domestic cats will be compared as well as the spatial distribution of the parasite
	Any other information	
PROJECT 2	Title of the project	Longitudinal study of Giardia and Cryptosporidium infections in lambs
	Co-supervisor names	
	Aim of Project	The natural course of Giardia and Cryptosporidium infection in lambs will be determined and species/strains will be characterised genetically.
	Background information	The protozoal parasites Giardia and Cryptosporidium are common in livestock. In dairy calves, the incidence of infection is 100% and the parasites can be significant causes of diarrheal disease. However, there little work on the incidence of infection in lambs and it is not known when lambs become infected with these parasites. It is also not known if these parasites are associated with clinical disease in lambs.
	Methodology to be used	Immunofluorescence microscopy will be used to enumerate cyst and oocyst excretion in the faeces of a group of lambs from birth until 20 weeks of age. DNA sequencing will be used to characterise the genotypes/species of Giardia and Cryptosporidium identified in the samples
	Any other information	
PROJECT 3	Title of the project	Occurrence and distribution of ticks in South Australia
	Co-supervisor names	
	Aim of Project	To determine the specie and location of ticks within South Australia
	Background information	A recent outbreak of the tick-transmitted parasitic disease Theileriosis in South Australia has raised questions regarding the presence of the tick vector. There is very little current information on the species of ticks that occur in South Australia or where they are distributed.
	Methodology to be used	Ticks will be collected, enumerated and identified from various regions of the state. Tick traps and tick flagging techniques will be used to collect the ticks. Molecular techniques will also be used to determine if the ticks are carrying known tick transmitted pathogens

GENERAL INFORMATION		
Contact details		Emma Greenwood, emma.greenwood@adelaide.edu.au, 0411375579
Brief Overview		My current research focus is the effect of manipulation of neonatal ruminant microbiota in order to effect long term productivity and health. I am a year into my post-doctoral position for which this is the focus, but my PhD was on pig housing and behaviour.
PROJECT INFORMATION		
PROJECT 1	Title of the project	The effect of inoculation of the neonatal ruminant with foreign microbiota on the development of the innate immune system, analysed through rumen and intestinal histology.
	Co-supervisor names	Phil Hynd
	Aim of Project	To analyse the effect of inoculation of neonatal lambs with known populations of rumen microbes on the development of the innate immune system.
	Background information	The gastrointestinal tract is a major interface between the host and its environment and is the site with the highest load of microorganisms. In order for microbiota populations to exist within the host, the immune system must tolerate those organisms, whilst simultaneously remaining vigilant against the potential threats posed by them. There are benefits accompanying this balancing act. Mounting evidence supports that the gut microbiota play a crucial role in the host resistance to invading pathogens in the intestines. Alterations and disturbances in microbiota, along with a reduction in diversity, may alter the risk of development of allergies, obesity, metabolic syndrome, inflammatory bowel diseases (such as Crohn's disease and ulcerative colitis) and autoimmune diseases (type 1 diabetes) and other inflammatory related problems in humans. The GIT epithelium plays an important role in the immune system and it is clear that the presence or absence of gut microflora have an effect on immune composition and lymphoid tissues.
	Methodology to be used	This project will not involve any animal work, as this has been completed previously and will therefore be great for anyone who wants to get some good laboratory experience. The experiment will involve completing histological slides of stored lamb intestinal tissues and analysing markers of innate immunity in the collected tissues.
	Any other information	

GENERAL INFORMATION		
Contact details		Farhid Hemmatzadeh farhid.hemmatzadeh@adelaide.edu.au
Overview		Molecular biology of viral infectious diseases. The available research projects are focused on avian influenza virus, Newcastle disease virus, Infectious canine hepatitis virus and Koala retrovirus.
PROJECT INFORMATION		
PROJECT 1	Title of the project	Pathogenesis of newly emerged Newcastle disease virus in South East Asia
	Co-supervisor names	Dr Milton McAlister
	Aim of Project	Detection of molecular basis of Newly emerged Newcastle disease virus in South East Asia
	Background information	A highly pathogenic Newcastle disease virus has emerged in South East Asian countries. The existing vaccines cannot provide proper protection against the new virus. During this project we will investigate molecular basis of pathogenicity of the virus and provide preliminary information to develop new vaccines for protection of poultry in Indonesia.

	Methodology to be used	Sequencing and transcriptomics analysis of infected tissues and isolated viruses.
	Any other information	The project has funded by Australian Centre for International Agriculture Research (ACIAR)
PROJECT 2	Title of the project	Evaluation of monoclonal antibodies in detection of Avian influenza antigens
	Co-supervisor names	TBA
	Aim of Project	Different recombinant and non-recombinant monoclonal antibodies against M2e antigen of avian influenza virus will be evaluated to find the most reactive antigens and antibodies.
	Background information	A panel of monoclonal antibodies is developed in last few years in virology research lab. These antibodies has different reactivity to the viral antigens. The reactivity of these antibodies will be evaluated against short peptides and the whole antigen will be mapped in peptide ELISA methods.
	Methodology to be used	ELISA and peptide mapping as serological test and purification and isotyping of the monoclonal antibodies using affinity methods.
	Any other information	The project has funded by Australian Centre for International Agriculture Research (ACIAR). A paper will be published in a high ranking journal.
PROJECT 3	Title of the project	Isolation and evaluation of protein pattern of Koala retroviruses
	Co-supervisor names	TBA
	Aim of Project	Antigenic pattern of isolated Koala retroviruses in South Australia
	Background information	We have access to wide ranges of Koala retroviruses in South Australia. The viruses will be cultured and isolated in proper cell cultures.
	Methodology to be used	Cell culture, virus isolation and purification and Western blotting for detection of the viral antigens.
	Any other information	
PROJECT 4	Title of the project	Full genome sequencing of recombinant strains of Canine Adenoviruses (ICH)
	Co-supervisor names	Lucy Woolford
	Aim of Project	Sequencing the entire genome of newly isolated Infectious Canine Hepatitis viruses
	Background information	A new ICH virus has isolated from few infected dogs, the preliminary data showed a recombination in one of the genes. Full genome sequencing will be performed to find the genomic structure of the virus.
	Methodology to be used	Full genome sequencing and genomic analysis for the isolated viruses.

GENERAL INFORMATION	
Contact details	Dr Andrea R. McWhorter (andrea.mcwhorter@adelaide.edu.au) Phone: 8313 7907 Office: Corridor Block G8
Overview	Our research is focussed on understanding the behaviour of Salmonella and Campylobacter species in the poultry (layer and broiler) farm environment and how these bacteria are able to persist in the food chain. Another aspect of our work is to understand virulence aspects of both Salmonella and Campylobacter which contribute to human disease.

