anzccart
HUMANE SCIENCE

CONFERENCE 2017

Maintaining social license in a changing world

QUEENSTOWN, NEW ZEALAND
Rydges Hotel
2-4 September

Full programme details at:
anzccart.org.nz/anzccart-conference

EXPLORE | DISCOVER | SHARE

ROYAL SOCIETY TE APĀRANGI

what is ANZCCART?

The Australian and New Zealand Council for the Care of Animals in Research and Teaching (ANZCCART) is an independent body which was established to provide a focus for consideration of the scientific, ethical and social issues associated with the use of animals in research and teaching. Such use is often the subject of lively debate. ANZCCART seeks to promote effective communication and co-operation between all parties and assist in the resolution of potential conflicts by promoting awareness of concerns and solutions to problems.

ANZCCART's corporate mission is to:

- promote excellence in the care of animals used in research and teaching
- ensure that the outcomes of the scientific use of animals are worthwhile
- foster informed and responsible discussion and debate within the scientific and wider community regarding the scientific uses of animals.

ANZCCART operates on a purely advisory basis and provides guidance and information to all interested parties including Animal Ethics Committees, scientists, teachers, regulatory authorities, granting agencies, government, animal welfare organisations, the media and the general public.

ANZCCART is governed by separate Boards in New Zealand and Australia. ANZCCART (NZ) is a Committee of Royal Society Te Apārangi. Its principal sponsors are the New Zealand Vice-Chancellors' Committee and AgResearch Ltd but it also receives annual contributions and/or other support from organisations including the Ministry of Agriculture and Forestry and the Royal New Zealand SPCA.

ANZCCART's principal sponsors in Australia are the Australian Vice-Chancellors' Committee, Australian Research Council, CSIRO, the National Health and Medical Research Council, and Royal Society Te Apārangi. State and Territory Government Departments responsible for the management of animal welfare legislation are also members, as is the RSPCA.

ANZCCART promotes and supports the commitment to the principles embodied in the legislation regulating the use of animals in research, testing and teaching in New Zealand (Animal Welfare Act 1999, Part 6), the Australian code of practice for the care and use of animals for scientific purposes and the relevant animal welfare legislation enforced by each State or Territory Government.

further enquiries

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Conference 2017

All meetings are being held in the Queenstown room on Level 5 of the Rydges Hotel (see map provided); except on Day 2 for 'Lessons from AEC front lines', where rooms will be allocated.

Catering during break times will be served in Reds Bar located on Level 6. The entrance will be just in front of you if you walk up the spiral staircase.

Day 1 | Saturday 2 September

- **Registration** (2.30pm-3.30pm)
- **Welcome** (3.30pm-3.35pm)

  Hon Pete Hodgson, ANZCCART New Zealand Chair
- **Information and communication of animal research** (3.35pm-4.10pm)

  Dr Helena Hogberg Deputy Director, Center for Alternatives to Animal Testing, Johns Hopkins University, USA
- **Social licence of freshwater use** (4.20pm-4.50pm)

  Dr Mike Joy, Senior Lecturer in Ecology/Zoology, Massey University

Close 5pm

Visit and dinner at Walter Peak Station:

5:30pm-5:45pm	Guests board TSS Earnslaw vintage steamship
5:45pm	Depart Steamer Wharf, Queenstown on TSS Earnslaw
6:45pm	Arrive Walter Peak and seated for dinner
8:30pm	Guests invited to attend farm demonstration
9:15pm	Depart Walter Peak on TSS Earnslaw
10:00pm	Arrive Queenstown

Day 2 | Sunday 3 September

Theme: Openness in Animal Research

- **Experiences from the UK on a Concordat on Openness on Animal Research** (9.15am-10.00am)

  Professor Roger Morris, Professor of Molecular Neurobiology, King's College London, UK

- **Painful truths: what systematic reviews reveal about the utility of animal research** (10.10am-10.50am)

  Professor Andrew Knight, Professor of Animal Welfare and Ethics, University of Winchester, UK

Morning tea 11.00am Location - Reds Bar

- **Legal perspective on social license** (11.30am- 12.05pm)

  Mr Marcelo Rodriguez Ferrere, Lecturer, Faculty of Law, University of Otago

- **Trends in media coverage of animal research in New Zealand and Australia** (12.15pm- 12.45pm)

  Dacia Herbulock, Senior Media Advisor, Science Media Centre (NZ)

Lunch 12.45pm

Theme: Lessons from AEC front lines

- **Difficult AEC experiences, with workshop breakout sessions** (1.45pm-2.40pm)
- **AEC Members of the Year Awards (Australia/New Zealand)** (2.40pm-3.00pm)

  Followed by presentations from the winners

Afternoon tea 3.00pm

Theme: Open Session

- **Operating a National AEC under state based licences** (3.30pm-3.55pm)

  Sharyn Zrna, Animal Research Ethics Coordinator, CSIRO

- **The assessment of housing density and social hierarchy of laboratory rats on behavioural measures to assess welfare** (4.00pm-4.25pm)

  Timothy Barker, University of Adelaide

- **Survey of education and training programmes in Australia and New Zealand: current status and future prospects** (4.30pm- 4.55pm)

  Dr Deirdre Bourke, Animal Welfare and Veterinary Advisor, University of Western Australia

Close 5pm

Evening Free for delegates and speakers to organise own activities/dinner

Day 3 | Monday 4 September

Theme: Developments in new technologies

- **De-extinction: the possibilities and the potential perils of bringing back extinct species through genetic engineering** (9.00am- 9.35am)
  Professor Phil Seddon, Director, Wildlife Management Programme, Department of Zoology, University of Otago
- **Using digital technologies to make trapping more efficient** (9.45am- 10.20am)

  Grant Ryan, the Cacophony Project

Morning Tea 10:30am

Theme: Application of the 3Rs (replacement, reduction and refinement)

- **Cam Reid Oration - New 3Rs techniques** (11.00am- 11.40am)

