



## MESSAGE FROM THE DIRECTOR

Welcome to the October edition of the CEBRA e-newsletter.

Over the previous quarter we have been fortunate to share the results of our collaborations with Department of Agriculture and Water Resources (DAWR) and Ministry for Primary Industries staff in national and international forums. Associate Professor Andrew Robinson was invited by Plant Health Australia to present at their National Plant Biosecurity RD&E Priorities Forum on 14 July in Melbourne. He presented "Risk Management; how are we prioritising our surveillance to minimise risk". Around 90 people gathered in Melbourne to identify ways to maximise the benefits of scientific research for Australian's crop producers, with a particular emphasis on projects on pests that attack more than one crop.

The International Pest Risk Research Group (IPRRG) hosted its tenth annual meeting at the European Food Safety Authority in Parma, Italy in August. Andrew presented "Sampling Interceptions for Risk Identification". The IPRRG is a group of research scientists and pest risk practitioners that aim to innovate rigorous pest risk modelling and mapping methods.

Professor Tom Kompas, Dr Tracey Hollings and I attended the Australian Academy of Science (AAS) Theo Murphy High Flyers Think Tank held at the AAS in Canberra. This year the theme of the Think Tank was "An interdisciplinary approach to living in a risky world". Tom is a member of the steering committee and led one of the four working groups.

It was great to be invited. We examined four areas which impact on our lives; Risk in international security; Risk and resource allocation for the environment; Antimicrobial resistance in a connected world; and Uncertainty, ignorance and partial knowledge.

I also presented at the Society for Conservation Biology Conference in Brisbane on July 7 on 'The state of conservation science' and attended the Chinese Academy of Science Conservation Meeting, in Beijing from the 1st to 3rd of September. I made two presentations, one on risk analysis and the other on scientific publishing.

Another highlight was attending the Quantitative and Applied Ecology Group (QAE) and CEBRA retreat workshop which was held at the Kinglake Ranges Wilderness Camp, Victoria on the 14th-15th July. Both QAE and CEBRA are in the School of BioSciences at the University of Melbourne. It was great to make the time to discuss issues and build stronger networks with our colleagues. The workshop focused on career pathways for young scientists, the management of large data sets, and the treatment of uncertainty in ecological models.

Finally, it's with some sadness that I am letting you know that I have accepted a new position as the Director of the Centre for Environmental Policy at Imperial College, London. After ten years building and leading ACERA and CEBRA it is time for new challenges. I will be

starting on February 1st 2017.

The Centre focuses on research and teaching that addresses key environmental and global policy challenges through the interdisciplinary study of science, technology and innovation.

While it's sad for me to be leaving, I leave CEBRA in great hands. Andrew continually demonstrates strong and effective leadership and a unique ability to work collaboratively to achieve innovative and practical outcomes. He has a wonderful group of co-workers in CEBRA, DAWR and MPI who will sustain and develop the Centre's research agenda for many years to come.

Thank you to all the committed staff, researchers and collaborators.

I look forward to the next few months as I wrap up my time with the University.

**Mark Burgman**

*Managing Director,*

Centre of Excellence for Biosecurity Risk Analysis

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## Martina Hoffmann

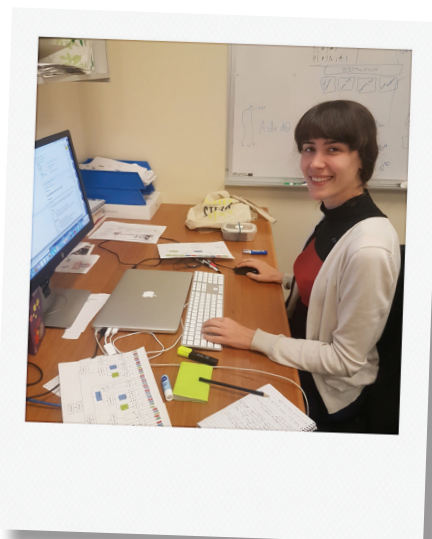
Researchers often talk about the challenge of ensuring their work is influencing policy and how to bridge the gap between the academic scientific community, policy makers and service delivery staff. Martina Hoffmann is closing this gap by sharing her Department of Agriculture and Water Resources (DAWR) research and service delivery knowledge and experience with her colleagues at CEBRA.

Martina joined CEBRA in January 2014 after two years working at DAWR both as a graduate with the Australian Bureau of Agricultural Resources Economics and Sciences (ABARES) and as a member of the Compliance Division.

"During my time at DAWR I was fortunate enough to visit the mail centre, airport and port at Sydney and see some of the work I had done on profiling at airports and in mail centres, using risk based Return on Capital approach, being used. It was pretty cool!" said Martina.

