

PERSONAL INFORMATION

Lindsay Matthews

 (Italy)

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Nationality New Zealander

WORK EXPERIENCE

22/05/2012 – Present

Animal welfare expert

Istituto "G.Caporale" Teramo (Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise)

<http://www.izs.it>

Lead the development of a world-class animal welfare research programme in the Human-Animal Relationship and Animal Welfare Laboratory and the OIE Collaborating Centre for Veterinary Training, Epidemiology, Food safety and Animal Welfare.

Key research areas include:

- integrative and practical measures of livestock and companion animal health and welfare;
- improving animal welfare, productivity and food safety;
- development of innovative tools for the management of 'street' dogs and cats;
- development and delivery of animal welfare training material in collaboration with the International Centre for Veterinary Training and Information.

01/07/1991 – 21/12/2011

Senior Scientist/Programme Leader/Science Leader

- Leading the team's development of research proposals and securing funding in animal behaviour and welfare from national and international funding agencies
- Developing and leading collaborations within the institute, and with national (e.g. Dairy New Zealand) and international (e.g. OIE Collaborating Centre) research teams
- Leading and managing research contracts with governmental and industry funders
- Conducting research in animal welfare, collating and analysing data and publishing the results in peer-reviewed journals
- Establishing national consultative committee and liaising with key stakeholders on research requirements
- Translating research results into policy or practical advice for the livestock and other industries

01/07/1989 – 30/06/1991

Scientist/Programme Leader/Science Leader

- Leading the team's development of research proposals and securing funding in animal behaviour and welfare from national and international funding agencies
- Developing and leading collaborations within the institute and with national (e.g. University of Waikato) research teams
- Leading and managing research contracts with governmental and industry funders
- Conducting research in animal welfare, collating and analysing data and publishing the results in peer-reviewed journals
- Liaising with key stakeholders on research requirements
- Translating research results into policy or practical advice for the livestock and other industries

01/02/1990 – 30/11/2011

Animal behaviour & welfare Lecturer

- Convening and teaching second and final year undergraduate courses on animal behaviour
- Supervising graduate students

01/05/1987 – 30/06/1989

Scientist

- Initiating research projects on human behaviour and road safety
- Leading and conducting research projects, and collating, analysing and publishing the results
- Liaising with key stakeholders on research requirements and translating research into policy and practical advice

01/10/1986 – 30/04/1987 **Scientist**
 • Conducting independent research to optimise intake of feed supplements by livestock and publishing the results
 • Developing practical advice for feeding supplements in the livestock industry

01/09/1984 – 30/09/1986 **Research Fellow**
 Developing an animal learning facility and conducting research on livestock behaviour and welfare

EDUCATION AND TRAINING

01/03/1978 – 01/10/1982 **Doctor of Philosophy** 7
 University of Waikato,
 Animal behaviour

01/03/1976 – 30/11/1977 **Master of Social Science 1st Class Hons** 7
 University of Waikato,
 Animal behaviour
 Zoology

01/03/1973 – 30/10/1975 **Bachelor of Science** 6
 The University of Auckland,
 Psychology
 Zoology
 Chemistry

PERSONAL SKILLS

Mother tongue(s) English

Other language(s)	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
German	B1	B1	B1	A2	B1

Levels: A1/A2: Basic user - B1/B2: Independent user - C1/C2: Proficient user
[Common European Framework of Reference for Languages](http://www.cedefop.europa.eu)

Communication skills

- Outstanding written and oral English communication and presentation skills gained through: my life experiences in an English-speaking country; other experience in publishing and presenting as a scientist in journals, conferences and to the media; lecturing to university students for 21 years; chairing national and international Committees; raising a family; presenting at Toastmasters International
- Excellent ability to embrace change and adapt in multicultural international environments gained as a young researcher in Germany while on an Alexander von Humboldt Fellowship, collaborating with academic colleagues in several other European countries (e.g. Welfare Quality), participating in international fora (Council member of the International Society for Applied Ethology (ISAE), member of the EC-NZ Animal Welfare Co-operation Forum)
- Ability to attract world-class scientific staff as demonstrated by appointment of skilled young scientists and PhD students from around the globe (Europe, North and Central America, Australia and New Zealand)
- Ability to gain the trust of key national and international scientific, industry and governmental stakeholders as demonstrated by appointment to leading scientific, governmental and industry science boards and advisory bodies, international co-operating fora, journal editorships, Associate Membership of the New Zealand Veterinary Association (Deer Branch) and the Australian College of Veterinary Scientists (Animal Welfare Chapter)
- Close and enduring collegial and co-operative relationships gained through participation in several local and national (e.g. between laboratories in AgResearch and with other national institutes e.g.