  Dr Helena Hogberg, Deputy Director, Center for Alternatives to Animal Testing, Johns Hopkins University, USA
- **From glowing grubs to superbugs: the 3Rs and infectious diseases research** (11.50am-12.20pm)

  Dr Siouxsie Wiles, Senior lecturer, Molecular Medicine and Pathology, University of Auckland

Lunch 12:30pm

Theme: Improving Animal handling

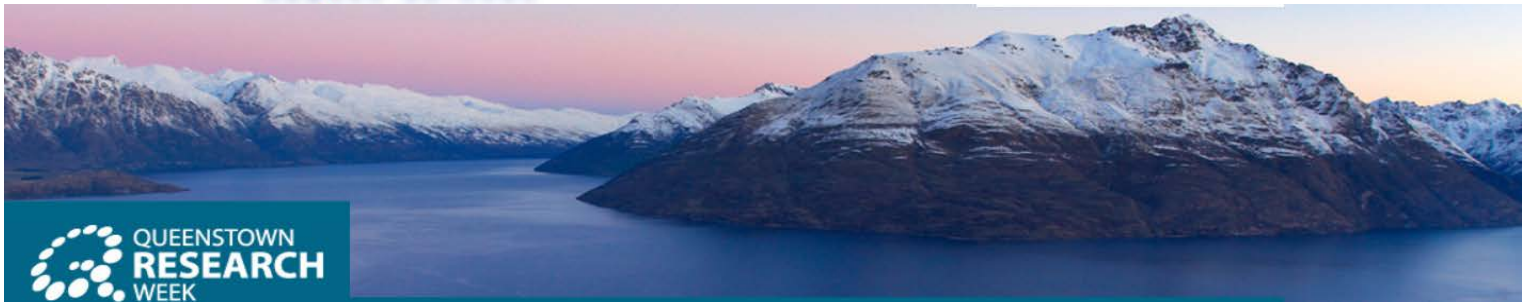
- **Dissecting distress - what is a humane death?** (1.30pm-2.05pm)
  Dr Ngaio Beausoleil, Senior lecturer, Institute of Vet, Animal & Biomedical Sciences, Massey University
- **Compassion fatigue – the cost of caring** (2.15pm- 2.50pm)
  Dr Arnja Dale, Chief Scientific Officer, Royal New Zealand SPCA

Afternoon Tea 3.00pm

- **Update on ANZCCART (NZ) projects** (3.30pm-3.40pm)
- **ANZCCART (NZ) Animal Care Technician Award** (3.40pm- 3.55pm)
- **Concluding statements** (3.55pm- 4.00pm)
  Hon Pete Hodgson, ANZCCART New Zealand Chair
- **2018 Conference** (4.00pm -4.05pm)
  Geoff Dandie

Close 4.05pm

7.00pm	Drinks Reception, Crown Plaza Hotel - Three Sixty Restaurant
7.30pm	Conference Dinner, Crown Plaza Hotel - Three Sixty Restaurant

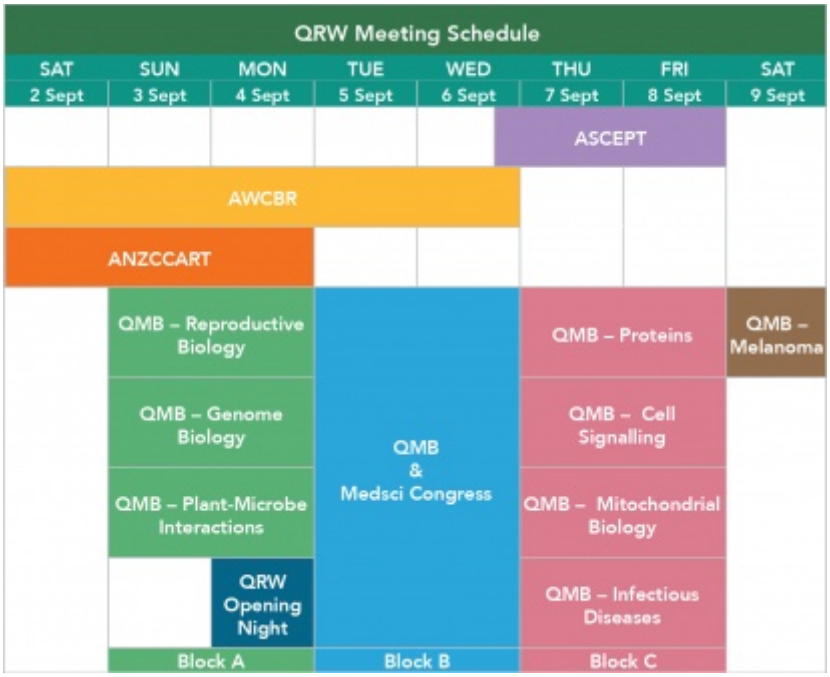


About Queenstown Research Week

Queenstown Research Week is New Zealand's biggest annual scientific gathering. It is a week of coordinated meetings covering a wide range of areas of science.

The Queenstown Research Week concept has allowed us to add a diverse range of satellite meetings every year that allow focused meetings for specialist areas of the New Zealand science community. These meetings bring together well over 1000 participants every year and feature presentations from some of the world's leading scientists. The registration policy means that registering for one meeting allows participants to freely attend any of the other meetings being held at the same time so maximizing potential for inter-disciplinary interactions

ANZCCART delegates are free to participate in Block A QMB seminars, as part of Queenstown Research Week. On Sunday 3 September and Monday 4 September there will be a trades area where QRW sponsors will be exhibiting. This is located on Level 4 of the Rydges Hotel and catering will be being served here for attendees of other meetings. You are welcome to visit the trades area during breaks but please ensure you dine in the Reds Bar.



