



## MESSAGE FROM THE DIRECTOR

Welcome to 2017!

I'm delighted and proud to be leading the Centre of Excellence for Biosecurity Risk Analysis (CEBRA) into its second decade of helping the Australian and New Zealand governments to remain at the forefront of practical biosecurity risk analysis. I offer heartfelt thanks to Mark Burgman for his wonderful leadership and service of the past ten years. His contribution has been steadfast and exemplary. We wish him well.

I warmly welcome Dr Colin Grant, formerly with the Department of Agriculture and Water Resources (DAWR), as the new chair of the Advisory Board. Colin was one of the originating members of the board, and was central in articulating the vision that began with ACERA. I look forward to working in partnership with Colin as we embrace our exciting future.

Also, I'm pleased to introduce three new staff members who have joined our CEBRA team; Dr. Richard Bradhurst from the University of New England (more about him in this newsletter); Ms. Karen Schneider, formerly an Advisory Board member when she represented DAWR as Executive Director of the Australian Bureau of Agriculture Resources Economics and Sciences (ABARES); and Ms. Hannah Fraser, a recent PhD student from the Centre of Excellence for Environmental Decisions (CEED) at the University of Melbourne. CEBRA now supports more than 12 researchers, not including our fine cadre of graduate students. The lab is rapidly filling!

Towards the end of last year, I spoke at DAWR's Consultative Group on Biosecurity Cooperation in Melbourne and at the Ministry for Primary Industries (MPI) Biosecurity Forum in Auckland, New Zealand.

Each meeting highlighted the continued interest that both Governments are showing and importance they are placing on biosecurity risk analysis and the role we play. Also I presented at DAWR's new Post Entry Quarantine Facility at Mickleham, Victoria, for the annual Quadrilateral (QUADS) Plant Health meeting. (QUADS countries comprise Australia, Canada, New Zealand and the United States of America.)

Prof. Tom Kompas continues to present and discuss the economic implications of effective biosecurity management. He delivered the keynote presentation at the Australian Agricultural and Resource Economics Society Annual Meeting where he discussed the 'Curse of Dimensionality' Resolved: Trade Effects and Optimal Surveillance for Early Detection in Large-Scale Modelling.

Tom has been extremely busy; he has also recently presented at the:

- Economics Society Annual Meeting on 'Maximum Economic Yield';
- Australian Institute of International Affairs on 'Food Security, Biosecurity and National Security in the Melanesian Arc';
- One-Health EcoHealth: The 4th International One Health Congress & The 6th Biennial Conference of the International Association for Ecology and Health on 'Budgeting and Portfolio Allocation for Biosecurity Measures' and
- Bridging Science, Economics and Policy Silos: Chief Scientists Roundtable, Crawford School of Public Policy, Australian National University, Canberra on 'Risk-Based Decision Making: Three Great Myths in Risk Assessment'.

Dr Richard Bradhurst, CEBRA and Dr Graeme Garner, DAWR presented and facilitated a workshop late last year - 'To vaccinate or not to vaccinate: using modelling to evaluate Foot and Mouth Disease (FMD) control options' at the European Commission for the Control of FMD within the Food and Agricultural Organisation (FAO) of the United Nations in Frascati, Italy. The Australian Animal Disease Model (AADIS) was used extensively by participants to model a variety of FMD outbreak and control scenarios for the purposes of contingency planning and response. More in this newsletter!

Enough from me, now. I look forward to joining with you all in our important work.

**Andrew Robinson**

*Managing Director,*

Centre of Excellence for Biosecurity Risk Analysis

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## Australian Animal Disease Model (AADIS)

A key component of managing emergency animal disease (EAD) incursions, and minimising their economic impact, is timely and effective decision-making in the face of uncertainty. This requires a good understanding of the potential transmission and control of EADs under Australian conditions. The Department of Agriculture and Water Resources (DAWR) has invested in the development of a new modelling capability – the Australian Animal Disease model (AADIS)—to support EAD preparedness and response.

AADIS is a flexible computational modelling platform that enables animal disease outbreaks to be studied at a national scale on a personal computer. Decision support tools such as AADIS can offer valuable insight into the effectiveness of different disease control strategies and thus assist with preparedness and planning.

AADIS has already been used in several studies on the spread and control of foot-and-mouth disease (FMD). AADIS also features in two current CEBRA projects that will significantly expand DAWR's modelling capability.