Dairy New Zealand, Massey University) and international (e.g. ICT, OIE Collaborating Centre, Welfare Quality) projects. Further, I have participated, by invitation, as a founding member of the national Centre of Research Excellence on Growth and Development at Auckland University, and on the Government's national Animal Welfare Advisory Committee

- Excellent team spirit by participating in and encouraging extracurricular social activities
- Community-minded with an intuitive understanding of human behaviour (experience with family, friends, school projects, students and colleagues).

Organisational / managerial skills

- Experienced leader and organiser: I lead our key multi-institute/international science projects and developed New Zealand's largest pastoral animal welfare research team (of 10 researchers); chaired the Science Advisory Board of the EU Welfare Quality project; member of the Management Committee of the OIE Collaborating Centre for Animal Welfare Science and Bioethical Analysis; lead the establishment (and was inaugural Chairman) of the national Animal Behaviour and Welfare Consultative Committee; participation on national and international science review and advisory bodies; co-organiser of two international ISAE conferences
- Self-motivated and strategic thinking ability as evidenced by: development of New Zealand's first and largest pastoral livestock animal behaviour and welfare research group; self-initiated collaborations and securing of funding (up to \$NZ 2 million p.a.) to serve the needs of key stakeholders; and founding of a national stakeholder consultative body on animal welfare
- Planning and fore-sighting demonstrated through: accurate assessment of impending animal welfare issues and development of techniques, personnel and innovative research programmes to address these topics
- Ability to work with key scientific, policy and industry stakeholders to identify research priorities (gained during the past 25 years of research and related initiatives)
- Experienced budget management: responsibility for managing all financial aspects of project budgets
- Excellent management and administration: completed courses on project management; manage multi-disciplinary, multi-institute and multi-national projects to achieve contracted outcomes; my research programme has achieved the highest possible rating by the national science funding agency; high output of quality scientific publications from the programmes.

Job-related skills

- Internationally-recognised for expertise in lateral thinking and finding creative scientific solutions to fundamental and practical issues of animal welfare and animal management. E.g. I have developed novel methodologies for: quantifying animal subjective states; inducing analgesia in deer without the use of chemicals; non-lethal methods for the control of unwanted animals; modelling behavioural routes of disease transmission in unwanted animals
- Excellent track record conducting and/or supervising multi-disciplinary, quality research in national and international research institutes including the welfare implications of under-nutrition in sheep and cattle (with University of Auckland Medical School, Dairy New Zealand, and CSIRO and Murdoch University, Australia), behavioural requirements of livestock and laboratory animals (with the German Ministry of Agriculture and University of Copenhagen's Department of Large Animal Clinical Sciences) and the effects of obesity on behaviour and health in mini-pigs (with the Biomedical and Life Sciences Faculties at the University of Copenhagen)
- Exemplary skills in experimental design, conduct of research, data collection, collation and analysis as demonstrated by the large number of publications in reputable peer-reviewed journals
- Wide multi-disciplinary scientific experience gained over 27 years in animal welfare research on livestock, companion, unwanted and laboratory animals using innovative techniques for measuring behaviour, stress, immunology and health
- Excellence in scientific writing with a high publication rate (over 190 publications in refereed journals, book chapters and refereed conference abstracts)
- Wide experience in developing and delivering training materials gained through: 21 years of lecturing to biology, veterinary and psychology undergraduate and graduate students; use of web-based tools for complementary delivery of lecture material; development of governmental and industry guidelines for livestock welfare assurance (e.g. deer transport and pain relief; cattle loafing pad design); successful supervision of 11 post-graduate theses and examination of national and international PhD candidates
- Ability to apply up-to-date theoretical knowledge to the resolution of applied animal welfare problems (e.g. through application of behavioural economic theory to understanding farm animal behavioural needs)
- Sharp intellect with superior problem-solving capabilities as demonstrated by successful development of world-class science and team to address difficult welfare issues.