PROJECT INFORMATION		
PROJECT 1	Title of the project	Exploring the interactions between Salmonella and Campylobacter species.
	Co-supervisor names	Associate Professor Kapil Chousalkar
	Aim of Project	To characterise both intra- and intercellular interactions between Salmonella and Campylobacter.
	Background information	Infection with Campylobacter and Salmonella species are the top to causes of bacterial-related, foodborne gastrointestinal disease. Both bacterial species are commonly found in the farm environment. It is not known, however, how these to bacterial species interact in a co-infection.
	Methodology to be used	Isolation and culture of primary cell lines, transfection of bacteria with fluorescent plasmid, fluorescent microscopy, lymphocyte proliferation assays.
	Any other information	
PROJECT 2	Title of the project	A sweet treat? Salmonella in raw egg based desserts
	Co-supervisor names	Associate Professor Kapil Chousalkar
	Aim of Project	To understand the behaviour of Salmonella in mousse, tiramisu, and custard
	Background information	Many savoury raw egg based food items such as aioli, are acidified to control bacteria. We have found that the culturability the in vitro invasiveness of the bacteria is reduced over time. Desserts, however, generally are not acidified and are frequently identified during salmonellosis outbreaks. This project will explore the behaviour of Salmonella Typhimurium in sweet foods to determine whether the bacteria exhibits enhanced growth and/or increase virulence.
	Methodology to be used	Preparation of raw egg based desserts. Basic bacteriological culture. Cell culture for in vitro invasion assays
	Any other information	
PROJECT 3	Title of the project	Viable but non-culturable bacteria: Understanding the risks for food safety.
	Co-supervisor names	Associate Professor Kapil K. Chousalkar
	Aim of Project	To determine the ability of viable but non culturable bacteria (Salmonella or Campylobacter species) to cause disease.
	Background information	Salmonella or Campylobacter species both cause gastrointestinal disease in humans and other mammals. Consumption of contaminated food is the primary source for both bacterial species. Often, the bacteria may be in a reduced virulence state (viable but non-culturable) in a food item. It is currently not known to what degree these bacteria contribute to causing disease.
	Methodology to be used	Basic bacteriology of either Salmonella or Campylobacter. Cell culture for in vitro invasion assays. Culture of C. elegans. Fluorescent microscopy.
	Any other information	

GENERAL INFORMATION	
Contact details	Dr Stephen Pyecroft Office G1b Leske Building, Roseworthy Campus, University of Adelaide Work Phone 08 8313 7823 Mobile 0414478630 stephen.pyecroft@adelaide.edu.au

Research focus		I have a broad range of research interests having lead roles in the research into Devil Facial Tumour disease and aquatic animal health (particularly farmed, ornamental and research fish populations). Most of my projects aim to increase the understanding of disease agents and their effects leading to the development of better diagnostic tools for their detection.
PROJECT INFORMATION		
PROJECT 1	Title of the project	The use of histopathology in Pacific oyster (Crassostrea gigas) health surveillance.
	Aim of Project	To assess serial temporal samples collected over 2015 & 2016 from an oyster farm at Coffin Bay, for health and signs of disease. The assessment (of gross and histopathological findings) will lead to an analysis of pathological changes and how they relate to oyster health. During the project the students will develop an understanding of pacific oyster health from SA production units and develop the procedures for a sate wide oyster health surveillance program.
	Background information	Edible oysters are a significantly important part of the SA aquaculture industry and an understanding of their health and significant diseases is fundamental for a sustainable industry. The development of a surveillance program is critical for early detection of disease incursion to SA oyster stocks.
	Methodology to be used	Samples will be collected for DVM 3 student's practicals and will be processed and examined (histologically) for documented signs of health and disease. The student will be involved in normal histological techniques and develop skills for reading histology of oysters, correlating data and possibly discovering undescribed oyster conditions.
	Any other information	There will be opportunities for the student to visit farm sites.
PROJECT 2	Title of the project	Studies in stress and the effect of physical environmental enrichment for Zebrafish (Danio rerio) used for research.
	Co-supervisor	Dr Susan Hazel and Dr Malcolm France – consultant external to UA
	Aim of Project	Assess the effects of physical enrichment in the tank environment of Zebrafish held for research. The study will aim to validate methods for assessing stress in Zebrafish before comparing tanks of fish with and without environmental enrichment.
	Background information	Zebrafish are rapidly becoming the research animal of choice for animal model development for studies including basic physiological, disease pathogenesis and developmental research. Whilst the fish are used for specific purposes within such projects very little is done to understand the fish themselves in terms of optimum environment and social interactions. If fish are stressed during experimental procedures then results could be flawed. Understanding the possible biases produced by stress is critical when assessing whether the developed fish model design is appropriate..
	Methodology to be used	Initial validation of techniques for measuring tank water cortisol levels will be undertaken. Cortisol levels (whole fish and water concentrations) will be measured from fish subject to a number of treatments. The effects of stress on lymphocyte telomere length will also be assessed as a measure of stress effect. Behavioural observations will also be incorporated to assess stress behaviour. The project will then study the effects of a simple device sold as the "Zeb" (hide) for affecting fish behaviour and stress reduction.
	Any other information	Provision of hides for the project from External collaborator.
PROJECT 3	Title of the project	The use of Australian Zeolite for ammonia control in aquarium fish tanks: water and feed inclusion.
	Aim of Project	To study the effects of in water and in feed application of zeolite powder for the control of ammonia in aquarium fish display tanks.
	Background information	'New tank syndrome" or toxic ammonia build up after establishment of a new tank setup is a common and fatal problem for aquarium fish. Ammonia is constantly produced as a nitrogenous waste from fish and without the appropriate biological flora in a new tank set up, ammonia is not converted to less toxic nitrate. Zeolite is naturally occurring ion exchange clay that absorbs ammonia from freshwater. Addition of zeolite powder to water and mixed infeed may help aquarist to manage new tank syndrome.
	Methodology to be used	This project aims to establish the activity of a commercial zeolite powder and test its possible applications as a water additive or as a dietary supplement.
PROJECT 4	Title of the project	Studies into the most appropriate diet for Zebrafish (Danio rerio)
	Aim of Project	Using natural diet information and experimentation the project aims to develop diet recipes for a variety of life stages of Zebrafish
	Background information	Zebrafish are held in their millions in research tanks around the world. There are a range of commercial diets available for the fish, based upon 'best fit' from other species

		similar to Zebrafish. There is demand from the colony managers to have appropriate feeds available for all life stages of the fish.
	Methodology to be used	Data analysis of natural diet composition will be undertaken to guide the development of commercial diets. This information will be attained from literature and /or GIT content analysis from native sourced fish and pond captive fish. Analysis of preferred species consumption will be undertaken. Biochemical analysis of content meal will be undertaken and then ration formulation form known commercial ingredients. Diets will then be assessed by feeding age groups over time with growth and survival measurements being taken.
PROJECT 5	Title of the project	Efficacy/appropriateness of currently available commercial transport media swabs for use in aquatic animal disease diagnosis.
	Co-supervisor	Ken Lee
	Aim of Project	To investigate the appropriateness of commercially available transport media for pathogenic marine bacteria isolated from diseased fish.
	Background information	Aquaculture production of marine fish has developed in Australia to be a major primary production sector. With intensification of fish comes the emergence of infectious disease. For years there has been a suspicion amongst aquatic diagnosticians that transport of samples taken from fish in cases of bacterial infection may be affected by the type of media used to transport the samples.
	Methodology to be used	Known bacterial pathogens will be placed in various transport media for variable times at variable temperatures. Replicates of treatments will be undertaken to calculate the significance of the media effects on different species of bacteria. If time permits trials will be repeated on a specifically designed media for marine organisms.

GENERAL INFORMATION		
Contact details		Dr Chris McDevitt/Prof Darren Trott darren.trott@adelaide.edu.au Ph : 08 8313 7989
Overview		Bacterial resistance to heavy metals and its relationship to antimicrobial resistance in human and veterinary pathogens
A list of projects you have available for next year (If you do not have specific project details at this stage, but are happy for students to contact you to discuss potential projects, please indicate this.)		Resistance to heavy metals in an Australia-wide collection of multidrug-resistant enterotoxigenic Escherichia coli isolated from pigs. Mechanisms of heavy metal resistance in carbapenem-resistant Enterobacteriaceae isolated from humans, animals and the environment
PROJECT INFORMATION		
PROJECT 1	Title of the project	Resistance to heavy metals in an Australia-wide collection of multidrug-resistant Escherichia coli isolated from pigs.
	Co-supervisor names	Dr Sam Abraham, Murdoch University
	Aim of the project	Zinc and other heavy metals such as copper are often used as an alternative to treating post-weaning diarrhoea in pigs. Resistance to multiple antimicrobials is often a feature of Australian isolates of porcine ETEC and this project will explore evidence for co-selection of both heavy metal and antibiotic resistance on multidrug-resistance-encoding plasmids
	Any scholarships available	The successful applicant will be encouraged to apply for a Pork CRC or APL Honours scholarship. This project will be located in the School of Biological Sciences (Molecular Life Science Building), Nth Tce Campus.
PROJECT 2	Title of the project	Mechanisms of heavy metal resistance in carbapenem-resistant Enterobacteriaceae isolated from humans, animals and the environment
	Co-supervisor names	Dr Sam Abraham, Murdoch University