QMB – Queenstown Molecular Biology
ASCEPT – Australasian Society of Clinical and Experimental Pharmacologists and Toxicologists
AWCBR –Australasian Winter Conference on Brain Research

1 Rydges Hotel

2 Crowne Plaza Hotel

3 Earnslaw Steamer Wharf

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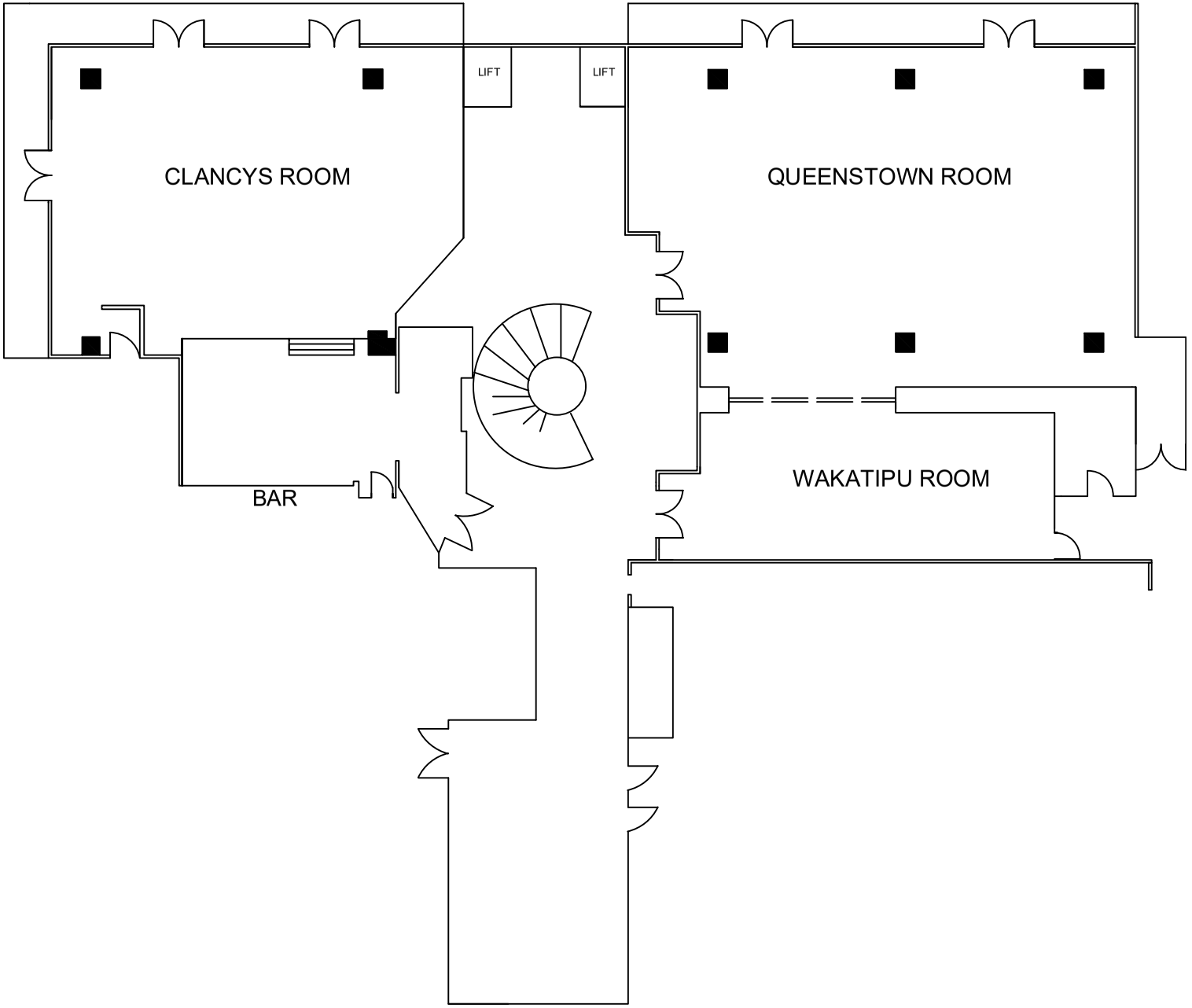
Conference 2017

Queenstown Programme

LEVEL 5 ROOMS

RYDGES HOTEL QUEENSTOWN



Speaker Abstracts
And
Biographies

Information and communication of animal research

Hogberg H.T | The Johns Hopkins University, Bloomberg School of Public Health, Center for Alternatives to Animal Testing, Baltimore, Maryland, USA

There has been an increasingly drawn attention to the unsettling lack of reproducibility of published scientific findings, both from *in vitro* and *in vivo* studies. Several factors contribute to this, such as bias in study selection and design, different data interpretation/evaluation and lack of proper reporting.

Bias occurs when a systematic error is introduced into sampling or testing by selecting or encouraging one outcome or answer over others. Some examples are selection, performance, attrition and selective reporting bias that all should be considered by the scientists before conducting the study.

Despite the development of guidelines and practices, e.g. Animal Research: Reporting of *In Vivo* Experiments (ARRIVE), good laboratory practice (GLP) and good cell culture practice (GCCP) the conduction of the experiments in scientific journals are often indefinite. The journals also indirect contribute to the selective reporting bias as negative results (no effects) are difficult to publish.

These issues do not only apply to basic science but as well to pre-clinical studies and studies used for decision in a regulatory context.

However, there are also several tools available and in use that could improve the reproducibility, for example systematic review methodologies and increased numbers of journals providing guidance on items that should be reported.

Dr. Helena Hogberg is the Deputy Director for the Center for Alternatives to Animal Testing (CAAT) at Johns Hopkins Bloomberg School of Public Health. She received her PhD from Stockholm University, Sweden in 2009. Her experimental work was performed at the European Center for the Validation of Alternative Methods (ECVAM), Joint Research Center, and European Commission in Italy. Her thesis was to develop alternatives tests to developmental neurotoxicity (DNT) using e.g. gene expression and electrical activity recording.