Computer skills

- Competent with most Microsoft Office programmes acquired through training and work experience

- Competent with scientific literature database searches acquired through training and work experience
- Competent programming skills for Observer® XT behavioural programming and analysis software acquired through training and work experience.

Driving licence C1, B

ADDITIONAL INFORMATION

1. Honours/distinctions, committees, roles:

- 1979-1982 William Georgetti Doctoral Fellowship; U.G.C. Doctoral Scholarship
- 1984-1986 Alexander von Humbolt Fellowship
- 1991-1997 Member Animal Welfare Advisory Committee (AWAC)
- 1991-2006 National Animal Welfare Advisory Poultry Sub-Committee
- 1992-present Founding Chair/member of the national Animal Behaviour and Welfare Consultative Committee
- 1994-1996 Working Group 4 to ISO Technical Committee 191 (Mammal Trap Standards)
- 1994-2000 Editor, Applied Animal Behaviour Science
- 1998-2008 Editor Journal of Applied Animal Welfare Science
- 2000-2008 Editor Anthrozoos
- 2001 ISAT Linkages Travel Scholarship on Animal Welfare
- 2002 Royal Soc Bronze medal for services to animal welfare and the environment
- 2003-present Appointed expert evaluator for EU 6th and 7 th Frameworks
- 2003-2010 Chair of Research User Group for FRST-funded Animal Welfare research programme
- 2004-2009 Appointed member (Chairperson in 2009) of Scientific Advisory Board to \$30 million EU 6th framework research project "Welfare Quality"
- 2004-present Foundation member of the National Research Centre for Growth and Development CORE (Liggins Institute, University of Auckland)
- 2005 Member of Expert Panel to evaluate Netherland's Welfare research (1996-2004)
- 2005 Meat and Livestock Australia Scientific Research Fellowship in Animal Welfare
- 2007 Animal welfare science expert on Dairy InSight Panel to review animal welfare research requirements for the Dairy industry
- 2007- ongoing Project Leader, Meat and Wool New Zealand/Meat and Livestock Australia: Objective measures research programme
- 2007- 2008 Lead Provider Dairy InSight Dairy cattle welfare
- 2008-present DairyNZ Advisory Group
- 2008-2012 EC-NZ Animal Welfare Cooperation Forum
- 2009-2012 Member of the Management Committee of the OIE (World Organisation for Animal Health) Collaborating Centre for Animal Welfare Science and Bioethical Analysis
- 2010- 2012 Defra-NZ Cooperation Forum
- 2010 Expert witness, Environment Court, Hamilton

2011 Expert witness, High Court, Christchurch

2. Professional memberships

American Dairy Science Association
American Poultry Science Association
American Society for Animal Science
Associate Member Australian College of Veterinary Scientists Chapter of Animal Welfare
Associate Member New Zealand Veterinary Association (Deer Branch)
Australasian Society for the Study of Animal Behaviour
International Society for Applied Ethology
NZ Association for Behaviour Analysis
NZ Society of Animal Production

3. Summary of Publication record

Refereed plenary publications: 5 (plus 6 non-published)
Book Chapters: 12 (includes 1 Refereed Plenary Paper)
Journal Articles Refereed: >115
Conference Publications Full Written Paper Refereed: 12
Refereed Conference Abstracts: 71
Other publications: >121
Number of patents: 3

4. Publication since 2006

Journal articles Refereed

Bagshaw, C.S., Thorold, B., Davison, M., Duncan, I.J.H., Matthews, L.R. 2008. The influence of season and of providing a water trough on stream use by beef cattle grazing hill-country in New Zealand. *Applied Animal Behaviour Science* 109: 155-166

Berry D. P., Macdonald K. A., Stafford K., Matthews L.R., Roche J. R. 2007. Associations among body condition score, body weight, somatic cell count, and clinical mastitis in seasonally calving dairy cattle. *Journal of Dairy Science* 90: 637- 648.

