Honours Research Projects

Current Honours research projects available in the School of Veterinary Science
Contents

Reference intervals for equine adrenocorticotropic hormone (ACTH) in Southeast Queensland ........ 4
Assessment of the diagnostic value of a combined thyrotropin-releasing hormone stimulation test and 2-step insulin response test to simultaneously diagnose Equine Pituitary Pars Intermedia Dysfunction and Equine Metabolic Syndrome ........................................................................................................... 4
Compare total and ionised calcium levels in wild reptiles with those in captive reptiles .......... 5
Food Forensics ........................................................................................................................................ 5
Current understanding and attitudes towards compassion fatigue and other mental health illnesses in SE Qld Veterinary Clinics .................................................................................................................. 5
Determining the feasibility of including ‘mental health risk assessments’ in animal ethics applications, research protocols and, teaching protocols that incorporate high risk tasks .................................................. 6
The social and psychosocial construct of abattoir workers and the psychological effects of perceived dirty work ............................................................................................................................................. 7
Pilot study determining the efficacy of two commercial formulations of pergolide to treat Pituitary pars intermedia dysfunction (PPID) in horses ........................................................................................................ 7
Comparison of the effects of storage and temperature on the stability of Australian liquid formulations of pergolide ........................................................................................................................................................................ 8
Can Near Infrared Reflectance Spectroscopy (NIRS) technology be used to assess the level of pasture contamination with infective nematode parasite larvae of important gastrointestinal nematode parasites of livestock or horses? ............................................................................................................................... 9
Measurement of transdermal analgesia through cattle skin ............................................................................. 9
Can CT imaging be used to detect changes in bone density in horses? ...................................................... 10
The ‘dolphin chirp’ – a potential new dolphin vocal sound .............................................................................. 10
The use of surface-generated sounds in the presence of singers ...................................................................... 10
Evaluation of overall prevalence and phylogeography of methicillin resistant Staphylococcus spp. carriage in dogs and cats presented in two veterinary referral centres in the greater Brisbane .............. 11
Reliability and accuracy of activity trackers in dogs .......................................................................................... 12
Investigating the impact of the native legume Indigofera linnaei (Birdsville Indigo) on cattle reproduction in northern Australia ........................................................................................................................................... 12
Medical geography of Q-fever in Queensland .................................................................................................. 13
Next generation analysis of gene expression exploring the effect of nutrition on skeletal growth in cattle ........................................................................................................................................................................ 13
Phosphorus deficiency in cattle ........................................................................................................................... 13
High throughput cellular metabolic phenotyping of cells from domestic animals during nutritional, drug and infectious agent challenges ...................................................................................................... 14
Oral microbiome of Bilbys; comparing wild and captive animals ........................................................................ 14
Prevalence of *Toxoplasma gondii* and Feline Immunodeficiency Virus (FIV) in unowned cat populations in Brisbane, South-East Qld. ................................................................. 15
Tracing the spillover of fleas (*Ctenocephalides* spp.) between native and domestic animals ........ 15
Assessing perceptions of tick and flea infestation risk in southeast Queensland ....................... 17
Spatial modelling of wildlife hospital admissions ........................................................................ 17
Determining the presence and persistence of colostral transfer of passive immunity against Hendra virus in foals, and their response to Hendra vaccination. ......................................................... 18
Reference intervals for equine adrenocorticotropic hormone (ACTH) in Southeast Queensland

Pituitary *pars intermedia* dysfunction (PPID) is a common disease of older horses affecting more than 20% of horses older than 15 years of age in Southern Queensland. This condition is caused by neurodegeneration of the inhibitory dopaminergic hypothalamic neurons resulting in adenomatous hyperplasia of the *pars intermedia* and increased adrenocorticotropic hormone (ACTH) concentrations. The typical clinical signs of PPID are hypertrichosis, chronic infections and hyper- or anhydrosis but one of the most severe problems experienced by affected horses is recurrent laminitis.

Measurement of basal ACTH concentration is the most commonly used method to diagnose PPID; however, because of circannual variability (higher ACTH concentrations in autumn), seasonal reference intervals should be developed by individual laboratories to accurately interpret ACTH results. In addition to circannual variations, regional variations have been described, indicating that reference intervals established at a specific latitude are not valid at another latitude, limiting the extrapolation of results from other institutions.

The purpose of this study is to establish ACTH reference intervals in Southern Queensland to improve the diagnosis of PPID. To achieve this goal, plasma samples will be taken from 50 healthy, ≥ 15-yearold horses monthly and reference intervals will be established for Southern Queensland.

This project is funded and has ethics approval.