Together with Dr. Hartung she started the current laboratory at the Center for Alternatives to Animal Testing (CAAT) in 2010 as a Postdoctoral Fellow. She was later promoted to faculty position. Her current research activity is still in the field of DNT with the use of emerging tools such as 3D organotypic cell cultures and omics approaches.

Social licence of freshwater use

Joy, M.K.[1] | [1]Institute of Agriculture and Environment, Massey University, Palmerston North, NZ

New Zealand's freshwater systems; rivers, lakes, groundwater and wetlands are all suffering immense ecological impacts. Almost all lowland waterways in the North Island and on the east coast of the South Island are significantly or severely impacted. These declining freshwater ecosystems are all impacted by the usual drivers implicated globally in freshwater degradation; vegetation clearance, damming of rivers, invasive fish introductions, agricultural run-off, urban and industrial wastewater discharges and over-allocation of water abstraction rights. The single best indicator of the extent of degradation waterways have suffered in NZ is the shocking reality that three-quarters of native fish taxa are listed as threatened or at risk. To see clearly what the contemporary riverine freshwater quality and ecosystem health issues are maps of water quality in NZ released by NIWA and others that reveal that the declines are all associated with intensive farming dominated catchments. The four-fold increase in dairy production over the last few decades while impressive was unfortunately mainly achieved mainly through massive increases in the importation and indigenous production of fossil-fuel derived nitrogen fertiliser, and the importation of fossil phosphate fertiliser and Palm kernel extract. The impacts of this are now seen in freshwaters, estuaries and nearshore environments, and the cost of this virtually uncontrolled intensification is being borne by the public and not the industry. Thus, the social license of the dairy industry has been well and truly lost, and because of the lag time of diffuse nutrient movement in many places worse is yet to come. The realisation of these impacts has heightened public sensitivity to water issues; the recent angry and widespread response to water bottling consents is a good example. While the response from government to the loss of social licence has moved on from denial, it has still been ineffectual and political.

Mike Joy BSc, MSc (1st class hons), PhD in Ecology is a Senior Lecturer in Ecology and Environmental Science at the Ecology group-Institute of Agriculture and Environment Massey University Palmerston North. He researches and teaches freshwater ecology, especially freshwater fish ecology and distribution, ecological modelling bioassessment and environmental science. He has and continues to supervise many Masters and PhD students doing research into freshwater ecology, with topics from native fish ecology to farmers' attitudes to sustainability.

Mike has published many papers in scientific journals, many international as well as articles and op-eds for newspapers and magazines. He has authored many reports for Regional Councils and ministry for the environment, and has developed a number of bioassessment tools and associated software used by many North Island Regional Councils.

Mike is an outspoken advocate for environmental protection in New Zealand and has received a number of awards including an Ecology in Action award from the NZ ecological Society, an Old Blue award from Forest and Bird, and he was named 2009 Environmental New Zealander of the year by North and South magazine. He was Manawatu Evening Standard 2012 person of the year, in 2013 he received the Tertiary Education Union NZ Award of Excellence for Academic Freedom and contribution to Public Education, the 2013 Charles Fleming Award for environmental work from the Royal Society of New Zealand and in 2015 the Morgan Foundation inaugural River Voice Award.

Experiences from the UK on a Concordat on Openness on Animal Research

Professor Roger Morris | King's College London

In the UK over the past 15 years, consideration of whether and how experimental animals should be used in research has gone from violent intransigent collision of extreme views, to a civilized discussion and rationally-defensible practice. The factors that have driven this change are:

- Effective police arrests and jailing of illegally violent anti-vivisectionists.
- Ethical review of all licensed experiments on live animals, enforced by effective collaboration between Home Office inspectors and scientists, so that animal experimentation could be justified to the public (and that which could not, was stopped).
- Introduction of the 3R's to guide overall research, including specific funding of 3R's led research by the National Centre for the Replacement, Refinement and Reduction of Animals in Research.
- Emergence of e.g. 'human immunology' (e.g. Mark Davis, Stanford) and clinical imaging – basic scientists collaborating with clinicians to do real experiments with man.
- Establishment of the Science Media Centre and Understanding Animal Research to guide scientists in explaining their research to the public.
- Scientists being open to the public about their research, including welcoming press, politicians and public groups into animal facilities to see what was actually happening, and why.
- A consensus emerged between enlightened politicians (David Willets), funders (MRC, Wellcome and other charities) and universities to enshrine these principles in the Concordat on Openness on Animal Research in the UK (Dec 2015).

Roger Morris is currently the Academic Manager of the Centre for Ultrastructural Imaging at King's College London. His career had included:

- *1990's: studies on the neurological effects of gene deletion/addition in transgenic mice contribute to establishing international standards (e.g. adopted by Nature & Neuron)*[1-4].
- *2000 Asked by the Home Office Inspector to establish the ethical review of animal experimentation at King's College London. I closed down 3 labs outright, and helped improve animal welfare throughout, working closely with our excellent animal house technicians.*
- *August 2005: group of anti-vivisectionists who had exhumed the deceased mother of a man who bred guinea pigs for research, were sentenced to prison terms. Signatures had been gathered for some time on a pre-Concordat statement of openness in animal research. It was decided to use the publicity from the sentencing to launch the statement. Being August, I was the only senior scientist not on holiday who was prepared to be interviewed. I gave about 40 TV, radio and newspaper interviews in one week, and for the next few years, was the main spokesperson for the appropriate use of animals in research.*

- *August 2007: I became Head of Faculty of Biomedical Research at King's, which included being line manager for the Animal Houses. We re-equipped throughout with much better caging, and opened the animal house for inspection by interested groups (MP's, the press, and one branch of the Women's Institute). This included free filming in our Marmoset Unit, which has over the past 20 years established the treatment regime of L-Dopa used to ameliorate Parkinson's Disease. One MP committed to a total ban on animal experimentation, changed his stance entirely after visiting us.*
- *Nov 2008: Oxford opens its experimental animal facility. I was on standby (within minutes) to justify it to the media, when Oxford scientists came forward and did a much better job. Thereafter, female PhD students at UCL also spoke to the press. Leicester, faced with massed protesters as they opened new animal laboratories, invited the Mayor and local newspapers to tour their facility, and the protesters became publically irrelevant. Now, openness is the norm in the UK, and science and experimental animals are much better off because of it.*

Painful truths: what systematic reviews reveal about the utility of animal research

Knight, A.[1] | SAFE, PO Box 28110, Kelburn 6150, Wellington 6011, New Zealand.