Bryant, J. R., Schütz, K. E., Arnold, A., Matthews L.R. 2012. Development of a heat load index for grazed dairy cattle in a temperate climate *Journal of Dairy Science* (submitted)

Butterworth, A., Knowles, T.G., Whittington, P., Matthews, L., Rogers, A., Bagshaw, C.S. 2007. Validation of broiler chicken gait score training in Thailand, Brazil, and New Zealand. *Animal Welfare* 16: 177-179.

Champion R.A., Matthews L.R. 2007. An operant-conditioning technique for the automatic measurement of feeding motivation in cows. *Computers and Electronics in Agriculture* 57, 115–122.

Clapperton, B.K., Day, T.D., Waas, J.R. Matthews, L.R. 2012. Designer repellents: combining olfactory, visual or taste cues with a secondary repellent to deter free-ranging house sparrows from feeding. *Pest Management Science* 68: 870–877.

Collins, R., McLeod, M., Hedley, M., Donnison, A., Close, M., Hanly, J., Horne, B., Ross, C., Davies-Colley, R., Bagshaw, C., Matthews, L. (2007). Best management practices to mitigate faecal contamination by livestock of New Zealand waters. *New Zealand Journal of Agricultural Research*, 50, 267-278.

Cook, N.J., Church, J.S., Schaefer, A.L., Webster, J.R., Matthews, L.R., Suttie, J.M. 2005. Stress and pain assessment of velvet antler removal from Elk (*Cervus elaphus canadensis*) and Reindeer (*Rangifer tarandus*). *Online Journal of Veterinary Research* 9, 13-24.

Day, T.D. Clapperton, B.K., Porter, R.E.R., Waas, J.R. Matthews, L.R. 2012. Responses of free-ranging house sparrows to feed containing primary and secondary repellents. *Journal of Crop and Horticultural Science*, 40: 127-138.

Fisher, A.D., Hogan, N., Bluett, S.J., Verkerk, G.A., Matthews, L.R. 2008. The effects of shade provision on the behaviour, body temperature and milk production of grazing dairy cows during a

temperate summer. *New Zealand Journal of Agricultural Research*, 51:99-105.

Hernandez-Verduzco, C., Matthews, L., Oliver, M.H., Bloomfield, F.H., Harding, J.E. 2010. Effects of sex, litter size, and periconceptual ewe nutrition on offspring behavioural and physiological responses to isolation. *Physiology and Behavior* In press.

Hernandez-Verduzco, C., Matthews, L., Oliver, M.H., Bloomfield, F.H., Harding, J.E. 2009. Effects of sex, litter size, and periconceptual ewe nutrition on the ewe-lamb bond. *Applied Animal Behaviour Science* 120, 76-83.

Hernandez-Verduzco, C., Harding, J.E., Oliver, M.H., Bloomfield, F.H., Held, S.D.E., Matthews, L.R. 2009. Effects of litter size, sex and periconceptual ewe nutrition on side preference and cognitive flexibility in the offspring. *Behavioural Brain Research* 204: 82-87.

Kendall, P.E., Nielsen, P.P., Webster, J.R., Verkerk, G.A., Littlejohn, R.P. and Matthews, L.R. 2006. The effects of providing shade to lactating dairy cows in a temperate climate. *Livestock Science* 103: 148-15.

Matthews, L.R., Cameron, C., Sheahan, A.J., Kolver, E.S., Roche J. R. 2012. Associations among dairy cow body and welfare-associated behavioral traits. *Journal of Dairy Science* 95: 2595-2601.

Matthews, L.R. and Hemsforth, P.H. 2012. Drivers of Change: Law, International Markets and Policy. *Animal Frontiers* 2: 40-45.

Matthews L.R. 2008. Methodologies by which to study and evaluate welfare issues facing livestock systems of production. *Australian Journal of Experimental Agriculture*, 48: 1014-1021.

Matthews, L.R. 2007. International drivers for animal welfare change and implications for New Zealand. *Proceedings of the New Zealand Society of Animal Production* 67: 226-231.