The first project brings together epidemiological and economic expertise from DAWR, the Australian National University and CEBRA to formally explore and establish a science-based and cost effective approach to regaining free-status after an FMD outbreak as expeditiously as possible. The project builds capacity in the AADIS model to study the effectiveness of various vaccination policies, diagnostic procedures and sampling regimes with respect to the regaining of FMD-free status and return to trade.

The second project extends the existing AADIS herd-based structure to handle insect vectors, essential when studying animal diseases such as bluetongue (BT). BT is an economically important, trade sensitive disease of ruminants conveyed



by *Culicoides* midges. The study of insect-borne disease can be challenging given a free-ranging vector that is strongly influenced by weather and landscape factors. This project brings together epidemiological and modelling expertise from DAWR, the University of Melbourne, the Australian National University and the United States Department of Agriculture Centre for Epidemiology and Animal Health.

Both projects will contribute to Australia's timely management and post management of emergency animal diseases.

AADIS has also featured in two modelling workshops hosted by the European Commission for the Control of FMD (EuFMD), that operates within the Food and Agriculture Organisation of the United Nations. The first, held in 2014, and the second, held in 2016 were attended by veterinary epidemiologists, animal health policy specialists and researchers from all over Europe. AADIS was used extensively by attendees to model a variety of FMD outbreak and control scenarios and investigate the potential benefits of suppressive ring vaccination, and the economic implications with respect to the cost of control and return to trade.

Dr Richard Bradhurst, CEBRA, University of Melbourne,  
Dr Maria De la Puente Arévalo, EuFMD, FAO,  
Dr Graeme Garner, DAWR,  
and Dr Melissa McLaws, EuFMD, FAO,  
on the rooftop of the UN FAO building in Rome  
for the 2016 EuFMD workshop

## Researcher - Dr Richard Bradhurst

CEBRA continues to seek and attract researchers with a variety of backgrounds. Dr Richard Bradhurst, who joined CEBRA at the end of last year, is a wonderful example. Richard joined CEBRA after more than twenty years working as a software/firmware engineer in the defence and aerospace industries. His projects included telemetry, a submarine combat system, civilian and military automated air traffic control systems, and tactical communication systems. Richard worked on these ground-breaking projects in Sydney, Vancouver, Calgary, Ottawa, Darwin, Canberra and Rome.

Richard now calls Melbourne home. While he began working officially with CEBRA in August 2016, his last five years as a research student/fellow in the field of computational science has seen him draw upon his previous twenty years' experience to support veterinary epidemiological projects. "I've found it really interesting to work in the biosecurity space" said Richard.

Richard's PhD, which he completed in 2015, was funded under the Australian Government's Animal Biosecurity Response and Reform program. "I was fortunate to be able to collaborate closely with Dr Graeme Garner AM, Dr Sharon Roche and Dr Iain East of the Department of Agriculture and Water Resources (DAWR). The time I spent with the Animal Health Policy Branch greatly increased my understanding of the interface between science and policy, which is so important in the work we do at CEBRA" said Richard.

A key outcome of Richard's PhD was AADIS, the Australian Animal Disease Model. AADIS simulates national-scale outbreaks of emergency animal diseases on a personal computer. Whilst the model is flexible to a range of animal diseases, foot-and-mouth disease (FMD) was chosen as the test case owing to its epidemiological complexity and economic importance. A 2013 study estimated the present value of total direct economic losses over 10 years for a large multistate outbreak at \$AUD 52 billion.

"Decision support tools such as AADIS can offer valuable insights into the effectiveness of different disease control strategies and thus assist with preparedness and planning. It's been really satisfying to see AADIS used in several CEBRA projects and featured in two modelling workshops hosted by the European Commission for the Control of FMD (EuFMD), that operates within the Food and Agriculture Organisation of the United Nations" said Richard.

Richard is currently working with veterinary epidemiologists from DAWR on the simulation of post-outbreak management of FMD and on extending AADIS to handle vector-borne disease such as bluetongue.



Dr, Richard Bradhurst

## Project Update

The following reports have been sent for endorsement by the Biosecurity Research Committee:

### Project 1404D

Using decision support tools in emergency animal disease planning and response: Foot and Mouth disease

### Project 1502C

National-level farm demographic data for preparedness of highly-infectious livestock disease epidemics.



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