Widespread reliance on animal models during preclinical research and toxicity testing assumes their reasonable predictivity for human outcomes. However, of 20 published systematic reviews examining human clinical utility located during a comprehensive literature search, animal models demonstrated significant potential to contribute toward clinical interventions in only two cases, one of which was contentious[1]. Included were experiments expected by ethics committees to lead to medical advances, highly-cited experiments published in major journals, and chimpanzee experiments—the species most generally predictive of human outcomes. Seven additional reviews failed to demonstrate utility in reliably predicting human toxicological outcomes such as carcinogenicity and teratogenicity. Results in animal models were frequently equivocal, or inconsistent with human outcomes. Consequently, animal data may not be considered generally useful for these purposes. Regulatory acceptance of non-animal models is normally conditional on formal scientific validation. In contrast, animal models are simply assumed to be predictive of human outcomes. These results demonstrate the invalidity of such assumptions. The poor human clinical and toxicological utility of animal models, combined with their generally substantial animal welfare and economic costs, demand greater rigor within animal studies, and justify a ban on animal models lacking scientific data clearly establishing their human predictivity or utility[2].

1. Knight A (2007). Systematic reviews of animal experiments demonstrate poor human clinical and toxicological utility. *Altern Lab Anim* 35(6), pp. 641-659.

2. Knight A (2013). The Australasian regulation of scientific animal use: a chimera of protection. In Sankoff P, White S and Black C (Eds.). *Animal Law in Australasia (2nd Edn.): Continuing the Dialogue.* Annandale, NSW, Australia: Federation Press. pp. 264 – 288.

Andrew is Director of Research and Education for SAFE. He is also a European, American and RCVS-recognised Veterinary Specialist in animal welfare, a Professor of Animal Welfare and Ethics, and Founding Director of the Centre for Animal Welfare, at England's University of Winchester. He has over 80 academic publications and a series of YouTube videos on animal issues. These include an extensive series examining the contributions to human healthcare, veterinary and other education, of invasive procedures on animals, which formed the basis for his 2010 PhD and his subsequent book, The Costs and Benefits of Animal Experiments.

Legal Perspectives on Social Licence

Rodriguez Ferrere, M. B.[1]. | [1] Faculty of Law, University of Otago

Research, testing and teaching (RTT) involving non-human animals in New Zealand is almost completely regulated by Part 6 of the Animal Welfare Act 1999. That regime's devolved and decentralised nature gives a great deal of flexibility to those actors and institutions involved in RTT, whilst its recognition of the 3 R's makes it one of the most progressive in the world. Nevertheless, several ad hoc legislative exclusions to the scope of Part 6 might assist a narrative that legislation largely obstructs – rather than assists – research that involves animals.[1]

Using three examples of legislative reform that affected the scope of RTT in New Zealand – the presumptive ban on RTT involving non-human hominids; the use of animals to test psychoactive substances; and the ban on RTT in making cosmetics – this paper will argue that researchers ought to view such reform as beneficial, in that it assists in securing social license for the RTT regime left unaffected[2]. This paper will contrast those reforms with recent controversies involving RTT in New Zealand - ultimately arguing that without the public engagement that such reform promotes, the potential legislative regime for RTT in New Zealand risks being left unfulfilled.

1. E.g., Suran, M. and Wolinsky, H. (2009) "The end of monkey research? New legislation and public pressure could jeopardize research with primates in both Europe and the USA" *EMBO Rep* 10: 1080-1082

2. Dixon-Woods, M. and Ashcroft, R. P. (2008) "Regulation and the social licence for medical research" *Med Health Care Philos* 11: 381-391; Olsson, I. A. S., (2010) "Legislation, social licence and primate research" *EMBO Rep* 11: 9.

M. B. Rodriguez Ferrere is a senior lecturer in the Faculty of Law in the University of Otago. His research interests include administrative law, constitutional law and regulation of non-human animals in the law. He has taught Animals and the Law at since 2013, and alongside Neil Wells, is the co-author of the forthcoming second edition of Wells on Animal Law in New Zealand

Trends in media coverage of animal research

Dacia Herbulock | Science Media Centre

Speaking publicly about animal research -- is it risky? Perceptions vary widely within the scientific community. Some voice concerns about attracting unwelcome attention or even becoming targets for animal rights extremists. Others champion the need to break with a tradition of secrecy and provide more and better information to the public.

Media coverage of issues relating to animal research can focus a sometimes uncomfortable degree of scrutiny on standard practices and extreme cases. However, the 2014 Concordat on Openness contends that maintaining public support for animal research requires a proactive approach from research organisations, including a commitment to enhanced communication with the media.

This talk will explore these tensions through recent examples of media coverage of animal research in New Zealand and Australia, drawing on reflections from conversations with leading journalists and media officers on the front lines of these issues.

Dacia Herbulock is Senior Media Advisor at the Science Media Centre (New Zealand), an independent resource centre promoting evidence-based media coverage of emerging issues where science meets society. She joined the SMC at its launch in 2008, bringing experience in radio, film, documentary, television news and science writing in the US, China and NZ.

She designs and delivers the Science Media Centre's national series of media training and science communication workshops for researchers. She also facilitates an ongoing series of newsroom 'expert encounters' that pair journalists with scientists to discuss issues like balance in media reporting of scientific evidence, conflicts of interest and emerging technologies.