	Aim of the project	We have recently isolated a carbapenem-resistant Salmonella enterica serovar Typhimurium isolate from a shelter cat with diarrhoea and systemic illness. The isolate was resistant to nine classes of antimicrobial in addition to arsenic. A large multidrug resistance-associated plasmid contained other presumably non-functional heavy metal resistance associated genes. Similar plasmids have been isolated from humans, the environment and seagulls in Australia as well as from humans and the environment in Asia. This project will explore the in-depth mechanisms of heavy metal resistance in this isolate and explore the hypothesis that heavy metals in the environment are co-selecting for resistance to critically important drugs such
	Any scholarships available	Usual school based scholarships based on merit. This project will be located in the School of Biological Sciences (Molecular Life Science Building), Nth Tce Campus.

Production Animal Health

GENERAL INFORMATION		
Contact details		Colin.trengove@adelaide.edu.au Mb: 0418 808045
Overview		Sheep health and production with a particular focus on nutrition - especially trace elements. Current research focussed on ewe and lamb nutrition in relation to rib fracture incidence and prevention of hypocalcaemia as well as the impact of parasites on health and productivity.
PROJECT INFORMATION		
PROJECT 1	Title of the project	Investigating the cause and prevention of red gut in lambs grazing lucerne
	Co-supervisor names	Phil Hynd
	Aim of Project	To identify factors contributing to the incidence of red gut in lambs grazing lucerne. Develop strategies to prevent red gut from occurring
	Background information	Red gut is reported in the scientific literature globally as a cause of lamb loss, but the specific cause and solution remains uncertain. It is postulated that the primary aetiology is lack of fibre in the diet contributing to strangulation of the gut resulting in sudden death. It is almost exclusively associated with consuming 100% legume diets and is recognised to cause up to 10% mortality in some flocks in the upper south east. Some lamb producers claim to have significantly reduced their lamb mortality while grazing lucerne by the use of foliar sprays, but this has not been tested.
	Methodology to be used	On farm trials to examine the success of manipulating macro and trace element nutrition to livestock via soil and pasture to control or eliminate red gut as a cause of mortality in lambs grazing lucerne.
	Any other information	Lucerne Australia have identified red gut as the most important animal health issue to lucerne growers in the upper south east of SA. They are interested in contributing funds towards finding a solution to this disease.

GENERAL INFORMATION	
Contact details	dave.kleemann@sa.gov.au 04 2885 6497 Turretfield Research Centre, SARDI, Rosedale SA 5350

Overview		Ovine reproductive physiology – manipulation of the reproductive process to achieve efficient gains in production for the Australian sheep industry
PROJECT INFORMATION		
PROJECT 1	Title of the project	Maternal behaviour in Merino ewes and neuroendocrine parameters
	Co-supervisor names	Dr Dave Kleemann, Dr Jen Kelly, Dr Simon Walker, Dr Alan Tilbrook, Dr Will Van Wettere and Dr Karen Kind
	Aim of Project	Determine relationships between maternal behaviour and neuroendocrine parameters in the Merino
	Background information	Poor lamb survival in the Merino is well recognised by the sheep industry in Australia and despite considerable research over several decades more than 20% of lambs born succumb within a few days of birth. Inappropriate maternal behaviour is responsible for some of this loss. The current project will examine how neuroendocrine mechanisms modulate behaviour and provide clues on why the Merino is deficient in providing adequate care at parturition.
	Methodology to be used	Endocrine measurements will be taken on Merino ewes prior to and during parturition and related to measurements on maternal behaviour.

GENERAL INFORMATION		
Contact details		Dr William van Wettere Corridor building, G05 william.vanwettere@adelaide.edu.au
Overview		Improving neonatal survival in production animals (pigs and sheep in particular). Improving fertility and fecundity of pigs and ruminant species, with particular focus on ovarian function (oocyte quality)
PROJECT INFORMATION		
PROJECT 1	Title of the project	Effect of arginine supplementation on ovarian function in sows
	Co-supervisor names	Dr Jen Kelly
	Aim of Project	To increase ovarian blood flow and oocyte quality of sows lactating and weaned during summer and winter
	Background information	Seasonal infertility is a significant issue for the pig production, with studies in cattle indicating that heat stress reduces blood flow to the ovary, thus impairing ovarian function and fertility. Arginine increases blood flow to the reproductive tracts and is, therefore, a potential strategy to increase blood flow to the reproductive tract of sows during summer.
	Methodology to be used	A larger study is being conducted at Australia's largest pig production system (Rivalea, Australia), focussing on the effects of arginine supplementation prior to farrowing through to mating on farrowing performance and ovarian function post-weaning. Ovaries will be collected from Big River Pork abattoir (Murray bridge), oocytes will be collected for in vitro embryo production, with additional measures of oocyte developmental competence and ovarian function collected.
	Any other information	Ron Lienert Honours Scholarships can be applied for by students conducting pig related honours projects.
PROJECT 2	Title of the project	Improving survival of new born piglets and sow performance
	Co-supervisor names	None
	Aim of Project	To increase the reproductive output of sows by increasing piglet survival using supplementary nutritional strategies in late gestation
	Background information	New born piglets often fail to thrive immediately after birth. This can be caused either by adverse conditions experienced during parturition, or by inappropriate nutrition during the final stages of

		gestation. In addition to affecting fetal development, late gestation feeding can also affect sow performance during lactation and return to reproductive function post-weaning.
	Methodology to be used	Feeding specific compounds / amino acids to sows in late gestation (last three weeks) and determining effects on piglet characteristics and survival immediately after birth through to weaning, as well sow lactation performance and interval from weaning to oestrus.
	Any other information	Ron Lienert Honours Scholarships can be applied for by students conducting pig related honours projects.

GENERAL INFORMATION		
Contact details		Assoc Prof Roy Kirkwood roy.kirkwood@adelaide.edu.au Tel: 8313 7617
Overview		My interests lie primarily with control of sow reproductive function with the intent of improving fertility and breeding outcomes
PROJECT INFORMATION		
PROJECT 1	Title of the project	Improving timing of farrowing
	Co-supervisor names	Kate Plush
	Aim of Project	To determine whether a longer-acting oxytocin will enhance the timing of parturition and survivability of neonatal pigs
	Background information	Induction of parturition in sows is frequently performed in commercial practice. Oxytocin can also be administered to improve timing of piglet delivery. However, the commercially available products can also result in piglet hypoxia and increased stillbirths. This study will examine an alternate product to determine whether we can get the benefits of oxytocin without the problems.
	Methodology to be used	Sows will be induced using prostaglandin with or without addition oxytocin or carbatocin
	Any other information	Eligible to apply for Pork CRC and the Ron Lienert Memorial scholarships
PROJECT 2	Title of the project	Reducing sow pain/discomfort during farrowing: effects on lactation performance
	Co-supervisor names	Kate Plush
	Aim of Project	To alleviate sow pain/discomfort during parturition and determine whether this improves piglet performance
	Background information	Parturition, particularly with young sows, can be painful and/or stressful with potential adverse effects on subsequent lactation. This study will employ corticosteroid and/or NSAID treatments to reduce stress with subsequent monitoring of farrowing performance, neonatal piglet viability, and pre-weaning growth rate (a measure of milk yield).
	Methodology to be used	Sows will be treated prepartum or serve as controls and their farrowing performance monitored directly of via video. Piglet weights will be recorded at birth and weaning
	Any other information	Eligible to apply for Pork CRC and the Ron Lienert Memorial scholarships