Contact: François-René Bertin, School of Veterinary Science, f.bertin@uq.edu.au.

Assessment of the diagnostic value of a combined thyrotropin-releasing hormone stimulation test and 2-step insulin response test to simultaneously diagnose Equine Pituitary Pars Intermedia Dysfunction and Equine Metabolic Syndrome

Pituitary pars intermedia dysfunction (PPID) and equine metabolic syndrome (EMS) are the most common hormonal disorders in adult horses. Although both conditions have been described worldwide, those diseases have a specific significance in Australia where it has been shown that more than 20% of aged horses are suffering from PPID and that more than a third of them are also suffering from EMS. Both conditions have a huge impact on equine health as they both result in laminitis. Prevention of the first painful episode of laminitis is critical when managing horses at risk of developing hormonal dysregulation.

As early detection of horses at risk is paramount in order to prevent the development of the first episode of painful laminitis, new diagnostic tools are needed. This project aims at assessing the diagnostic value of combining two sensitive tests to diagnose both endocrine disorders at once. To achieve this goal, control horses and horses with PPID, EMS and both will be tested with this novel diagnostic tool.

This project has ethics approval and funding is pending.

Contact: François-René Bertin, School of Veterinary Science, f.bertin@uq.edu.au.
Compare total and ionised calcium levels in wild reptiles with those in captive reptiles

Hypothesis: That wild reptiles will have significantly higher total and ionised calcium levels than those kept in captivity

Reason: Metabolic bone disease, particularly nutritional secondary hyperparathyroidism, is common in captive reptiles. Artificial lighting is used in an attempt to prevent this problem, but it is not always effective. This project will demonstrate to veterinarians and pet owners the difference between wild and captive reptile calcium levels.

Method: Blood will be collected from wild and captive Carpet pythons and Bearded dragons and analysed for total and ionised calcium levels. The results will be analysed to see if there are significant differences.

Contact: Dr Bob Doneley r.doneley@uq.edu.au

Food Forensics

Contamination of foodstuffs with animal cadavers, particularly rodents is a rare but important issue for the food industry. Rodent contamination has been reported in everything from nuts to soft drink and sometimes results in legal proceedings. Despite legal and public health implications there is very little published on the effect of food substrate on the murine cadaver at a gross and histological level. Preliminary data shows time, temperature, substrate critically effect a cadaver in predictable ways. This project will examine the effect of liquid, dry and various heat treatments on ethically acquired murine cadavers with the goal of producing one or more papers to guide pathologists undertaking product contamination investigations on food or drink. Techniques learned include autopsy and histopathology assessment, as well as literature review and scientific writing.

Adviser: A/Prof Rachel Allavena r.allavena@uq.edu.au

Current understanding and attitudes towards compassion fatigue and other mental health illnesses in SE Qld Veterinary Clinics.

Charles Figley (1995) described compassion fatigue as equivalent to secondary traumatic stress, and defined compassion fatigue as the caregiver’s reduced capacity or interest in being empathic or “bearing the suffering of clients;” and being “the natural consequent behaviours and emotions resulting from knowing about a traumatising event experienced or suffered by a person”. There is a substantial body of evidence of occupational stress in personnel working in human health care and, to a lesser extent, in animal health care. Professionals who work with people or animals, particularly
those who are suffering, must not only cope with the normal stress or dissatisfaction of work but also with their personal feelings and emotional response to that suffering.

Compassion fatigue in animal-related professions is most often considered to be a direct result of the impact of euthanasia. However, evidence to date suggests that negative feelings are also induced by other common occupational stressors such as client financial constraints, employee workload, longterm care of patients with chronic diseases and, end of life care (Stamm, 1995; Figley, 1995; Figley & Roop, 2006; Rollin, 1987; Black et.al., 2011; Foster & Maples, 2011; Baran et.al., 2012). Compassion fatigue and the associated negative feelings can also be compounded by feelings of failing a patient, the client, or both (Joinson, 1992; Stamm, 1995; Figley, 1995; White & Shawhan, 1996; Arluke, 1991; Black et.al, 2011; Foster & Maples, 2011, Baran et.al., 2012). There is increasing dialogue on occupational stigma and the negative perception of various animal-related work tasks including broadly, the decision to euthanize, the use of animals in research and the global push towards the ideals of no-kill animal shelters (Rohlf & Bennett, 2005; Black et.al, 2011; Foster & Maples, 2011; Baran et.al., 2012; Davies & Lewis, 2010; Anderson et.al., 2013). This stigma may further compound the effects of occupational stress and compassion fatigue and lead to emotional dissonance and the potential for emotional contagion not only between those directly involved in these tasks but also to ancillary and support staff such as receptionists and other office workers (Rohlf & Bennett, 2005; Black et.al, 2011; Foster & Maples, 2011; Baran et.al., 2012; Davies & Lewis, 2010; Anderson et.al., 2013).