In 2017, she joined Victoria University of Wellington as an Adjunct Research Fellow. Her research interests are in public perceptions of science and technology and developing evidence-based advice for science communication practitioners.

Operating a national AEC under state based licences

Sharyn Zrna | Animal Research Ethics Coordinator, Commonwealth Scientific and Industrial Research Organisation (CSIRO), Kintore Avenue Adelaide, South Australia 5000

Australia is wide brown land with animals galore

I'll discuss CSIROs ethics plan - and let's hope I don't bore

A National Code licenced by the States; please contrast and compare

Hence the similarities and the differences with you I plan to share

Don't be offended, don't get upset, no-one's wrong or right

But less differences between the States might means my hair's less white

My plan involves a big group hug; a sharing of ideas

To streamline ethics processes (so I drink far less beers)

So strap in tight, let's grab the wheel, and unravel common ground

To determine what, if any, collective solutions can be found

Sharyn has been both in and out of CSIRO since 1993 – mostly in; except for a 4-year stint in the Australian Wine Industry where she met her winemaker husband. She studied Chemistry and Aquatic Biology at Deakin University in Warrnambool Victoria, Australia where she obtained her Bachelor of Applied Science with Honours. Her initial work experiences were in aquatic ecotoxicology, pesticide chemistry and soil and water analysis. She then managed and facilitated human research trials involving ileostomy participants to determine foods that contain resistance starch. In order to remove herself from working in the laboratory she agreed to become the Executive Officer of an Animal Ethics Committee. 6 years on and she is the Executive Officer of 3 AECs and is the CSIRO Animal Research Ethics Coordinator.

Assessment of housing density, space allocation and social hierarchy of laboratory rats on behavioural measures of welfare

Barker, T.H.[1], George, R.P.[1], Howarth, G.S. [1,2], Whittaker, A.L.[1] | [1]School of Animal and Veterinary Sciences, The University of Adelaide, Roseworthy Campus, Australia & [2]Gastroenterology Department, Children, Youth and Women's Health Service, Adelaide, Australia.

Minimum space allowances for laboratory rats are legislated based on weight and stocking rates, with the understanding that increased housing density encourages crowding stress. However, there is little evidence for these recommendations, especially when considering positive welfare outcomes. This study consisted of two experiments which investigated the effects of housing density (rats per cage), space allocation (surface area per rat) and social rank (dominance hierarchy) on the ability to perform simple behavioural tests.

Male Sprague Dawley (SD) rats (n=64) were allocated to either high-density (n=8) or low-density (n=8) cages. The second experiment investigated the effects of surface area. SD rats (n=40) were housed in dyads in either the large (n=10) or small (n=10) cage. In both experiments, animals were tested on a judgment bias paradigm, with their responses to an ambiguous stimulus being ascribed as optimistic or pessimistic. Animals were also tested on open-field, novel-object recognition and social-interaction tests. Recordings were taken from 1700-2100h daily for rat observation and social rank establishment.

Dominant animals responded with significantly more optimistic decisions compared to subordinates for both the housing density ($p<0.001$) and space allocation ($p=0.0015$) experiment. Dominant animals responded with increased social affiliative behaviours in the social-interaction test, and spent more time in the centre of the open-field test for both experiments. No significance was detected between housing density or space allocation treatments. These findings suggest that social rank is a significantly greater modifier of affective state than either housing density or space allocation. This finding has not yet been reported and suggests that future drafts of housing guidelines should consider animal social status in addition to floor space requirements.

Survey of education and training programmes in Australia and New Zealand: current status and future prospects

Bourke, D.A., Lindeman, M.J. | University of Western Australia, Perth, WA.

In both Australia and New Zealand, the legislative and regulatory frameworks offer no direct guidance on required standards of education and training for people involved in the care and use of animals in research and teaching. At the 2016 ANZCCART conference, the authors outlined the different national and international education and training requirements for people working with animals in research and teaching[1]. Delegates expressed strong support for a proposed follow-on survey to seek feedback from organisations and individuals in Australia and New Zealand, on the current state and potential future direction of education and training programs for people involved in the care and use of animals in science.

Therefore, two online surveys were created using the Qualtrics survey tool. The surveys were voluntary and anonymous, and The University of Western Australia provided approval to conduct this research, in accordance with its human ethics review and approval procedures.

Both surveys were distributed in association with ANZCCART, and were accessible for completion for a period of two weeks.

The overall aims of these surveys were to:

• Collate details on current education and training programs offered by institutions.

• Identify deficiencies, suggested improvements and future aspirations of institutions and participants.

• Gauge interest in future standardisation and accreditation of education and training in the region.

For the first survey of organisations, staff who arrange and deliver the education and training programs were invited to participate. This survey contained questions on provision of training, including current course content, delivery modes, general assessment modes, specific competency assessment, types of participants, future plans and perspectives on standardisation and accreditation. The second survey requested responses from individual ANZCCART members, who represent a broad range of categories, including researchers, students, animal care staff, AEC members, and animal welfare and ethics personnel. The member survey asked for feedback on personal experiences as participants in training courses, learning preferences, satisfaction, identified deficiencies, suggested improvements and opinions on current capabilities, standardisation and accreditation.

The results of these surveys will be presented and discussed. It is anticipated that data collected will assist evaluation of current and future education and training standards for people involved in the care and use of animals in science, in both Australia and New Zealand.

1. Bourke, D.A, Lindeman, M.J. (2016) *Let's discuss: Standardisation of training in Australia.* In G.Dandie (Ed.) Proceedings of 2016 ANZCCART Conference: Man or Mouse. (pp 56-62) Australian & New Zealand Council for the Care of Animals in Research & Teaching, Adelaide, 2017.

Dr Bourke is a veterinary graduate with more than 25 years' experience within teaching and research establishments. She has been a veterinary member of animal ethics committees in the both the UK and Australia. She has also acted as a consultant for independent audits and as panel member for External Reviews of educational and research establishments.

