



## MESSAGE FROM THE DIRECTOR

Welcome to the first edition of the CEBRA E-newsletter for 2015. Our year kicked off with the CEBRA Priorities Setting Workshop which was held in Canberra with Department of Agriculture and Ministry for Primary Industries staff on 20 February.

The main purpose of the workshop is to establish the CEBRA research themes and priorities for 2015-16. It is perhaps the most important event in CEBRA's year. Our senior colleagues in government discuss priorities and objectives, build collaborative relationships and plan adoption strategies that will see successful research used to support more efficient biosecurity activities and better decisions.

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This workshop follows the CEBRA Planning Meeting held in Melbourne late last year with core CEBRA staff. Staff discussed all of CEBRA's activities, plans and expectations for 2015 and beyond. This meeting prepared CEBRA's personnel and resources to deal with the challenges in the coming year.

On the collaboration front, CEBRA continues to strengthen its linkages with New Zealand's Ministry for Primary Industries and Massey University. Our featured Project 1402C on the 'Estimation of farm-level livestock using remotely sensed imagery' is an excellent example of this collaboration, involving researchers from the Ministry, Massey University and CEBRA at the University of Melbourne. This work will have important real world applications in New Zealand and Australia.

And finally a couple of congratulations. Firstly, I would like to congratulate CEBRA's Deputy Director Andrew Robinson who was promoted to Reader and Associate Professor in the Department of Mathematics and Statistics at Melbourne University in December. Secondly, CEBRA's Jane Elith along with Melbourne University's Mike Kearney recently received "Recognition of Achievement for a Research Paper" awards. These prestigious awards are presented to the corresponding author of the most highly cited paper in the British Ecological Society journals for the past 5 years.

**Mark Burgman**  
Managing Director,  
Centre of Excellence for Biosecurity  
Risk Analysis



LEFT: CEBRA's Deputy Director Andrew Robinson, promoted to Reader and Associate Professor in the Department of Mathematics and Statistics at Melbourne University.

RIGHT: CEBRA's Jane Elith received "Recognition of Achievement for a Research Paper" award.

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## Bridging the Policy-Research Divide is a Popular Read

Translating science and research outcomes into meaningful policy responses from politicians and policy makers has long been an issue for the scientific community – and now we know it is a popular topic with readers as well.

The University of Melbourne recently acquired the ability to measure social engagement with research articles by tracking mentions such as tweets, Facebook mentions, news mentions, science blogs, policy documents, with a measure called Altmetrics.

*It turns out that Mark's Nature article is the highest ranked article, from the perspective of social engagement, from a University of Melbourne author.*

In 2013 CEBRA's Mark Burgman co-authored a Nature Journal article *Policy: Twenty tips for interpreting scientific claims*. It turns out that Mark's Nature



article is the highest ranked article, from the perspective of social engagement, from a University of Melbourne author.

As well as being the most mentioned article with a University of Melbourne author, outstripping the discovery of the Higgs boson, cancer studies and climate

change, it is also the 8th most mentioned article in Nature.

This level of engagement is an encouraging reflection of the broad level of interest in the important interface between science and public policy.

## WELCOMING ANCA HANEA



We would like to welcome new staff member, Dr Anca Hanea, to CEBRA.

Anca is an applied mathematician and a research fellow at the University of Melbourne. Her research interests and experience lie in high dimensional dependence modelling, risk analysis, decision theory, probabilistic graphical models, and structured expert judgement. Her current research is focused on structured expert judgement elicitation and aggregation methods for Bernoulli distributed random variables. Anca has joined us from the Delft University of Technology in The Netherlands. She has commenced with us as Research Fellow (Expert Judgement), at the end of October last year.

## PROJECT UPDATE

The following research project has been endorsed by the BRSC on 5 December 2014:

- Final report for CEBRA project 1302A, Evaluation of arrival pathways and species distribution models.

\* The School of BioSciences was formed in 2015 through the amalgamation of the School of Botany and the Departments of Genetics and Zoology. CEBRA was previously part of the School of Botany.

## PROJECT OVERVIEW

# 1402C Estimation of farm-level livestock demographics using species distribution modelling and remotely sensed imagery

You cannot manage what you cannot measure. It's a simple principle that has long underpinned a wide range of natural resource management challenges, and it is particularly relevant in a biosecurity risk planning and management context.

The ability to accurately predict and model disease, pest or weed incursions is critical to developing appropriate policies, budgets and effective resource deployments on the ground.

Consequently, predictive modelling is a central tool in biosecurity risk management.

The key challenge with predictive models is ensuring they are based on the best available data inputs. Better inputs lead to better outputs, which in turn lead to better planning and more effective and efficient response efforts.

Delivered in collaboration with the New Zealand Ministry of Primary Industries (MPI) and Massey University New Zealand, this project aims to develop a predictive model to quantify the number and location of livestock across New Zealand.

While commercial agricultural livestock demographic data are more readily available, the numbers of livestock of different species at the farm level are less well known. Of particular interest is the livestock demographics on smallholder or 'lifestyle' blocks across New Zealand, which are not as well understood.

The risk is that livestock distributed across lifestyle blocks could increase the rate and spread of a disease incursion.

This project adds substantially to the ability of authorities to effectively plan for and manage a disease incursion.



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For authorities to effectively manage a disease incursion, such as Foot and Mouth Disease, they first need to know how many livestock there are that could influence the spread of the disease and where they are located.

By validating certain property vegetation and environmental characteristics, size and locations with the presence of livestock, the project team are developing a series of species distribution models that can be used to predict livestock across other properties with similar characteristics.

Using a combination of satellite derived GIS vegetation data, property data (such as size and location) and existing livestock demographic data, the model

can be scaled to predict livestock units for properties at a national level.

The model can be constantly updated when new or more up-to-date data becomes available, improving its accuracy. On the ground validation of the models will be undertaken by the research team at MPI.

If there is a high level of accuracy then the model will give authorities a much better understanding of the risk profile of a disease incursion, enable more immediate and targeted prevention measures to a particular geographic area, and ultimately lead to more effective management of New Zealand's biosecurity risks.

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**NZ MPI:** Mary van Andel, Dr. Daan Vink.  
**Massey University, NZ:** Dr. Chris Jewell, Prof. Tim Carpenter.  
**CEBRA:** Assoc Prof. Andrew Robinson, Dr. Tracey Hollings, Prof. Mark Burgman.