Further to this, a study by Jones-Fairnie et.al. (2008) looked at the rate of suicide among veterinarians in two Australian States and reported that many older Australian veterinarians claim to know of at least one colleague who has committed suicide. The rate of suicide in paraprofessionals is also thought to be on the increase, however no research has been conducted to this end. These increases in suicide leads to the perception that veterinary professionals may be at considerable risk for suicide. Presently, however, there is no evidence that rates of suicide for Australian veterinarians differ markedly from that of the general population.

This study aims to gather information relating to veterinary personnel current understanding and attitudes towards compassion fatigue and other mental health illnesses in SE Qld Veterinary Clinics.

Contact: Dr Rebekah Scotney  rebekah.scotney@uq.edu.au

Determining the feasibility of including ‘mental health risk assessments’ in animal ethics applications, research protocols and, teaching protocols that incorporate high risk tasks.

OH&S is a strong focus across all industries and occupations. Risk assessments are very important as they form an integral part of an occupational health and safety management plan. They help to create awareness of hazards and risk, identify who may be at risk (e.g., employees, cleaners, visitors, contractors, the public, etc.), determine whether a control program is required for a particular hazard, prevent injuries or illnesses, especially when done at the design or planning stage, prioritize hazards and control measures and, meet legal requirements where applicable.
Risk assessments comprise a major component in animal ethics applications, research protocols and teaching protocols. These specific situations or applications focus entirely on the physical risk of procedures, chemicals and interactions.

There is ever emerging literature (Scotney et.al., 2017) on the mental and emotional effects of those working in animal-related occupations and as such it is important to consider potential risk factors associated with ‘high-risk’ tasks in this area. By formally identifying high-risk tasks, it is then possible to put in place strategies and resources to aid in mitigating the effects of same.

The aim of this project is to determine the feasibility of including mental health risk assessments in animal ethics applications, animal research protocols and teaching protocols.

**Contact:** Dr Rebekah Scotney  rebekah.scotney@uq.edu.au

The social and psychosocial construct of abattoir workers and the psychological effects of perceived dirty work.

There are limited studies which look at the mental well-being of those who work in abattoirs. Extant work regarding meatworkers has tended to focus on either the psychological well-being of workers (e.g., Dillard, 2008) or the potential health hazards for consumers, given food chain concerns (e.g., Nowak, Sammet, Klein, & Mueffling, 2006). Where attention has turned more toward the broader aspects of attitudes to animals within meat-working populations, the issues raised have been disturbing on both human and animal welfare fronts. In 2008, Dillard called for legal redress for “slaughterhouse workers” (commonly termed “meatworkers” in Australia/NZ) because of the psychological trauma caused by their daily experience of “large-scale violence and death” (p. 391) within an institutional culture that does little to reduce animal or human suffering (Richards et.al., 2013).

There are gaps in knowledge of the underpinning social and psychosocial construct of those who work in abattoirs. A better understanding of the prevalence of lowered mental wellbeing and psychological harm among abattoir workers needs to be achieved so as to bridge this gap and, to inform strategies and programs to aid mental wellbeing in those employed in abattoirs.

**Contact:** Dr Rebekah Scotney  rebekah.scotney@uq.edu.au

Pilot study determining the efficacy of two commercial formulations of pergolide to treat Pituitary pars intermedia dysfunction (PPID) in horses.

PPID is a common disease afflicting horses (and ponies) throughout the world, with more than 20% of horses older than 15 years affected. Clinical signs of PPID include hypertrichosis, chronic infections; hyper- or anhydrosis and recurrent laminitis. Laminitis is a painful and incurable condition of horses resulting in loss of use, high veterinary and farrier expenses and decreased survival.
Elevated basal plasma adrenocorticotropic hormone (ACTH) concentration is used to diagnose PPID. The dopamine agonist pergolide mesylate provides the most effective treatment for PPID. Dosages used to successfully control PPID range from 1 to 5 mg of pergolide daily. Treatment success is considered to be resolution of clinical signs and normalization of ACTH concentrations. There are anecdotal reports of high rates of treatment failures in horses and ponies being treated with liquid pergolide products. This may be because of inadequate dose or degraded drug because of inappropriate storage conditions and delays between manufacture and administration.

The proposed pilot study would enrol client owned horses and ponies with PPID. ACTH concentration will be periodically measured after treatment with a liquid and tablet formulations of pergolide. A dose escalation study will be performed until clinical signs and ACTH concentrations improve. The efficacy of liquid and tablet formulations of pergolide will be compared.