PROJECT 3	Title of the project	Effect of pre-partum hCG on farrowing performance of older parity sows and their piglets viability
	Co-supervisor names	Kate Plush
	Aim of Project	To determine whether pre-partum hCG will elevate sow blood oestrogen with downstream effects on farrowing duration and neonatal piglet viability and preweaning growth and survival.
	Background information	Older sows suffer a disproportional rate of stillbirths, possibly due to inadequate uterine muscle tone. Parturition requires elevated oestradiol which, if limited, may result in poorer contractions with resultant stillbirths.
	Methodology to be used	Sows will be treated at specific times prepartum and the progress of farrowing and piglet viability and preweaning growth and survival monitored.
	Any other information	Eligible to apply for Pork CRC and the Ron Lienert Memorial scholarships

GENERAL INFORMATION		
Contact details		Prof Wayne Pitchford Wayne.Pitchford@adelaide.edu.au 0418809688
Overview		My primary work is in genetics of beef cattle. However, I have also supervised projects in sheep, goats, pigs and deer. Discipline areas also include meat science, physiology and feed efficiency, nutrition, filling feed gaps with novel feeds, modelling production systems, welfare, statistics, optimisation, extension methodologies and social science.
PROJECT INFORMATION		
PROJECT 1	Title of the project	Genomics of tropical composite beef cattle
	Co-supervisor names	Rick Terle, Stephen Lee, Michelle Hebart
	Aim of Project	Improving the accuracy of breeding value estimation in a commercial breeding program,
	Background information	We currently undertake genetic evaluation for a tropical beef breeding program. There are opportunities for an Honours project to work on improving the data analysis techniques.
	Methodology to be used	Analysis using mixed models in R
	Any other information	There will be opportunities to be involved in data collection in Queensland as well as analysis.
PROJECT 2	Title of the project	Black Baldy
	Co-supervisor names	Rick Terle, Stephen Lee, Michelle Hebart
	Aim of Project	Quantify the performance of Hereford cross (Black Baldy) compared to purebred Angus cattle including evaluating young sires.
	Background information	We have a project with Hereford's Australia where we are quantifying the performance of Black Baldy compared to purebred Angus cattle. The project is nearing its end and there is opportunity to be involved in analysis and writing as well as presenting results to breeders.
	Methodology to be used	Analysis using mixed models in R
	Any other information	There will be opportunities to be involved in data collection in Tasmania as well as analysis
PROJECT 3	Title of the project	Trans-Tasman maternal efficiency
	Co-supervisor names	Stephen Lee, Michelle Hebart, Michael Wilkes

	Aim of Project	Improve genetic selection strategies for maternal productivity in Angus and Hereford cattle in Australia and New Zealand
	Background information	This project utilises data from the Black Baldy project (above), measurements in Australian seedstock herds and New Zealand progeny testing herds.
	Methodology to be used	Analysis using mixed models in R
	Any other information	There will be opportunities to be involved in data collection in NSW as well as analysis. I cannot guarantee a trip to NZ.

GENERAL INFORMATION		
Contact details		Prof. Wayne Pitchford wayne.pitchford@adelaide.edu.au
Overview		My primary area of interest is in the genetic improvement of beef cattle. However, I also have projects on genetic improvement of sheep (meat and wool), goats, dairy, and pigs. In addition to genetics I have had students working on reproduction, meat quality, lamb density, feed efficiency, physiology, animal behaviour and welfare, walk-over-weigh technology, development of statistical methods, forage crop breeding, systems for developing countries, social science, participatory extension, and social media. I always try and develop projects that suit the student, have good co-supervisors and are closely linked with industry.
PROJECT INFORMATION		
PROJECT 1	Title of the project	Optimising fodder beet grazing management for beef cattle
	Co-supervisor names	Michael Wilkes and Dr Michelle Hebart
	Aim of Project	Determine the optimum stocking rate, grazing face and crop allocation to maximise the growth rate of steers grazing fodder beet crops.
	Background information	Grazing Fodder beet crops in situ has been pioneered by the New Zealand livestock industries and achieved positive gains in animal performance. Fodder beet crops enable the autumn-winter feed gap to be filled cheaply and allow growth rates in excess of 1kg/hd/day to be achieved in weaner cattle. Little is known about the optimal stocking rates, allocation of leaf and bulb (grazing face) and daily allocation of beets and the effect that changes in these parameters have on animal performance.
	Methodology to be used	Work within existing fodder beet research project. On farm trial sites (5) throughout south east of South Australia.
	Any other information	
PROJECT 2	Title of the project	Managing diurnal changes in rumen pH of cattle grazing fodder beet
	Co-supervisor names	Michael Wilkes, Dr Michelle Hebart, Prof Phil Hynd?? Dr Mariana Caetano??
	Aim of Project	Quantify rumen pH changes in cattle grazing fodder beet crops to allow for greater understanding of managing intake dynamics and manipulating the rumen to optimise its function.
	Background information	High Water soluble carbohydrate (sugar) feed sources such as fodder beet predispose cattle to low rumen pH conditions. Little is known on the extent of rumen pH fluctuations in cattle grazing fodder beet long-term. A greater understanding of rumen conditions will direct methods of pH manipulation to optimise rumen function.
	Methodology to be used	Work within existing fodder beet research project On farm trial sites (5) throughout south east of South Australia

		Rumen pH loggers and/or rumen cannulations for rumen fluid sampling.
	Any other information	
PROJECT 3	Title of the project	Sow conformation and performance
	Co-supervisor names	Dr David Lines and Dr Michelle Hebart
	Aim of Project	To determine the relationship between sow conformation (assessed at gilt selection) and performance over 4 parities.
	Background information	Longevity of sows is important to pig production, both economically and for animal welfare. Low culling rates are associated with increased piglet numbers and health status of the herd. Since longevity can only be recorded once the sow dies early predictors of longevity are important to enable selection of higher producing sows. Sow conformation traits measured at gilt selection have shown promising potential as early predictors of sow longevity. The relationship between sow conformation measured at gilt selection and sow performance over 4 parities will be investigated.
	Methodology to be used	A large existing commercial pig dataset will be examined.
	Any other information	
PROJECT 4	Title of the project	Genetics of Lamb Survival
	Co-supervisor names	Dr Forbes Brien and Dr Michelle Hebart
	Aim of Project	To determine the genetic relationship between birth weight and lamb survival in a research flock.
	Background information	Poor lamb survival is a major contributor to sheep reproductive inefficiency in Australia where survival of lambs from birth to weaning can vary considerably and is often less than 80% of lambs born. It has been estimated that 10 million lambs and weaners are lost to the Australian sheep annually making it one of the largest losses from endemic disease or wastage (Sackett et al. 2006). Apart from the economic impact, such reproductive wastage is an animal welfare concern, which adds further incentive to find effective strategies to improve lamb survival. Whilst there are a number of management strategies known to improve lamb survival the potential for genetic gain to further enhance survival as part of an integrated approach is warranted.
	Methodology to be used	A genetic analysis of the existing South Australian Selection Demonstration Flock Data will be done.
	Any other information	

GENERAL INFORMATION	
Contact details	John Williams john.williams01@adelaide.ed.au
Research Focus	Management of domestic animals can have a large effect of the expression of genetics at the phenotypic level. It is now know that maternal diet can have a lasting effect on the performance of their progeny and even subsequent generations. I am interested in this genotype by environmental interaction and how this affects the performance of animals, particularly in complex traits such as reproduction and disease response