Robertson, I., Matthews, L.R. 2011 "Normal" behaviour of the legal animal is more than just "what they do in the wild". *Journal of Applied Animal Welfare Science*, submitted.

Schütz, K.E., Clark, K.V., Cox, N.R., Matthews, L.R., and Tucker, C.B. 2010. Responses to short-term exposure to rain and wind by dairy cattle: time budgets, shelter use, body temperature and feed intake. *Animal Welfare* 19: 375-383.

Schütz, K., Cox, N., and Matthews, L. 2008. How important is shade to dairy cattle? Choice between shade and resting following different levels of lying deprivation. *Applied Animal Behaviour Science* 114, 307-318.

Schutz, K., Davison, D. and Matthews, L.R. 2006. Do different levels of moderate feed deprivation in dairy cows affect feeding motivation. *Applied Animal Behavior Science*, 101: 253-263.

Stewart, M., Webster, J.R., Matthews, L.R., Rogers A.R. 2010. Effects of road transport, including stationary periods, on environmental conditions and physiological responses of lambs. *Proceedings of the New Zealand Society of Animal Production*, 70: 162-164.

Tucker, C.B., Burke, J.K., Cox, N.R., Wells, D.N., Matthews L.R. 2010. Cloned bulls in the first year of life: behavior and growth. *Transgenic Research*, 19: 138 (abstract).

Tucker, C. B., Rogers, A.R., Verkerk, G.A., Kendall, P.E., Webster, J.R., and Matthews, L.R. 2007. Effects of body condition and shelter on the behaviour and physiology of dairy cattle in winter. *Applied Animal Behaviour Science* 105:1-13.

Verbeek, E., Waas, J., McLeay, L., Matthews, L.R. 2011. Measurement of feeding motivation in sheep and the effects of food restriction. *Applied Animal Behaviour Science* 132: 121-130

Verbeek E., Oliver M.H., Waas J.R., McLeay L.M., Blache D., Matthews, L.R. (2012) Reduced Cortisol and Metabolic Responses of Thin Ewes to an Acute Cold Challenge in Mid-Pregnancy: Implications for Animal Physiology and Welfare. *PLoS ONE* 7(5): e37315. doi:10.1371/journal.pone.0037315

Webster, J. and Matthews, L.R. 2006. Behaviour of red deer following antler removal with two methods of analgesia. *Livestock Science*, 100; 150-158.

Conference Publications Full written paper refereed

Bryant, J. R., Matthews, L.R., Davys, J. 2010. Development and application of a thermal stress model. Proceedings of the 4th Australasian Dairy Science Symposium Eds G.R. Edwards and R.H. Bryant) Lincoln University, Christchurch, New Zealand 31st August -2nd September 2010. Pp 360-364.

Verkerk , G., Tucker, C., Kendall P., Webster, J., Bloomberg, M., Rogers, A., Stewart, M. Davison, D., Matthews, L. 2006. Physical environments and dairy cow welfare: lessons from New Zealand research. Proceedings of the Society of Dairy Cattle Veterinarians of the New Zealand Veterinary Association 23:35-46

Refereed Conference Abstracts

Arnold, A.A., Matthews, L.R. 2009. Dairy cows will work for access to shelter from wind and rain. Proceedings of the 43rd International Congress of the International Society for Applied Ethology, Cairns, Australia, July, 2009. Pp49.

Bagshaw, C.S.; Marks, D.; Jones, B.; With, L.; Butterworth A.; Matthews, L.R. 2006: Broiler Welfare: issues, measurement and results. Australasian Veterinary Poultry Association Conference, Auckland, 31st October – 1st November 2006.

Doughty A., Ferguson, D., Matthews, L.R., Hinch, G. 2011. Does energy intake drive willingness to walk for food in a motivation test? International Ethological Conference Behavior 2011, Bloomington, USA. (accepted).

Doughty A., Ferguson, D., Matthews, L.R., Hinch, G. 2011. Improving the practicality for measuring behavioural motivation for food in ruminants. 5th International Conference on the Assessment of Animal Welfare at Farm and Group Level, University of Guelph, August 2011.