This project will only be available if funding is obtained.

Contact: Allison Stewart allison.stewart@uq.edu.au phone 0417962127

Comparison of the effects of storage and temperature on the stability of Australian liquid formulations of pergolide

PPID is a common disease afflicting horses (and ponies) throughout the world, with more than 20% of horses older than 15 years affected. Clinical signs of PPID include hypertrichosis, chronic infections; hyper- or anhydrosis and recurrent laminitis. Laminitis is a painful and incurable condition of horses resulting in loss of use, high veterinary and farrier expenses and decreased survival.

The dopamine agonist pergolide mesylate provides the most effective treatment for PPID. Dosages used to successfully control PPID range from 1 to 5 mg of pergolide daily. Treatment success is considered to be resolution of clinical signs and normalization of ACTH concentrations. There are anecdotal reports of high rates of treatment failures in horses and ponies being treated with liquid pergolide products. This may be because of inadequate dose or degraded drug because of inappropriate storage conditions and delays between manufacture and administration.

Concentrations of pergolide in various commercially available products will be measured after exposure to various temperatures and periods of time using liquid chromatography-mass spectrometry (LC-MS).

This project will only be available if funding is obtained.

Contact: Allison Stewart allison.stewart@uq.edu.au phone 0417962127
Can Near Infrared Reflectance Spectroscopy (NIRS) technology be used to assess the level of pasture contamination with infective nematode parasite larvae of important gastrointestinal nematode parasites of livestock or horses?

Internal parasites are a major constraint to both the livestock and equine industries, and anthelmintic resistance to multiple drug classes among many of the most pathogenic helminth species is widespread. The principles of integrated parasite management are essential in the sustainable management of parasites in these industries, which encompasses the management of parasite “refugia” (environmental stages of the parasite life cycle). The ability to prepare safe pastures for grazing by susceptible stock classes is fundamental to parasite management, however, there is no practical or convenient method of estimating pasture larval contamination.

Near infrared reflectance spectroscopy (NIRS) technology has been used for decades to predict the composition of plant and animals tissues as well as aspects of animal performance. In more recent years, research focus has expanded to consider other innovative uses of NIRS technology and widen its application.

The objective of this project will be to test the ability of NIRS to detect differences in pasture larval contamination with infective nematode larvae. An experiment will be conducted to seek proof of concept, where pasture plots spiked with known quantities of L3 larvae will be used to develop calibration models. These models will then be used to measure the spectral absorbance of some unknown test samples.

If NIRS is reliably able to detect differences in pasture larval contamination, future work could focus on expanding and refining the models to include variations in pasture types and species of nematode larvae. Positive findings from this pilot project may indicate a useful role for NIRS technology in parasite management worldwide.

Contact: Dr Anne Beasley a.beasley@uq.edu.au

Measurement of transdermal analgesia through cattle skin

This project will investigate the movement of local anaesthetics (lignocaine) through cattle skin. There is substantial interest for such a formulation since current approaches require parenteral (needle) delivery and can potentially cause more stress than not having a local anaesthetic effect. This project will screen a number of potential formulation (vehicles) to contain lignocaine and determine which most effectively drives the drug through skin. The intended outcome is to develop a topically-applied local anaesthetic formulation that will have similar of better efficacy to control pain following surgical incision as human formulations (e.g. Emla), reducing the pain and stress of these procedures in cattle.

Contact: Paul Mills p.mills@uq.edu.au
Can CT imaging be used to detect changes in bone density in horses?

Change in the structure of sub chondral bone is a common finding in lame horses. Many traditional assessments rely on subjective evaluation of radiographs. By incorporating a standard “phantom” into diagnostic CT protocols it is possible to obtain a true measure of focal bone density. A student undertaking this study would use image analysis of equine CT cases and micro-CT samples to determine if bone density measurements can be correlated with lameness and therefore provide additional criteria for diagnosing bone pathology.