PROJECT INFORMATION		
PROJECT 1	Title of the project	Establishing a system for assessing of cellular response to bioactive compounds as a prelude to testing in vivo.
	Co-supervisor names	Kiro Petrovski
	Aim of Project	The project will establish tissue culture and tissue explant systems for the bovine mammary gland. These will be use to assess toxicity and

		the response to bioactive compounds that may be suitable alternatives to antibiotics in the management of mastitis
	Background information	Mastitis is one of the most commercially important diseases for dairy production, resulting in drop in milk yield, veterinary intervention and premature culling of cows. Current treatment with antibiotics is associated with withdrawal of milk from the food chain and the risk of antibiotic resistance. Alternatives to antibiotics for the management of mastitis may be more effective and more sustainable.
	Methodology to be used	In vitro tissue culture will be initiated using established transformed (continuously) growing cell lines. This will teach sterile techniques and how to manipulate cells in culture. These cells will then be subjected to in vitro exposure to toxins and known bioactive compounds and responses characterised at the level of survival and cell morphology, and through the expression of stress genes. Novel compounds will then be tested to assess their effects on the cultured cells. Depending on progress an explant system will be established from the mammary epithelium to assess the effect of s selected compound (s) this tissue from the target organ.
PROJECT 2	Title of the project	Colostrum programming for a healthy life
	Co-supervisor names	Kiro Petrovski, Wayne Pitchford, Stephen Hiendleder
	Aim of Project	To explore the biological and molecular effects on a calf of receiving colostrum from its natural dam, from a different cow or not receiving colostrum
	Background information	A calf naturally receives colostrum from its mother very shortly after birth. This first meal is important, not only in a nutritional sense but also because colostrum passes immunoglobulins from the mother that transfer passive immunity to the calf. However, the full effects of colostrum are not fully understood. Miss-mothering or giving stored colostrum means a mismatch between the calf and colostrum which may have a lasting effect on health and performance, which may be mediated through epigenetic programming. The effect of insufficient colostrum volume/quality intake is also poorly understood in beef cattle.
	Methodology to be used	The project will identify 5 calves that receive colostrum from their natural dams, 5 calves receiving colostrum from a surrogate mother and 5 calves receiving colostrum replacer and the same three groups receiving insufficient colostrum volume/quality. These calves will be followed during the first months of life to observe the lasting effects. Measurements will include growth rates and levels of acute phase proteins, level of total protein as indicator of passive transfer. Circulating microRNA will be measured to explore intra-cellular signalling. Possible impacts on epigenetic programming will be measured by comparing methylation of blood derived monocytes. Bioinformatic analysis will assess biological pathways affected by the miRNA signalling and changes in epigenetic programming .
	Any other information	

GENERAL INFORMATION		
Contact details		Dr William van Wettere william.vanwettere@adelaide.edu.au
Overview		Reproductive physiology, including ovarian function and oocyte quality. Neonatal survival of production animal species
PROJECT INFORMATION		
PROJECT 1	Title of the project	Improving ovarian blood flow in pigs
	Co-supervisor names	Dr Karan Kind, Dr Jen Kelly, Dr Hayley McGrice
	Aim of Project	To determine whether nutritional supplementation with arginine prior to ovulation improves ovarian blood flow and oocyte quality in female pigs

	Background information	Ovarian blood flow affects delivery of gonadotrophins and metabolic factors to the developing follicle, and as such affect oocyte and follicle competence. In humans, substances which improve ovarian blood flow also improve response to gonadotrophins.
	Methodology to be used	The effects of arginine supplementation on ovarian blood flow and response to exogenous gonadotrophins will be determined using young female pigs. Diets will be fed prior to puberty. Response to exogenous gonadotrophins will be determined based on ovarian follicle growth. One ovary will be used for collection of follicular fluid to determine intra-follicular levels of key metabolites, steroids and gonadotrophins. The second ovary will be used to measure the expression of angiogenic factors (including, vascular endothelial factor, angiopoietin and hypoxia inducible factor). Doppler ultrasound will be used prior to the first ovulation and on days 14, 16 and 18 of the first oestrous cycle to assess ovarian blood flow.
	Any other information	Pork CRC, Ron Lienert Scholarship and APL honours scholarships are all appropriate
PROJECT 2	Title of the project	Factors affecting embryo gender
	Co-supervisor names	Dr Karan Kind, Dr Jen Kelly, Dr Hayley McGrice
	Aim of Project	To determine what factors, within the ovary and follicle, as well as during final stages of oocyte maturation affect the gender of the embryos produced
	Background information	The ability to increase the number of female progeny produced would significantly improve the efficiency and productivity of the dairy industry, the pig industry and the sheep industry.
	Methodology to be used	In vitro oocyte and embryo production technologies will be used in conjunction with basic measures of ovarian morphology and physiology to determine whether the ratio of embryos produced can be skewed in favour of female progeny
	Any other information	Pork CRC, Ron Lienert Scholarship and APL honours scholarships are all appropriate
PROJECT 3	Title of the project	Effect of maternal caffeine supplementation on thermoregulation and survival of new born lambs
	Co-supervisor names	Dr Kate Plush, Jen Kelly, Dr Karen Kind, Dr Dave Kleeman
	Aim of Project	To determine whether adding caffeine to the diets of pregnant ewes during the last few days of gestation improve the thermoregulatory capacity, viability and survival of new born lambs
	Background information	Neonatal mortality is a significant welfare and production concern for the sheep industry. This project builds on our work in pigs demonstrating a positive effect of maternal caffeine supplementation on piglet survival and thermoregulation
	Methodology to be used	See me for details
	Any other information	

Our Collaborators

GENERAL INFORMATION		
Contact details		Jen Kelly, jen.kelly@sa.gov.au SARDI, Turretfield Research Centre, Rosedale, SA
Research focus area		Reproductive biology, with a focus on assisted reproductive technologies, embryo and oocyte development.
PROJECT INFORMATION		
PROJECT 1	Title of the project	In vitro maturation of canine oocytes
	Co-supervisor names	Karen Kind (karen.kind@adelaide.edu.au) Jose Len (jose.lenyin@adelaide.edu.au)
	Aim of Project	Determine the effects of different in vitro maturation (IVM) conditions on the developmental competence of canine oocytes.
	Background information	Assisted reproductive technologies, such as in vitro oocyte maturation (IVM) and in vitro fertilization (IVF), in the canine offer potential benefits for animal breeding and conservation of endangered canid species. However, the efficiency of these technologies in the dog is limited. In particular, the capacity of canine oocytes to complete meiotic maturation in vitro is very low, compared to other species. This likely relates to the unique reproductive biology of the dog. In most mammals, nuclear and cytoplasmic maturation of the oocyte occurs within the ovarian follicle before ovulation. However, canine oocytes are ovulated at an immature stage and undergo meiotic maturation within the oviducts over a prolonged period (48-96 h). Therefore, to develop the appropriate conditions for in vitro maturation of canine oocytes both the follicular and oviductal environments the oocyte would typically be exposed to in vivo need to be considered. We have previously assessed the effects of varying the hormones added to the maturation media. This project will further assess the effects of varying other components of the media and conditions used on in vitro maturation of the canine oocyte.
	Methodology to be used	Oocyte collection (from ovaries donated after spay), in vitro oocyte maturation, oocyte nuclear maturation staining.
	Any other information	

GENERAL INFORMATION		
Contact details		Professor Mary Barton mary.barton@unisa.edu.au Ph: 8302 2933 UniSA, Animal Welfare Officer, Research and Innovation Services
Research focus		Veterinary microbiology and veterinary public health. Amongst other areas I have particular interests in Rhodococcus equi which causes "rattles" in foals and in the use of bacteriophages as an alternative to antibiotics.
PROJECT INFORMATION		
PROJECT 1	Title of the project	Potential for bacteriophages to control Rhodococcus equi infections in foals
	Co-supervisor	Dr Garry Muscatello, University of Sydney
	Aim of the project	Determine if bacteriophages can be isolated that are effective in killing Rhodococcus equi. Bacteriophages will be isolated from horse faeces and from soil samples from horse studs and other environments and tested for their capacity to kill Rhodococcus equi. The bacteriophages will be characterised by electron microscopy. RFLP and sequencing. The laboratory work would be carried out at North Terrace, not Roseworthy.