Prior to relocating to Western Australia, she worked at the Rowett Research Institute of Nutrition and Health in the UK, combining veterinary clinical and statutory compliance responsibilities as Named Veterinary Surgeon

(under the Animals (Scientific Procedures) Act 1986). She also maintained an active research career, studying nutritional and reproductive physiology in a variety of large animal species. She progressed to Head of Animal

Services, with overall responsibility for all veterinary and animal care services, and was subsequently appointed to the Senior Management Group of the Rowett Research Institute.

For the last 12 years she has been engaged as Animal Welfare and Veterinary Adviser to the University of Western Australia (UWA). In this role she provides veterinary expertise, advice and support to UWA's Research and Teaching Community and Animal Ethics Committee. She also organises and presents on the UWA Programme in Animal Welfare, Ethics and Welfare in Science (PAWES) course and other animal related training workshops, and develops general educational resources.

De-extinction: the possibilities and the potential perils of bringing back extinct species through genetic engineering

Seddon, P.J.[1] | [1]Department of Zoology, University of Otago, Dunedin, NZ.

De-extinction, the prospect of using new genetic tools to resurrect lost species, burst upon the public and scientific consciousness only in 2013, and since then has prompted vigorous debate, a flurry of publications, but no actual species restorations to date. The mere prospect of de-extinction is polarising, creating strong advocates and implacable opponents, with both camps invoking moral, ethical, economic, and ecological arguments. Two fundamental questions arise: 1) Is it really possible to resurrect an extinct species? And if so, 2) Just because you can do something, doesn't mean you should – is de-extinction a good idea? I will explore the origins of de-extinction, outline the three recognised de-extinction pathways and consider how close we can come to recreating what has been lost, then I explore the potential for de-extinction projects to contribute to conservation goals.

1. Seddon, P.J. (2017) *The Ecology of De-extinction.* Functional Ecology *31: 992-995*

Phil Seddon is a Professor of Zoology and Director of the Post-Graduate Wildlife Management Programme at the University of Otago. His research interests relate to the field of Reintroduction Biology and the restoration of populations of threatened species. Phil is a member of the World Conservation Union's (IUCN) Species Survival Commission, and chaired the international IUCN Task Force that produced the 2016 Guiding Principles on De-extinction. Phil has worked in South Africa and Saudi Arabia, and now contributes to and advises on species restoration projects in New Zealand, Australia, Indonesia, Austria, Mongolia, the Middle East and North America.

The Cacophony Project: Using digital technologies to make trapping 80,000 times more efficient

Ryan, G.J. [1], Ryan-Pears, C.J. [1] | [1]The Cacophony Project.

The modern information technology used by the Cacophony Project can theoretically make eradication of predators in New Zealand 80,000 times more efficient, with a combination of sound and visual lures, artificial intelligence (AI) predator identification, and solar power.

- The lure can last 20 times longer than food traps, being solar powered.
- It potentially only requires 1/100th the number of traditional traps, because they can operate over 10 times the distance (100 times the area).
- One trap can target any predator (possum, rat, mustelid or feral cat), so only a quarter the number of traps are required.
- The kill percentage could be closer to 100%, rather than less than 10% for current traps.
- Moore's law implies there is likely to be a consistent exponential drop in cost and improvement in performance over time.

The Cacophony Project is totally open source, so any time there are improvements made they can be rolled out to all the networked traps. These collective improvements mean that, theoretically, the traps could be 80,000 times more efficient: 20 (lure life) x 100 (trap intensity) x 4 (one trap, four pests) x 10 (kill ratio). This project has been going for 2 years, and has succeeded in:

- Creating a device to turn any old smartphone into an objective environmental monitoring tool
- Encouraging initial testing of digital lures that shows possums can be detected and lured from a distance.
- Using artificial intelligence (AI) to automatically identify different predators from video analysis
- Achieving a way to robustly measure the effectiveness of existing traps and monitoring tools (existing traps work as little as 1% of the time)
- Developing a super-sensitive dual camera tool (heat and infrared) to monitor predators better than any existing tool, which should be particularly useful for other scientific projects but will ultimately form the core of the automated trap

Grant is an addicted inventor who is now working using information technologies to make NZ predator free. He has started numerous high tech companies - GlobalBrain (sold to NBCI), RealContacts (sold to Intel), Eurekster, SLI-Systems (listed on NZX), YikeBike and PurePods. He has a degree in Mechanical engineering and PhD in Ecological Economics.

Cam Reid Oration - New 3Rs techniques

Hogberg H.T | The Johns Hopkins University, Bloomberg School of Public Health, Center for Alternatives to Animal Testing, Baltimore, Maryland, USA

The Center for Alternatives to Animal Testing (CAAT) has for more than 35 years been a leading force in the USA to promote humane science by supporting the creation, development, validation, and use of alternatives to animals in research, product safety testing, and education. We seek to effect change by working with scientists in industry, government, and academia to find new ways to replace animals with non-animal methods, reduce the numbers of animals necessary, or refine methods to make them less painful or stressful to the animals involved.

The National Research Council report from 2007 "Toxicity Testing in the 21st Century: A vision and a strategy" (Tox-21c) has created an atmosphere of departure in the USA. It suggests moving away from traditional (animal) testing to modern technologies based on toxicity pathways.

The current developments on OECD level are to organize our knowledge on hazard manifestations as Adverse Outcome Pathways (AOP). The concept of toxicity pathways is part of the AOP and describes the molecular definition of mechanism and the perturbed networks.

In the last years several new 3Rs techniques, such as induced pluripotent stem cells (iPSCs), organotypic cell models, human-on-chip approaches, omics methods, evidence-based toxicology and read-across tools, have been developed to implement the vision and strategy of Tox-21c.