Contact: Lisa Kidd l.kidd@uq.edu.au

The ‘dolphin chirp’ – a potential new dolphin vocal sound

The ‘dolphin chirp’ is a short, relatively low-frequency downsweep sound, which has been recorded (using a fixed hydrophone array) quite often off the coast of Peregian Beach on the Sunshine Coast. Groups of bottlenose dolphins are commonly seen around the hydrophone array therefore it is likely that this sound comes from bottlenose dolphins. However, this ‘chirp’ sound is quite unique, in that there are no similar sounds that have been attributed to bottlenose, or indeed any species, of dolphin in the literature. Preliminary work has acoustically positioned these chirp sounds to other dolphin sounds (click and whistle sounds) on a few occasions. These chirp sounds also seem to have little variation in structure, and may be significantly louder than other dolphin sounds, therefore may be a useful sound for acoustically monitoring this dolphin population. This project will carry out further analysis on the ‘chirp’ sounds to provide further evidence that this is a novel sound from bottlenose dolphins. It will estimate the variance in sound structure within and between chirp bouts, compare sound parameters with other commonly heard tonal dolphin sounds (whistles) and determine if there are any changes in the frequency of ‘chirp’ acoustic detections over time (2002 – 2015). Results of this study will likely add a novel sound to the bottlenose dolphin repertoire, and provide some evaluation of its potential to be used in acoustic monitoring of this population of dolphins.

Contact: Dr Rebecca Dunlop r.dunlop@uq.edu.au and Associate Professor Michael Noad m.noad@uq.edu.au

The use of surface-generated sounds in the presence of singers

Humpback whales emit two main communication sounds; vocal sounds and sounds generated on the surface (by breaching and slapping their pectoral and tail fins). Groups of whales tend to switch their communication strategy from using primarily vocal sounds, to using primarily surface-generated sounds, in higher wind noise. Whales also emit vocal sounds at higher levels in increased wind noise and therefore utilise two different methods to overcome potential deleterious effects communicating in noise. Interestingly, whales must also consider their social environment when signalling. Groups (especially females with a nursing calf) emit vocal sounds at lower levels in the presence of singing whales, despite the song being a potential source of noise. This is presumably to avoid the unwanted attention of a singing male. Therefore there are two competing effects; wind noise causing an increase in vocal level, and singing whales causing a decrease in vocal level. It is unknown, however, if whales
emit fewer surface-generated sounds in the presence of singing whale (potentially to avoid the unwanted attention of the male), and if noise levels change this response. This project will determine if singing whales have an effect on the use of surface-generated sounds in humpback whale groups. It will also consider the potential effect of noise within this response to their social environment.

**Contact:** Dr Rebecca Dunlop r.dunlop@uq.edu.au

---

**Evaluation of overall prevalence and phylogeography of methicillin resistant Staphylococcus spp. carriage in dogs and cats presented in two veterinary referral centres in the greater Brisbane**

Methicillin-resistant *Staphylococcus* species are a major area of study worldwide due to their zoonotic potential and ability to develop multi-resistance to antibiotics. Methicillin-resistant *Staphylococcus* (MRS) infections as well as carriage have been shown in both people and animals. MRS carriage prevalence for dogs in North America is well known but its prevalence in Australia has not yet to our knowledge been reported. Australia is usually well-known for its overall low prevalence in infectious diseases so it is possible that the carriage rate could be different. The main goal of this study is to evaluate the overall prevalence of Methicillin-resistant *Staphylococcus* spp through the sampling of dogs and cats in different setting and location around the greater Brisbane area. The second goal would be to evaluate possible difference in carriage rates depending on location (urban vs rural area) and level of association with veterinary medical environment (general practice vs referral practice). The third goal would be to compare the strains obtained in animals to the ones most present in humans. The clinical and public health implications of this project are numerous and could lead to the development of collaborative projects with physicians and infectious diseases researchers as part of the One Health project.

The expected benefits of this project for a student are as follow:

1) The student will gain significant experience in study design, scientific data collection and statistical treatment of that information.

2) The preliminary data will be presented by the student at the end of the study period to the supervising staff in a 15 min oral presentation. The final data could be also submitted for presentation at a local, national or international congress.

3) The data collected will lead to the writing of a scientific manuscript for publication in a peer reviewed journal. The student will be involved in the redaction of the manuscript for additional experience with writing of scientific article with the degree of involvement depending on the personal implication in the project of the student.

This project requires mainly an individual who is serious, highly motivated, hard-working and can be relied on for the collection of the study sample and data. An interest in microbiology, data analysis and statistics software will be appreciated but is not mandatory.

**Contact:** Dr Erika Meler e.meler@uq.edu.au
Reliability and accuracy of activity trackers in dogs

The use of activity trackers in humans is widespread and nowadays common use. These are mostly used to objectively record people activity and to ensure that an adequate calorie-burning activities are done in day. Some companies have developed similar devices for dogs. These devices have some similarities but also more varied purposes. The initial goal of these device in companion animals was the ability to locate them via GPS application when lost. Nowadays the new generations of pet trackers are advertised to allow also monitoring of heart rate, respiratory rate as well as activity level. Up to now, there is no evidence of a study looking at the reliability and accuracy of these devices offered to the technology eager public of pet owners. Some of the data generated by these tackers will without a doubt trigger questions to treating veterinarians. It appears important from a medical point of view to be able to provide a thoughtful insight based on sounded research on the validity of the measurement obtained with these new devices. Moreover, should some of these devices be identified as particularly reliable and accurate from this study, follow-up research could investigate their use in the clinical setting for animals with cardiac, respiratory, orthopaedic or neurologic conditions.