GENERAL INFORMATION	
Contact details	Dr Forbes Brien, Associate Professor Room G12, Davies Building Email: forbes.brien@adelaide.edu.au Mob: 0427004066
Research Focus	General area is in quantitative genetics and its application to livestock improvement programs. Have also worked in reproductive physiology research. Current focus is genetic improvement of lamb survival and reproductive performance. Also prediction of genetic gain in reproductive performance and lamb survival, disease and welfare traits in sheep

PROJECT INFORMATION		
PROJECT 1	Title of the project	Thermal imaging of lamb temperature to help boost survival
	Co-supervisor names	Kiro Petrovski (Bovine mastitis, lactational physiology, antimicrobial resistance, mastitis products development, herd health, population medicine)
	Aim of Project	Assessment of the core body temperature by thermography as an indirect selection criterion for genetically improving lamb survival
	Background information	Thermography has been correlated with core and local body temperature of various animal species. It has been also used to estimate stress in pigs. The effect of stress and core body temperature on lamb survival as estimated by thermography has not been attempted previously.
	Methodology to be used	Thermography of newborn lambs using a digital thermal imaging camera, correlating it with more conventional recording of core temperature via a rectal thermometer.
PROJECT 2	Title of the project	Design and implementation of a sheep breeding program at Roseworthy
	Co-supervisor names	Professor Wayne Pitchford, Dr Stephen Lee
	Aim of Project	To comprehensively design a breeding program for the Roseworthy sheep flock and assist in its implementation
	Background information	The Roseworthy farm is currently considering a major change to its sheep flock, involving the establishment of a ram breeding nucleus to breed its own ram replacements. This presents a great opportunity to develop a comprehensive and innovative plan and to be part of its implementation
	Methodology to be used	Various computer software packages for helping to design breeding objectives, assess breeding options and predict genetic gain.

GENERAL INFORMATION	
Contact details	Professor Gordon Howarth G07, J.S. Davies Phone: +61 8 8313 7885 E-mail: gordon.howarth@adelaide.edu.au
Overview	There are two main research areas that our group focuses on. These include development of breath tests for diagnosis of neurodegenerative diseases. Secondly we also investigating wool production traits which are influenced by genetic factors.

PROJECT INFORMATION		
PROJECT 1	Title of the project	Identification of volatile organic compounds (VOCs) from exhaled breath for early diagnosis of Huntington's disease using a sheep model.
	Co-supervisor names	Dr Sharon Siva
	Aim of Project	Analyse and identify differences between exhaled breath VOC profiles of HD and control sheep, in order to establish a breath 'fingerprint' specific to HD.

		Establish a simple, reliable and robust breath diagnostic test that can be applied in both research and clinical environments for HD diagnosis and therapeutics development.
	Background information	Huntington's disease (HD) is a progressive, fatal, neurodegenerative disorder, similar to Alzheimer's disease, Parkinson's disease, Friedreich ataxia and amyotrophic lateral sclerosis. Huntington's disease is caused by a genetic mutation within the human Huntingtin gene. Development of HD is primarily attributed to progressive loss of cells within the brain, resulting in dementia and motor impairment. Current diagnostic methods such as biopsy, magnetic resonance imaging (MRI) and positron emission tomography (PET) scans are not only costly and invasive, but they are also unable to detect subtle changes associated with HD development prior to the onset of brain degradation. Therefore, further work is necessary to develop alternative HD diagnostic methods that are able to detect HD at its earliest stages and determine the efficacy of therapeutics in large animal models before treatments can be applied to human patients. Huntington's disease causing mutant proteins are expressed in almost all cells, and are known to disrupt mitochondrial functions and cellular energy metabolism. Breath testing is a sensitive analysis method that could be applied as a new method for HD diagnosis to evaluate chemical compounds and reactive oxygen species (ROS) in the breath arising from cellular biological processes associated with HD.
	Methodology to be used	Exhaled breath samples will be collected from HD transgenic and age-matched control sheep. Breath samples will be analysed using gas-chromatography mass spectrometer to identify volatile organic compounds (VOCs). Resulting data be analysed using specialised GC-MS data analysis package to identify VOCs specific to HD.
	Any other information	
PROJECT 2	Title of the project	Identifying genetic mutations in sheep DSC1 & DSG4 genes essential for skin and wool follicle architecture.
	Co-supervisor names	A/Prof David Groth (external collaborator); Dr Sharon Siva
	Aim of Project	Characterise single nucleotide polymorphisms (SNPs) and insertion/deletion (indels) in sheep DSC1 & DSG4 gene sequences. Determine the association between genetic mutations within DSC1 & DSG4 genes and wool production traits
	Background information	Australia is one of the world's largest wool producers, with an estimated value of wool export of around $3 billion in 2015-16. Genetic factor is a major element influencing physical characteristics of wool traits such as clean fleece weight, staple strength, staple length and fibre diameter. Wool quality traits are polygenic traits, whereby several genes are associated with a wool phenotype. Genome-wide association studies (GWAS) and quantitative trait loci (QTL) studies have shown that keratin and demosomal associated genes expressed in the outer layer of the skin influence fibre traits in sheep. Although several candidate genes have been linked to wool production traits, further investigation is required to identify and characterise genetic mutations within these candidate genes to fully understand their role in influencing wool quality. In this project, the student will identify mutations within two candidate genes (DSC1 & DSG4) known to maintain skin barrier function and hair/wool structure. Mutations identified in this project can be used for SNP-genotyping in future studies. Cohorts of sheep with known wool production traits can be genotyped to determine whether the known mutations increases/decreases wool quality.
	Methodology to be used	Gene mutations in sheep DSC1 & DSG4 gene sequences will be identified using a chromatogram viewing software. Positions and type of mutations within the genes will be catalogued using a multiple sequences alignment software. Web-based bioinformatics programs will be used to predict potential effect of the mutations on the protein structures. Genetic mutations known to alter the amino acid sequence of DSC1 & DSG4 will be further investigated through PCR and sequencing to infer the association between the mutations and wool production traits in a cohort of sheep.

	Any other information	

GENERAL INFORMATION		
Contact details		A/Prof Adrian Cummins, adrian.cummins@adelaide.edu.au Basil Hetzel Institute for Translational Medical Research, The Queen Elizabeth Hospital
Overview		I have a long term focus on the small intestine in health and disease (coeliac disease, malnutrition, HIV enteropathy, small bowel bacterial overgrowth, intestinal mucositis after cancer chemotherapy). My current interests include intestinal stem cells and postnatal growth of the small intestine and coeliac disease
PROJECT INFORMATION		
PROJECT 1	Title of the project	Growth signalling pathways acting on the intestinal stem cell
	Co-supervisor names	Professor Gordon Howarth, Dr Will Van Wettere
	Aim of Project	To access activity of positive and negative signalling pathways that act on intestinal stem cells
	Background information	The small intestine grows a by combination of crypt fission and crypt hyperplasia. Crypt fission is now realised to be due to an increase in intestinal stem cells but has been poorly studied. This study will compare and contrast activities of the canonical and non-canonical Wnt pathway, the Notch pathway, the epidermal growth factor pathway and the bone morphogenetic protein pathway in 3-, 7- and 14-day old pigs
	Methodology to be used	Immunstaining of activation markers with assessment by cumulative signal analysis, and quantitative RT-PCR of transcription factors. Crypt fission will be assessed by a tissue microdissection technique and recording the percentage of bifid crypts.
	Any other information	

GENERAL INFORMATION	
Contact details	Dr John Finnie john.finnie@health.sa.gov.au 8222 3370 Senior Veterinary Pathologist. SA Pathology, Adelaide, S.A. 5000
Research focus	Veterinary neurological disorders and animal models of human neurological diseases. Please contact Dr Finnie to discuss potential projects.

