



## MESSAGE FROM THE DIRECTOR

After ten years as Managing Director it is time to say au revoir.

I have had the privilege of running CEBRA since its beginnings in 2006 when the Australian Centre of Excellence for Risk Analysis was established with funding provided by the then Department of Agriculture, Fisheries and Forestry. It's been exciting and very gratifying to see it grow, not only in size but in the importance our policy colleagues, both here and in New Zealand, place on it. To meet the growing demand for risk thinking and analysis this year we established the Centre for Environmental and Economic Research (CEER) – a new research consultancy and high level training group at the School of Biosciences at the University of Melbourne. Prof Tom Kompas is its leader.

I have enjoyed my time at CEBRA immensely and have thrived on the challenges our policy colleagues have set us but more importantly it's been a pleasure to meet so many hard working, dedicated colleagues. I thank you for the support, guidance, and encouragement you have provided me during my time at CEBRA.

While the research we do is important it is equally important that we share our research and continue to provide leadership in risk thinking. Over the last few months we have had the opportunity to share our research with our policy colleagues. Dr Susie Hester from the University of New England presented "Influencing importer choices and valuing passive surveillance – new insights into pest and disease management" to the Ministry for Primary Industries' (MPI) Operations Branch while A/Prof Andrew Robinson presented 'CEBRA & Expert Elicitation' to MPI's Surveillance and Incursion

Investigation Group. Andrew also recently presented 'CEBRA: Biosecurity Research that Works at the Border of Policy and Practice' to our UK colleagues at the Department for Environment Food and Rural Affairs.

We were proud to have hosted two international visitors at CEBRA: Dr Olaleken Obisesan from the Department of Statistics at the University of Idaban in Nigeria and Dr Barney Caton from the US Department of Agriculture.

Prof Tom Kompas and I are pleased to be a part of the new Australian Research Council's Discovery Project led by Brendan Wintle on 'Predicting the ecological and economic outcomes of trade'. This work will contribute to the Department of Agriculture and Water Resources' project on the value and health of the biosecurity system.

We have recently taken on some new and exciting work. Anca Hanea and Victoria Hemming are supporting a project funded through CEER on the application of structured expert judgement to defence problems, accounting for the constraints typical of assessments made in defence settings.

Further, Anca Hanea and Fiona Fidler were successful in a bid to undertake a new project with the US Intelligence Advanced Research Projects Activity (IARPA) on how experts reason when making judgements and predictions. IAPRA invests in high-risk, high-payoff research programs to tackle some of the most difficult challenges of the Intelligence Community.

Together we have grown to a position of world leadership in biosecurity risk analysis. I am proud to have been a part of this successful partnership between the

University of Melbourne and Government in Australia and New Zealand, which will continue to grow under Andrew Robinson's leadership. I am grateful especially to Prof Ron Sandland, who is also giving up the helm of the CEBRA Board after 10 years.

I am looking forward to starting a new phase of my career at Imperial College in the UK. I wish you all the very best and thank you again for advising, guiding and inspiring me.

Merry Christmas

**Mark Burgman**

*Managing Director,*

*Centre of Excellence for Biosecurity Risk Analysis*

### IN THIS EDITION

- 1 MESSAGE FROM THE DIRECTOR
- 2 BIOSECURITY RISK OF ONLINE SHOPPING
- 3 BONNIE MINGLING WITH THE FAMOUS
- 3 STEVE LANE
- 4 2016 YEAR IN REVIEW
- 5 2016 YEAR IN REVIEW CONTINUED

## Biosecurity risk of online shopping

Goods bought on the internet may have biosecurity risks, and the ability of regulators to monitor trade is limited. Given the scale and complexity of the challenge, automated monitoring by software is the preferred solution.

Published studies describe these risks, suggesting that the enforcement of biosecurity regulations upon this trade is relatively difficult. Systematic monitoring of e-commerce should be implemented to support detection, interdiction and education. Such monitoring should identify sale offers and purchases of biosecurity-regulated goods on dedicated e-commerce sites, enthusiast forums and social media.

Project 1503B was proposed by New Zealand's Ministry for Primary Industries (MPI) with the aims of i) identifying software that can meet MPI's requirements for monitoring international trade in biosecurity-regulated goods, and ii) investigating the experiences of other jurisdictions in managing biosecurity risk from e-commerce. The project was a desktop exercise involving reviews of available literature and discussions with researchers and staff in other jurisdictions.

Of the biosecurity agencies successfully contacted, only US Department of Agriculture -Animal and Plant Health Inspection Service (USDA—APHIS) and Department of Agriculture and Water Resources (DAWR) reported an existing program of e-commerce monitoring. USDA—APHIS previously used custom software in-house to automatically search target websites for key commodities, but the cost and difficulty of its maintenance led to a decision to out-source the function. DAWR's e-commerce monitoring is a manual process of searching for online sales of regulated goods by using common search engines. DAWR's results are reportedly augmented by other manual

searches performed by an Australian non-profit organisation, the Invasive Species Council.