Contact: Dr Erika Meler e.meler@uq.edu.au

Investigating the impact of the native legume Indigofera linnaei (Birdsville Indigo) on cattle reproduction in northern Australia

Indospicine is a toxic amino acid found only in *Indigofera* plant species which have widespread prevalence in grazing pastures across tropical Africa, Asia, Australia, and the Americas. Indospicine is an unusual in that it is non-proteinogenic and is cumulatively absorbed as the free amino acid into tissues of livestock grazing *Indigofera* plant species. It is a competitive inhibitor of arginine metabolic processes and in experimental studies causes both liver disease and abortion in cattle and sheep. The abortive effect has also been reported in pregnant rabbit does where feeding as little as 5% *Indigofera* in daily rations resulted in 100% stillborn when fed in the last 15 days of pregnancy.

*Indigofera linnaei* (Birdsville Indigo) has a widespread distribution in north Australia rangelands of northern Australia, and given the extensive nature of cattle production systems in these regions, foetal losses due to maternal consumption of indospicine may well occur and contribute to observed reproduction losses in these regions without any specific attribution. This project is laboratory based and is designed to measure indospicine concentration in serum samples collected from pregnant cows and investigate the relationship between the measured indospicine levels and pregnancy outcomes.

This project will be located in laboratories at Food and Health Sciences Precinct, Coopers Plains (Brisbane) and utilise Liquid Chromatography Mass Spectrometry (LC-MS).

Contacts: Dr Mary Fletcher (mary.fletcher@uq.edu.au) Phone: (07) 3276 6089 and Professor Michael McGowan (m.mcgowan@uq.edu.au)
Study of changes in semen quality in young tropically adapted bulls

Contact: Professor Michael McGowan (m.mcgowan@uq.edu.au)

Medical geography of Q-fever in Queensland

Q-fever is a notifiable zoonotic infection which causes debilitating disease in humans working with livestock and potentially the community. It is highly incident in Australia particularly in Queensland. The student will build a spatial model to identify the level of disease clustering in Queensland and the role of individual, household and environmental factors that determine its geographical distribution.

Contact: Dr Ricardo Soares Magalhaes r.magalhaes@uq.edu.au Phone: 5460 1827

Next generation analysis of gene expression exploring the effect of nutrition on skeletal growth in cattle

This project will involve analysis of differentially expressed genes in the growth plate and other tissue from biopsies in growing animals. A student would learn valuable skills in bioinformatics, cell and tissue biology as it applies to real-world scenarios and aspects of nutrition and production of cattle. Students with a background in cell biology, animal or veterinary science, veterinary technology, biology, molecular biology, genetics or animal production would be ideal.

Contact: Dr Lisa Kidd (School of Veterinary Science) email:(l.kidd@uq.edu.au ), phone 0438 714 876 or Professor Dennis Poppi (School of Agriculture and Food Sciences) email d.poppi@uq.edu.au

Phosphorus deficiency in cattle

There are a number of projects available as part of a large study examining management strategies for the important problem of phosphorus deficiency in cows and heifers in northern Australia. The project involves analysis of bone and growth plate biopsies using histology, dynamic histomorphometry, bone cell populations and bone microstructure using micro CT. Students will gain skills in image analysis, histomorphometry, bone tissue histology in health and disease, CT and radiology imaging of bone and measuring dynamic indices of bone tissue in response to phosphorus deficiency or supplementation under wet and dry season conditions during pregnancy, lactation and recovery. Students with a background in agriculture, biology, animal or veterinary science, veterinary technology, molecular biology, nutrition, animal production or similar would be ideal. This project is in collaboration with staff from QAFFI and The UQ School of Biomedical Sciences.

Contact: Dr Lisa Kidd (School of Veterinary Science) on 0438 714 876 or email l.kidd@uq.edu.au
High throughput cellular metabolic phenotyping of cells from domestic animals during nutritional, drug and infectious agent challenges.