GENERAL INFORMATION		
Contact details		Dr Suzanne Mashtoub suzanne.mashtoub@adelaide.edu.au 8161 6991
Overview		Dr Mashtoub leads a research group at the Women's and Children's Hospital, specialising in animal models of intestinal disease. Dr Mashtoub's group investigates the efficacy of Emu Oil in combination with other nutraceuticals, as part of the Digestive Health Research Group.
PROJECT INFORMATION		
PROJECT 1	Title of the project	Oral versus intrarectal Emu Oil administration and protection against Crohn's disease in mice
	Co-supervisor names	Prof Gordon Howarth
	Aim of Project	To determine if Emu Oil (administered via oral or intrarectal route) is capable of reducing the impact of Crohn's disease in mice.
	Background information	Crohn's disease is an idiopathic, incurable bowel disorder characterised by transmural inflammation throughout the intestinal tract. Previously, we demonstrated the anti-inflammatory and reparative properties of orally-administered Emu Oil in animal models of intestinal disease, including acute Crohn's disease. It is important to determine any differences in efficacy of orally-administered Emu Oil (following metabolism) versus intrarectally-administered Emu Oil (local un-metabolised effect) in this setting.
	Methodology to be used	Methodology includes: Animal trial (daily monitoring, disease activity index, behavioural measures, colonoscopically-assessed disease severity) Biochemical analysis (myeloperoxidase activity) Histological analyses (quantitative and qualitative) Intestinal permeability (FITC-D)
	Any other information	
PROJECT 2	Title of the project	The impact of Emu Oil treatment, in combination with Japanese Kampo medicine, on mouse behaviour in a model of colitis-associated colorectal cancer
	Co-supervisor names	Dr Alex Whittaker and Prof Gordon Howarth
	Aim of Project	This project seeks to determine behavioural modifications resulting from combined Emu Oil and Kampo treatment in a mouse model of colitis-associated colorectal cancer.
	Background information	Ulcerative colitis, a type of inflammatory bowel disease, is a lifelong condition characterised by unremitting inflammation of the distal bowel. Persistent inflammation causes cells to grow uncontrollably, resulting in colorectal cancer. Previously, we demonstrated the anti-inflammatory and reparative properties of orally-administered Emu Oil in animal models of intestinal disease. The impact of a combined therapy of Emu Oil with Kampo medicine (a traditional Japanese herbal medicine) on mouse behaviour is yet to be investigated.
	Methodology to be used	Students will co-run a 9-week mouse study assessing different aspects of behaviour including burrowing, nesting and facial grimace of mice.
	Any other information	
PROJECT 3	Title of the project	Validation of real-time Mouse Grimace Scale scoring in a mouse model of chronic ulcerative colitis
	Co-supervisor names	Dr Alex Whittaker

	Aim of Project	1. To establish that the Mouse Grimace Scale (MGS) can reliably identify pain in a mouse model of chronic ulcerative colitis. An analgesic test will be applied to determine that the response is pain-related. 2. To validate real-time scoring of the MGS against the standard method of retrospective video scoring.
	Background information	This will be the first study in mice to contrast a real-time method of grimace scoring with the established video-scoring method in a mouse model of chronic ulcerative colitis. This is an important validation to perform to improve animal welfare. The cage-side method is the most practical to perform by researchers or technicians. The instant results obtained can be recorded on clinical record sheets, and directly applied in implementation of humane endpoints, or administering analgesics. This project will therefore provide benefits to animals by allowing timely analgesic intervention. Furthermore, it will provide research benefit by allowing accurate identification and treatment of pain which is known to modify physiological responses, and act as an experimental confounder.
	Methodology to be used	Students will co-run a 9-week mouse study assessing different aspects of behaviour including burrowing, nesting and facial grimace of mice.
	Any other information	
PROJECT 4	Title of the project	Understanding the role of Flii protein in colitis-associated colorectal cancer development
	Co-supervisor names	Dr Zlatko Kopecki and Prof Gordon Howarth
	Aim of Project	To investigate the effect of altered Flightless I (Flii) gene levels on development of colitis-associated colorectal cancer in mice.
	Background information	Ulcerative colitis, a type of inflammatory bowel disease, is a lifelong condition characterised by unremitting inflammation of the distal bowel. Persistent inflammation causes cells to grow uncontrollably, resulting in colorectal cancer. Previous studies have identified a novel protein present at high levels in gastrointestinal tract of humans and mice with colitis which contributes to disease severity. Moreover, this protein affects cancer development in the skin. It is hypothesized that mice with high levels of this harmful protein will have higher quicker onset and more severe development of colon cancer.
	Methodology to be used	Methodology includes: Animal trial (daily monitoring, disease activity index, colonoscopically-assessed disease severity) Biochemical analysis (myeloperoxidase activity) Histological analyses (quantitative and qualitative) Intestinal permeability (FITC-D)
	Any other information	

GENERAL INFORMATION	
Contact details	Associate Professor David Stone david.stone@sa.gov.au 0428542440
Overview	David has worked throughout Australia, North America, Europe, Asia and the Pacific, collaborating closely with both governments, universities and small to large sized enterprises on a range of research and development projects aiming to improve businesses through innovation and developing the understanding of the effects of sustainable nutrition and feed technology on growth, feed efficiency, health, product quality and the environment.

PROJECT INFORMATION		
PROJECT 1	Title of the project	Digestive tract health in yellowtail kingfish fed diets with different energy level, with and without an emulsifier at winter water temperatures
	Co-supervisor names	Professor Gordon Howarth, Associate Professor David Stone, Dr Rebecca Forder , Dr Matthew Bansemer
	Aim of Project	To understand the effects of an emulsifier and different energy levels and on the digestive tract health of Yellowtail Kingfish.
	Background information	In fish, dietary energy is the second growth limiting factor, after dietary protein, which should ideally be satisfied by dietary lipids. Yellowtail Kingfish grow out diets previously contained 20% crude lipid (Stone and Bellgrove, 2013). Based on recent research however, Stone et al. (2016) suggested that Yellowtail Kingfish may be fed a higher lipid (~30-35%) diet during summer water temperatures to improve growth. Temperate water marine fish species, including Yellowtail Kingfish, may be less tolerant to high lipid diets when exposed to low water temperatures. To improve lipid digestion and absorption in the gastrointestinal region of Yellowtail Kingfish, an emulsifier may be included in the diet. However, the effect of different energy levels (lipid levels) and emulsifiers on the digestive tract health of Yellowtail Kingfish is unknown.
	Methodology to be used	Investigating two factors (2 × 2). • Factor one, emulsifier (no emulsifier and emulsifier) • Factor two, lipid level (high [30%] and low [20%]). Twenty fish will be measured, weighed and stocked into one of the three replicate 5000 L tanks treatment combination-1 (n = 4 treatments; n = 12 tanks). Tanks will be supplied with partial flow-through/recirculating (100% system water exchange d-1), sand filtered, UV treated sea water at ambient temperature. Fish will be fed to apparent satiation at 9:00 h daily for a total of 84 days. At the conclusion of the study, the hind gut of fish will be sampled to investigate digestive tract health of Yellowtail Kingfish.
	Any other information	$3000 operating funds for sample analysis provided by SARDI. Samples will be collected from a larger industry funded project.
PROJECT 2	Title of the project	Lipid metabolism in yellowtail kingfish fed different energy diets with and without an emulsifier at winter water temperatures
	Co-supervisor names	Professor Gordon Howarth, Associate Professor David Stone, Dr Todd McWhorter, Dr Matthew Bansemer
	Aim of Project	To understand the effects of different energy levels and emulsifiers on the liver and pyloric caeca health and lipid metabolism of Yellowtail Kingfish.
	Background information	In fish, dietary energy is the second growth limiting factor, after dietary protein, which should ideally be satisfied by dietary lipids. Yellowtail Kingfish grow out diets previously contained 20% crude lipid (Stone and Bellgrove, 2013). Based on recent research however, Stone et al. (2016) suggested that Yellowtail Kingfish may be fed a higher lipid (~30-35%) diet during summer water temperatures to improve growth. Temperate water marine fish species, including Yellowtail Kingfish, may be less tolerant to high lipid diets when exposed to low water temperatures. To improve lipid digestion and absorption in the gastrointestinal region of Yellowtail Kingfish, an emulsifier may be included in the diet. However, the effect of different energy levels (lipid levels) and emulsifiers on lipid metabolism and digestion of Yellowtail Kingfish is unknown.
	Methodology to be used	Investigating two factors (2 × 2). • Factor one, emulsifier (no emulsifier and emulsifier) • Factor two, lipid level (high [30%] and low [20%]). Twenty fish will be measured, weighed and stocked into one of the three replicate 5000 L tanks treatment combination-1 (n = 4 treatments; n = 12 tanks). Tanks will be supplied with partial flow-through/recirculating (100% system water exchange d-1), sand