From glowing grubs to superbugs: the 3Rs and infectious diseases research

Dr. Siouxsie Wiles | Molecular Medicine and Pathology, University of Auckland

Bioluminescence (literally 'living light') has evolved in a wide variety of fascinating organisms with many different purposes. It allows glow worms and anglerfish to lure food, fireflies to find a mate and nocturnal squids to camouflage themselves from predators. The light is produced as a by-product of an enzyme ('luciferase') reaction, emitted when a substrate ('luciferin') is exposed to oxygen. Siouxsie will talk about her research using bioluminescence to better understand infectious diseases, from tracking infections in living animals to discovering new antibiotics.

Dr Siouxsie Wiles is an award-winning scientist who has made a career of manipulating microbes. She and her team at the University of Auckland engineer bacteria to glow to understand how superbugs make us sick and to find new medicines. Siouxsie studied medical microbiology at the University of Edinburgh, followed by a PhD in microbiology at the Centre for Ecology and Hydrology in Oxford. She spent almost a decade working at Imperial College London, before relocating to New Zealand as a Health Research Council Hercus Fellow in 2009. Siouxsie's commitment to the ethical use of animals in research has won her the inaugural UK National Centre for the Replacement, Refinement and Reduction of Animals in Research (NC3Rs) prize in 2005 and the New Zealand National Animal Ethics Advisory Committee (NAEAC) 3Rs prize in 2011. In 2016, Siouxsie was named a Blake Leader by the Sir Peter Blake Leadership Trust. She recently published her first book, 'Antibiotic resistance: the end of modern medicine?', as part of the BWB Texts series.

Dissecting Distress: What is a humane death and how can we assess the humaneness of death in the context of Controlled Atmosphere Stunning?

Beausoleil, N.J. | Animal Welfare Science and Bioethics Centre, Institute of Veterinary, Animal and Biomedical Sciences, Massey University, Palmerston North, New Zealand.

Welfare is a state within the animal itself and is often characterized as the outcome of the various mental experiences the animal has at a point in time, i.e. how it experiences what is happening to it. A key feature of this characterization is that animals must be conscious to have mental experiences, meaning that their welfare can only be impacted upon when they are conscious.

There are concerns about the impacts of controlled atmosphere stunning (CAS) methods on animal welfare. In the context of CAS, the humaneness of death depends on three general features: the duration for which animals may have conscious experiences; the quality/type of negative experiences occurring during that time; and the intensity/severity of those experiences. In the past, evaluations of animal welfare have often been centred on the absence of 'pain and distress/suffering', with the use of generic terms such as 'distress' and 'suffering' aimed at covering all negative experiential bases. However, the use of such generic phrases can limit the accuracy of welfare evaluations and lead to the 'no pain, no welfare problem' fallacy. For example, their usage can lead to under-emphasis of the importance of other unpleasant experiences that are qualitatively dissimilar from pain but which can be equally or more detrimental to welfare (e.g. air hunger), as well as the failure to systematically look for, or recognize, indicators of such experiences. In addition, the use of 'distress' or 'suffering' does not facilitate understanding of what causes the aversion expressed by animals, nor how to specifically avoid or mitigate those experiences.

In the context of CAS, the kinds of information that can be cautiously used to systematically explore negative experiences before loss of consciousness include: an understanding of the physiological/neurophysiological mechanisms of different unpleasant experiences and the effects of strategies known to circumvent or mitigate those specific experiences (e.g. analgesics for pain); observation of specific protective behavioural and physiological responses; and human reports of experiences during similar situations. The use of specific terminology and studies designed to investigate the occurrence of specific unpleasant experiences in different species exposed to various CAS methods are needed to better understanding the relative humaneness of these methods of stunning/killing animals.

Ngaio is Canadian born but has spent more than half her life in New Zealand. She completed her PhD in animal behaviour, physiology and welfare at Massey University in 2006 and is currently senior lecturer and Deputy Director of Massey's Animal Welfare Science and Bioethics Centre. Ngaio's research focuses on scientific assessment of animal welfare and employs behavioural and physiological methods to investigate various aspects of welfare in farm, companion and wild animal species. Major research themes include:

- *Systematic scientific evaluation of animal welfare*
- *Extending our understanding of the range of negative experiences affecting animals' welfare, with particular interest in breathlessness*

- *Humane methods of 'euthanasia' particularly gaseous methods*
- *Welfare impacts associated with wildlife conservation activities including pest control*

Ngaio is currently the animal welfare science expert member of New Zealand Veterinary Journal Editorial Board and the Wellington Zoo Trust Animal Welfare Committee. She is also an independent scientific member of the New Zealand Animal Behaviour and Welfare Consultative Committee and the Massey University liaison for the Universities Federation for Animal Welfare. She teaches animal physiology to science and veterinary science undergraduates and supervises postgraduate research students.

Compassion Fatigue - The Cost of Killing

Dr Arnja Dale | Chief Scientific Officer, RNZSPCA

Animal care workers such as veterinarians, vet nurses, laboratory animal workers and animal shelter workers are at an increased risk of developing compassion fatigue. Compassion fatigue is the emotional and physical exhaustion triggered by traumatic events, such as cruelty cases, major trauma events, or constant exposure to euthanasia and is often referred to as 'the cost of caring' or the 'caring-killing paradox'. Compassion fatigue produces lower levels of job satisfaction, high employee turnover and generates a variety of physical and psychological symptoms ranging from mild to severe. Understanding of the risk factors, symptoms and methods to prevent compassion fatigue and assist people suffering from compassion fatigue are vital components of ensuring that animal care workers can continue to do their important work. Employers of animal care workers need to be aware of the risk factors for compassion fatigue in their staff and should ideally implement proactive strategies to help prevent compassion fatigue and assist those staff suffering from compassion fatigue.

Arnja is the Chief Scientific Officer for the RNZSPCA where she leads the animal welfare science and education teams. Arnja sits on ANZCCART and NAEAC & is pleased to be able to share the work she has done in relation to compassion fatigue.