The metabolic rate of cells determines everything from energy conversion capability to how cells cope with insults/stress, including infectious agents. Until recently, there was no high throughput means of establishing the metabolic effect of diverse cellular treatments and challenges, be they changes in nutritional status of the animal, hormonal changes or exposure to drugs or infectious agents. With over 20,000 genes, 200,000 proteins and thousands of pathways, it is not possible to measure everything in a cell at once, but it is now possible to measure the energy systems that drive them at a broad level. Previous in vitro methods have typically required techniques highly disruptive to cells, such as mitochondrial preparations, but more recently metabolic flux analysis has been developed, whereby it is possible to measure energy flux in live, intact cells in real time. Taking advantage of the recently acquired flux analyser at the Gatton Campus, this project will focus on the optimization of the underpinning methods and subsequent analysis, with a special focus on mitochondrial and glycolytic bioenergetics, in at least two settings: (i) the effect of various nutrients and/or drugs on cell metabolism in various organs of food producing animals (cattle, sheep, pigs, poultry), (ii) the effect of immunological stimuli and infectious agents on the metabolism of peripheral blood leukocytes of domestic animals.

This project is funded and has ethics approval.

Contact: Helle Bielefeldt-Ohmann (h.bielefeldtohmann1@uq.edu.au) or Nick Hudson (n.hudson@uq.edu.au).

Oral microbiome of Bilbys; comparing wild and captive animals.

The project aims to:

- Review the incidence of captive held Bilbys in Australian collections via retrospective analysis of zoo medical records
- Describe the dental anatomy of Bilbys
- Collect samples from both wild and captive Bilbys to allow the identification and comparison of oral bacteria by PCR and culture
The outcome of this project will be to identify a marker for the early recognition of dental disease in captive Bilbys.

**Contact:** Bob Doneley (r.doneley@uq.edu.au)

---

**Prevalence of Toxoplasma gondii and Feline Immunodeficiency Virus (FIV) in unowned cat populations in Brisbane, South-East Qld.**

In Brisbane, feral cats are problematic and are subjected to ongoing management by local government. Unowned cats can reach high local densities, and potentially harbour and spread diseases of importance to public health and pets, livestock and wildlife conservation. There is increasing resistance from residents towards local government cat management programs. Information regarding the diseases carried by unowned cats, and the potential risks these may pose to residents, pets, livestock and wildlife, may assist local government to formulate informed awareness and education programs and may persuade more responsible pet ownership.

Limited studies indicate that feral or unowned cats can host a variety of endoparasites, ectoparasites and bacterial pathogens. Two diseases of particular concern include toxoplasmosis and Feline Immunodeficiency Virus (FIV). The prevalence of *T. gondii* and FIV in unowned cat populations in Brisbane is unknown, and implications for disease (and unowned and owned cat) management remain unclear.

This honours project will design and implement a study to investigate the prevalence of toxoplasmosis and FIV in unowned cats in the greater Brisbane City Council area. Specifically, this project will aim to sample unowned feral cats euthanized from management programs by Brisbane City Council. In Brisbane City Council, typically 800-1000 unowned cats per year are euthanized as part of ongoing management programs. Necropsy of selected animals provides the opportunity to sample a range of unowned cats for diseases of concern including toxoplasmosis and FIV. This project has strong support from Brisbane City Council, and will be jointly supervised by the University of Queensland, Brisbane City Council and Biosecurity Qld.

This project is pending funded and ethics approval, with a proposed start date of Feb 2019.

**Contact:** Rowland Cobbold; r.cobbold@uq.edu.au.

---

**Tracing the spillover of fleas (Ctenocephalides spp.) between native and domestic animals**

Spillover of parasites between wildlife and pets is a threat to animal health. Cat fleas (*Ctenocephalides felis*) and related dog fleas (*C. canis*) are among the world’s most economically important ectoparasites. Both can infest domestic pets as well as a diversity of wildlife species. Yet knowledge on their distributions, particularly among wildlife, is poor. To provide the first assessment of ectoparasite populations among Australia’s wild mammals, our team is currently sampling parasites from native and feral mammals across urbanization gradients in Southeast...
Queensland. The aims of this Honours project are twofold: (1) to contribute to wildlife trapping and surveying efforts; (2) to develop DNA markers that can be used to understand the influences of biotic and environmental features on the genetic population structure of cat fleas. Interests in genetics, wildlife sampling and data analysis will be appreciated.

Working as part of a vibrant research team, students will benefit in the following ways:

(1) Experience in sampling design and data collection in field and laboratory environments

(2) Quantitative analysis of complex datasets using script-based software

(3) Contributing to the planning, writing and submission of peer-reviewed publications

This project is funded and has ethics approval.