		filtered, UV treated sea water at ambient temperature. Fish will be fed to apparent satiation at 9:00 h daily for a total of 84 days. At the conclusion of the study, fish will be histologically sampled for pyloric caeca and liver histology. Both aspects will improve our knowledge of lipid metabolism in Yellowtail Kingfish fed dietary energy (lipid) levels and inclusions of emulsifiers.
	Any other information	$3000 operating funds for sample analysis provided by SARDI. Samples will be collected from a larger industry funded project.
PROJECT 3	Title of the project	The effect of dietary inclusions of solvent extracted soybean meal and de-hulled lupin meal on the growth, feed utilisation and digestive tract health of greenlip abalone.
	Co-supervisor names	Professor Gordon Howarth, Associate Professor David Stone, Dr Matthew Bansemer
	Aim of Project	To understand the effect of dietary inclusions of solvent extracted soybean meal and de-hulled lupin meal on the growth, feed utilisation and digestive tract health of greenlip abalone.
	Background information	Dietary inclusions of solvent extracted soybean meal and de-hulled lupin meal are commonly used ingredients in abalone diets. Recent research has highlighted that the effect of both these ingredients have on the growth, feed utilisation and digestive tract of greenlip abalone is unknown. This research project aims to improve our knowledge in this area.
	Methodology to be used	Four graded levels of solvent extracted soybean meal (0, 10, 20 and 30%) and four graded levels of de-hulled lupin meal (0, 10, 20 and 30%) will be investigated. Twenty post-weaned greenlip abalone (15-25 mm) will be weighed, measured and stocked into one of four replicate tanks treatment combination-1 (n = 8 treatments, n = 32 tanks). Abalone will be held at 22°C (optimal water temperature) and fed their respective diet to excess daily at 16:00 h. Uneaten feed will be collected the following day. At the conclusion of the study, abalone will weighed and measured to determine growth performance and feed conversion ratio. Additionally, four abalone per tank will be fixed in 10% seawater formalin, before gastrointestinal samples are sectioned and stained to determine the effect of dietary inclusions of solvent extracted soybean meal and de-hulled lupin meal on the digestive tract health of greenlip abalone.
	Any other information	$2000 operating funds for sample analysis provided by SARDI. Samples will be collected from a larger industry funded project.
PROJECT 4	Title of the project	Digestive tract health in greenlip abalone fed dietary inclusions of steam distilled grape marc meal.
	Co-supervisor names	Professor Gordon Howarth, Associate Professor David Stone, Dr Matthew Bansemer
	Aim of Project	To understand the effect of dietary inclusions of grape marc meal on the digestive tract health of greenlip abalone.
	Background information	A previous study run in our lab has identified that abalone fed dietary steam distilled grape marc meal inclusions (5-20%) exhibited superior growth compared to a basal diet (0% grape marc meal). Steam distilled grape marc meal from TARAC technologies is commercially available, which is significantly cheaper than the energy ingredients used in current commercial diets, making this a highly promising alternative ingredient. However, the effect of feed diets that contain inclusions of distilled grape marc meal on the gastrointestinal morphology of greenlip abalone is unknown.
	Methodology to be used	Based on this previous study, steam distilled grape marc meal will be validated in an on-farm trial before results are taken up by industry. Three diets will be tested on farm that contain different levels of distilled grape marc meal. The experiment will run for ~6 months. At the conclusion of the study, four abalone per tank will be sampled and fixed in 10% seawater formalin, before samples are sectioned and stained to determine the effect of dietary inclusions of grape marc meal on the digestive tract health of greenlip abalone.
	Any other information	$3000 operating funds for sample analysis provided by SARDI.

		Samples will be collected from a larger industry funded project.
GENERAL INFORMATION		
Contact details		Dr Joshua Philp joshua.philp@adelaide.edu.au 08 83130008
Overview		I am researcher specialising in multidisciplinary research for development projects involving smallholder forage and livestock production in developing economies of East and Southeast Asia. https://researchers.adelaide.edu.au/profile/joshua.philp
PROJECT INFORMATION		
PROJECT 1	Title of the project	Management practices to enable early wet season forage production in lowland rice production systems of The Lao PDR
	Co-supervisor names	Dr Matthew Denton https://researchers.adelaide.edu.au/profile/matthew.denton
	Aim of Project	Identify soil amendments that may enable the production of forage crops outside the main wet season of the Lao PDR
	Background information	The supply of high-quality feeds to animals raised in rainfed lowland rice production systems of the Lao PDR is most constrained during the dry and early wet seasons, when animals are grazed in, or fed from, various extensive yet unproductive land types. Management practices which enable the production of high-quality feeds between rice crops therefore have great potential to contribute to the development of regional livestock production, particularly if these can be implemented without scarce water inputs.
	Methodology to be used	Field trial followed by analysis in GenStat
	Any other information	Candidates are strongly encouraged to seek funding from the Crawford Fund to participate in the overseas fieldwork https://www.crawfordfund.org/awards/the-2018-crawford-fund-student-awards/

GENERAL INFORMATION		
Contact details		Kate Plush Kate.Plush@sa.gov.au Pig Reproduction Scientist SARDI
Overview		Very interested in the production and welfare standards in farrowing houses
PROJECT INFORMATION		
PROJECT 1	Title of the project	The impact of birth trauma on piglet mortality
	Co-supervisor names	William van Wettere
	Aim of Project	We aim to determine if lesions indicative of birth trauma are present on still-born piglets, and if these lesions are also present on piglets dying from other causes (starvation/overlay). We also aim to gain a better understanding of whether these lesions impact on piglet physiology after birth.
	Background information	In sheep, birth trauma results in central nervous system damage which can be identified by lesions on the brain and spinal cord during post mortem autopsy. There is strong evidence that the presence of these lesions also increases the risk of other causes or mortality like starvation and hypothermia. In pigs, we do not know whether similar CNS lesions are observed, and whilst there is indirect evidence that a difficult birth may decrease piglet vitality, the link between CNS damage and other causes of death remain to be established.

	Methodology to be used	This project will involve two phases: Piglet autopsy: dead piglets will be collected and autopsied for cause of death with a special focus on the dissection of the CNS to search for lesions Piglet physiology: piglets thought to have experienced birth trauma (long birth, meconium staining) will be recorded for traits important for survival (vitality score and feeding behaviour, rectal temperature, colostrum ingestion), and then sacrificed at day 2 to quantify CNS damage.
	Any other information	Australian Pork Limited, Pork CRC, Ron Lienert, RSPCA