Ferguson, D.M., Niemeyer, D.D.O., Lea, J.M., Matthews, L.R., Fisher, A.D. 2009. A novel system to automatically measure behavioural motivation for food in cattle. Proceedings of the 43rd International Congress of the International Society for Applied Ethology, Cairns, Australia. Pp42.

Hernandez, C., Matthews, L. R., Oliver, M.H., Bloomfield, F.H., Harding, J. E. 2009. Effects of sex and periconceptual ewe nutrition on offspring behavioural and physiological response to isolation. Proceedings of the 43rd International Congress of the International Society for Applied Ethology, Cairns, Australia. Pp41.

Hernández C.E., Oliver M.H., Bloomfield H.F., Held S., Harding E.J., Matthews LR. 2007. Periconceptual undernutrition in sheep increases aversion to humans and modifies laterality in the offspring. Proceedings of the 41st International Congress of the International Society of Applied Ethology, Merida, Mexico, 83.

Matthews, L.R.; Hernandez, C., Harding, J. 2011. Periconceptual undernutrition in ewes and offspring behavioural and emotional development. International Ethological Conference Behavior 2011, Bloomington, USA.

Matthews, L.R., Bryant, J. 2011. Perceptual threshold for cold stress in dairy cows. Annual Congress International Society for Applied Ethology, Indianapolis, USA, 2011.

Matthews, L.R., Bryant, J. 2010. Do thermal stress models reflect the behavioural requirements of dairy cattle. Development and application of a thermal stress model. Proceedings of the 4th Australasian Dairy Science Symposium Eds G.R. Edwards and R.H. Bryant)Lincoln University, Christchurch, New Zealand 31st August -2nd September 2010. Pp 435.

Matthews, L.R. Arnold, A. 2009. How hot is too hot? A cow's view. Proceedings of the 43rd International Congress of the International Society for Applied Ethology, Cairns, Australia, July, 2009. Pp48.

Matthews L.R., Aspin P., Roche J., Kolver E. 2007. Variation in body condition in dairy cattle and motivation to feed at pasture. Proceedings of the 41st International Congress of the International Society of Applied Ethology, Merida, Mexico, 4.

Matthews, L.R.; Champion, R.; Davison, D. 2006. A novel method for automatically quantifying resource requirements of pastoral livestock in naturalistic settings. Proceedings of the 40th International Congress of the International Society for Applied Ethology: 104.

Roberts, N., Laborie, J., Kerr, C.A., Hinch, G.N., Matthews, L.R., Barnett, J.L., Hemsworth, P.H., Fisher, A.D. 2006. Absence of variation between sheep in motivation to feed. Proceedings of the 40th International Congress of the International Society for Applied Ethology 38.

Schütz, K., Clark, K.V., Cox, N., Matthews, L. R., Tucker, C. 2010. Responses to short-term exposure to simulated rain and wind by dairy cattle. Proceedings of the 44th Congress of the International Society for Applied Ethology, Uppsala, Sweden, 4-7 August, 2010.

Schütz, K.; Davison, D., Cox, N.; Matthews, L. 2007. The importance of shade to dairy cattle : Trade-off between shade use and resting when exposed to different levels of lying deprivation. 41st International Congress of the International Society of Applied Ethology, Mexico, July 2007.

Verbeek, E., Waas, J., McLeay, L., Oliver, M.H., Ferguson, D., Matthews, L.R. 2011. Feeding motivation and metabolites in pregnant ewes with different body condition scores. International Ethological Conference Behavior 2011, Bloomington, USA. (accepted).

Verbeek, E., Waas, J., McLeay, L., Oliver, M.H., Matthews, L.R. 2010. The effects of body condition score on stress and metabolic responses to a cold challenge in pregnant ewes - preliminary results. Proc. of the 44th Congress of the International Society for Applied Ethology, Uppsala, Sweden, 4-7 August, 2010.

Verbeek, E., Waas, J., McLeay, L., Matthews 2009. Measurement of feeding motivation in sheep: effects of food restriction. Proceedings of the 43rd International Congress of the International Society for Applied Ethology, Cairns, Australia, July, 2009. Pp86.