Contact: Dr Nicholas Clark; n.clark@uq.edu.au and Prof Jenny Seddon; j.seddon1@uq.edu.au
Assessing perceptions of tick and flea infestation risk in southeast Queensland

Paralysis ticks (Ixodes holocyclus) and cat fleas (Ctenocephalides felis) are two of Australia’s most economically important ectoparasites. Both parasites cause morbidity in pets and can infest a diversity of wildlife species. This represents a substantial One Health issue, yet factors that influence risk of parasite infestation, and how people perceive this risk, are not known. This presents a challenge for animal health workers, as people’s risk perception and knowledge of their pets’ interactions with wildlife can influence parasite spread at the domestic animal – wildlife interface. This Honours project aims to understand factors that influence pet owners’ perceptions of ectoparasite infestation risk. Voluntary questionnaires and requests for public parasite submissions will be used to identify factors influencing risk of paralysis tick and flea spillover between wildlife and pets in southeast Queensland. Data collected will be non-identifiable but will provide necessary information to (1) quantitatively assess environmental and demographic correlates with risk perception; and (2) contribute to spatial models of incidence risk. Interests in One Health, wildlife disease and spatial data analysis will be appreciated.

Working as part of a vibrant research team, students will benefit in the following ways:

(1) Community engagement from a One Health perspective
(2) Script-based quantitative data analysis and spatial modelling
(3) Contributing to the planning, writing and submission of peer-reviewed publications

This project is funded and has ethics approval.

Contact: Dr Nicholas Clark; n.clark@uq.edu.au A/Prof Ricardo Soares Magalhães; r.magalhaes@uq.edu.au Prof Jenny Seddon; j.seddon1@uq.edu.au

Spatial modelling of wildlife hospital admissions

Wildlife hospitals offer a tremendous service to the local community. One of the key benefits they can provide is gathering information on spatial and temporal patterns in wildlife trauma incidents. Understanding which species are more susceptible to trauma, and uncovering particular areas or times of the year when incidents are more likely to occur, can provide powerful leverage to local planners, conservation groups and policymakers. This Honours project will apply spatial modelling tools to a large dataset of wildlife hospital clinical records to identify factors associated with increased incidence of trauma. Outputs will consist of high-resolution maps of trauma incidence estimates and reports aimed at influencing planning decisions in efforts to reduce these occurrences. Interests in wildlife Health, conservation and spatial data analysis will be appreciated.

Working as part of a vibrant research team, students will benefit in the following ways:
(1) Script-based quantitative data analysis and spatial modelling

(2) Interacting with wildlife veterinarians to guide a joint research agenda

(3) Contributing to the planning, writing and submission of peer-reviewed publication

This project is funded and has ethics approval.

Contact: Dr Nicholas Clark; n.clark@uq.edu.au and A/Prof Ricardo Soares Magalhães; r.magalhaes@uq.edu.au

Determining the presence and persistence of colostral transfer of passive immunity against Hendra virus in foals, and their response to Hendra vaccination.

Hendra virus (HeV) is a uniquely Australian zoonotic virus of horses, posing significant economic, animal welfare, and public health concerns. The virus is transmitted from bats to horses.

An equine vaccine Equivac® HeV is available and antibody titres greater than 1:32 are considered protective. There have been no HeV cases in vaccinated horses. As there is no human vaccine for HeV, the most effective means of preventing human infection is through vaccination of horses. All horses at UQ are vaccinated, with foals vaccinated at 4-6 months of age.

Immunity in the equine neonate is conferred via transfer of passive immunoglobulins through ingestion of colostrum. Maternal antibody titres in foals may offer a short period of protection against HeV. The ideal time to vaccinate foals is unknown. The project will involve bleeding foals at birth and then every month until vaccination. Blood samples will also be collected after vaccination of different aged foals. HeV titres will be measured. PhD level projects may also involve laboratory work in the validation of other diagnostic tests to measure HeV antibody titres.

Please contact Allison Stewart allison.stewart@uq.edu.au. Graduate student salary and tuition support is currently not included in the funds available for this project. Australian and Commonwealth students may be eligible for scholarships. We would welcome international students with home country financial support (academic performance greater than B+ and IELTS >6.5 overall and > 6 in each category). Limited UQ scholarships for international students are available for high outstanding applicants.
For general enquiries on Honours studies in Veterinary Science, please contact:

Dr Rebecca Dunlop r.dunlop@uq.edu.au for enquiries about the Bachelor of Science (Honours) – Gatton in Animal and Veterinary Bioscience
http://www.uq.edu.au/study/program.html?acad_prog=2354

Associate Professor Michael Noad mnoad@uq.edu.au for enquiries about the Bachelor of Veterinary Technology (Honours) http://www.uq.edu.au/study/program.html?acad_prog=2422