"It was invaluable to see the DAWR officers on the ground in action and hear about their experiences and how things work in practice. Getting familiar with DAWR processes is invaluable in informing the models that DAWR and CEBRA build to assist with decision-making."

Martina has a real passion for working on biosecurity related projects and now at CEBRA is continuing this passion. While at CEBRA she has worked calculating confidence intervals on a proportion in the case of small true proportions. This is useful to DAWR because with an inspection process on a large volume (such as



sniffer dogs smelling thousands of parcels per day, for instance), there is always likely to be some amount of leakage, that is, undetected biosecurity risk material, but usually this leakage is small. Academically, predicting the uncertainty for low proportions is an interesting problem in itself, and hence projects of this nature are of interest to CEBRA.

A similar project is when the sampling regime is a Continuous Sampling Plan, which is a sampling plan that rewards compliant suppliers (that is, importers with a low level of contamination in their pathways) by requiring fewer samples from them. Sampling in a biosecurity sense costs time and money. It is important to sample those pathways with the greatest risk.

Other projects that Martina has been involved in were a preliminary assessment of a database from the Australian Pesticides and Veterinary Medicines Authority about negative experiences involving pesticides and/or veterinary medicines and also developing statistics relating to the internal activities of Conservation Biology, the journal edited by

Professor Mark Burgman, CEBRA Director.

More recently, Martina worked on a DAWR project attempting to formulate a series of similar Key Performance Indicators across biosecurity pathways, mail, passengers, cargo, ships, aircraft, etc.

"CEBRA has allowed me to further develop my R skills through application, as well as dabbling in C++ code and learning how to send my code via ssh to the maths and stats department servers for faster simulations. I am currently also learning how to use latex. Associate Professor Andrew Robinson has been an invaluable resource in helping me further my skills. The great thing about programming, I find, is that if you have a problem, likely someone else has had the same problem, and somewhere online is a solution, it's just a matter of finding it!" said Martina.

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## 1404C-SP: Testing compliance-based inspection protocols

This project consisted of undertaking a series of economic experiments in a computer laboratory, in order to understand interactions between the department and importers relating to biosecurity inspections. These experiments built on economic theory relating to importers' incentives in the biosecurity inspection system documented in CEBRA Project 1304C *Incentives for importer choices*. These theoretical frameworks have also been informed by discussions with stakeholders. The experiments, undertaken at Monash University, examined differences in importer choices about supplier behaviour for two different inspection rules – the CSP-1 and CSP-3; for different levels of information about these inspection rules; and in a setting where importer could choose the rule that applied to them from a small set

of rules.

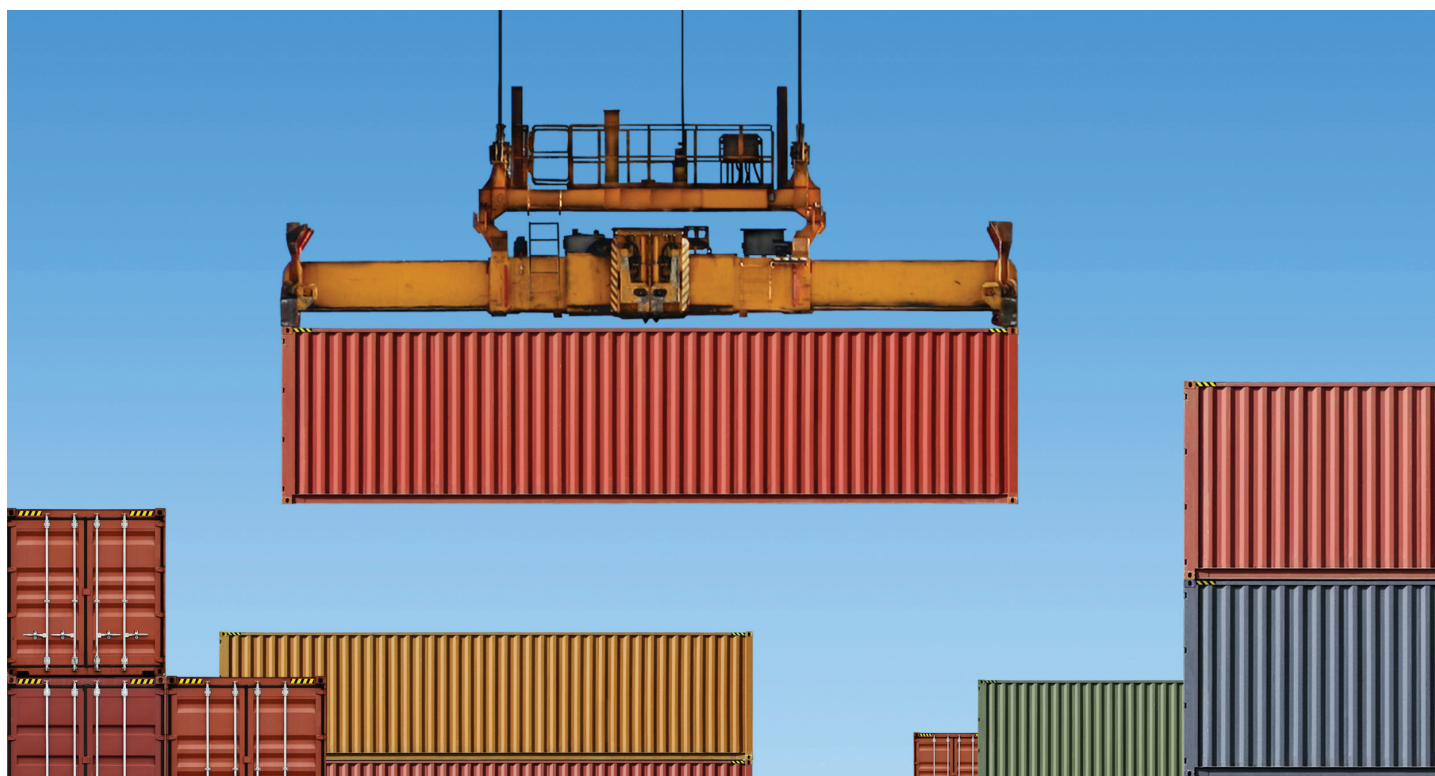
The experiments did not find consistent systematic differences in the supplier choices of subjects between directly comparable CSP-1 and CSP-3 treatments, although subjects who reported to understand the inspection rules better tended to choose suppliers with lower biosecurity risk material approach rates. Other experimental results suggest that providing more information to importers about the inspection rule parameters and the consequences of failing inspection could support them choosing lower risk suppliers. The findings in the simple rule-choice experiment were surprising and suggest that offering a choice of rule, based on changing combinations of parameters alone would be ill advised. Rather, it would be better to opt for intervention

options that are based on import-supply chain participants providing evidence of undertaking activities that reduce the likelihood of biosecurity risk material being found in imported consignments. Findings from this project have been incorporated into CEBRA Project 1504C *Testing incentive-based inspection protocols*, where several inspection protocols are modified and implemented as part of a field trial.

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## 1504C-SP: Testing incentive-based inspection protocols

The focus of this phase of the project was running field pilots of proposed compliance based inspection protocols in order to give a more complete understanding of industry stakeholders' responses to different rules. The field pilots involve introducing the Continuous Sampling Plan (CSP)-1 protocol on two plant-product pathways (peat and selected vegetable seeds for sowing), observing the responses of importers, suppliers and customs brokers, and assessing regulatory burden savings associated with the protocols. The evaluation drew on both administrative data (from the AIMS and Incident databases) held by the Department of Agriculture and Water Resources (DAWR) and semi-structured interviews with importers and customs brokers.

The compliance-based inspection protocols that will be rolled out arise from the theoretical work in CEBRA

Project 1304C *Incentives for importer choices*, together with refinements suggested by analysis of the experiments that took place as part of CEBRA 1404C *Testing compliance-based inspection protocols*. The CSP-1 rule is a slightly stricter rule than the CSP-3 rule (implemented under the Compliance Based Inspection Scheme) but is easier to explain to stakeholders and likely to be more beneficial from the regulator's perspective. Findings from 1404C indicated that simpler rules, where more information is disclosed to importers, result in stronger compliance behaviour by importers. The experiments undertaken in CEBRA 1404C also highlighted providing structured feedback could boost compliance. As part of the trial, vegetable seed importers will receive feedback reports containing consolidated information on their own import data, including details of consignments imported, and inspection passes and failures by

supplier and country of origin.

The project is innovative from DAWR's perspective, as the trial is investigating whether the AQIS Commodity Code (ACC) can be used to separate different products (and therefore biosecurity risks) under the same tariff code. The department is also trialing new ways of communicating with industry stakeholders, drawing upon insights from CEBRA Project 1304C. The expected benefits of this project are improved knowledge about implementing compliance-based inspection regimes and the cost savings for import supply-chain participants, including the Australian Government, that result from more effectively targeting inspection efforts. The findings will also inform adoption to other import pathways across the department.

## Project Update

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

**Project 1304C** - Incentives for importer choices

**Project 1401** - SAC free-text mining.

**Project 1402B** - Tools and approaches for invasive species distribution modelling for surveillance

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