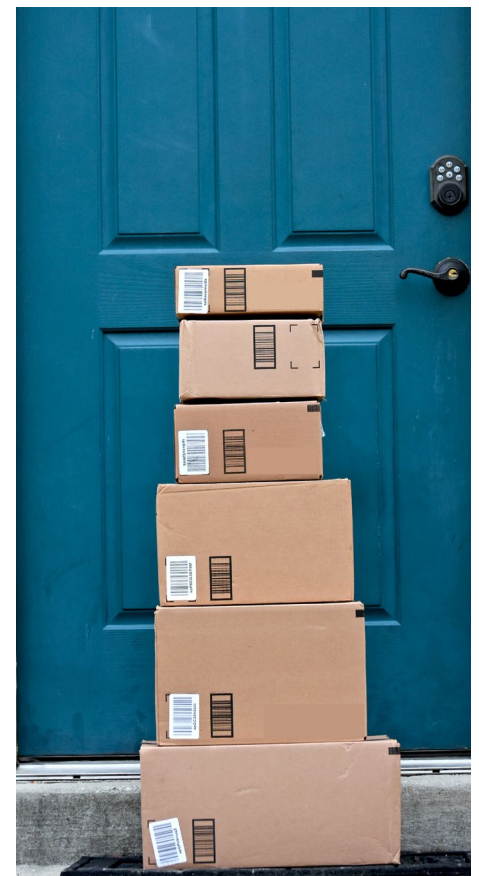
The trade of many live plants and animals, and their products, are regulated for both biosecurity and the illegal wildlife trade (IWT). Furthermore, both IWT and biosecurity-regulated trade occurs relatively openly on public websites. In contrast, the 'hard' contraband targeted by Customs agencies (narcotics, cash and weaponry) are not generally traded in this way, but rather on the dark web or other non-public forums. The project found relevant research and software from the IWT realm, but not from the Customs realm.

No non-commercial software was found that is immediately suited to automatically detecting online sales of regulated goods. However, the following systems show promise as potential solutions after further development and/or customisation.

1. The GLDIATR system, recently developed by the Great Lakes Commission, is used to automatically detect e-commerce sales of invasive species into the Laurentian Great Lakes region.
2. The IBIS system, developed through ACERA/CEBRA and run by DAWR to automatically gather intelligence on pests and diseases, has been undergoing redevelopment that will allow it to perform searches more generically, i.e. of any website for any set of key terms.
3. The Train Browser search engine is used by TRAFFIC China to automatically detect online sales of IWT items, but it is currently only available in Chinese.
4. The iTrade system is being developed by researchers at the University of Kent to automate the detection of IWT items offered for sale on a large e-commerce site.

The project also found an appetite for collaboration on the further development of automated e-commerce surveillance capability, notably among organisations and researchers active in biosecurity and IWT regulation and advocacy.

Once online sales of regulated goods are detected, the ability to use the intelligence for interdiction is often constrained by legislation: vendors are usually in foreign jurisdictions, and buyers' contact details are subject to privacy restrictions. However, several agencies have successfully worked with some e-commerce platforms and vendors to reduce the volume and shipping availability of regulated goods, such as prohibited seeds and ivory.



## Bonnie mingling with the famous

Our former colleague Dr Bonnie Wintle, research fellow at the Centre for the Study of Existential Risk (CSER) at the University of Cambridge, has had a night she will never forget!



Bonnie (back centre)

She was invited to the opening of the Leverhulme Centre for the Future of Intelligence (CFI) on Wednesday, 19 October held at the David Attenborough Building. Professor Stephen Hawking spoke at the launch where he discussed the ways in

which Artificial Intelligence (AI) is poised to transform humanity as we know it. "It was a dream of mine to meet Dr Hawking. My mum even rang me from Australia as she saw me on SBS news!" said Bonnie.

CFI is building a new community of researchers, with strong links to technologists and the policy world, and a clear practical goal: to work together to ensure that we humans make the best of the opportunities of artificial intelligence as it develops in coming decades.

The Centre focuses on the future of AI, and builds on work initiated through CSER, where Bonnie is based as a Postdoctoral Research Associate. Her role at CSER is to horizon scan for extreme risks and opportunities associated with emerging technologies, to help ensure that developments in these fields are safe and beneficial. Stephen Hawking is on the Scientific Advisory Board for CSER, and Prof Huw Price is the Academic Director of both research centres.

"I was fortunate enough to land this fascinating job thanks to the experience I gained from my PhD and early postdoctoral work with CEBRA and the QAECO [Quantitative and Applied Ecology Group], researching structured ways to elicit better judgements from experts. This is critical to good policy and decision making, whether you're working with the environment, intelligence, or mitigating potential threats to our very existence!" said Bonnie.

**Our goal is to work together to ensure that we humans make the best of the opportunities of artificial intelligence**

## Steve Lane

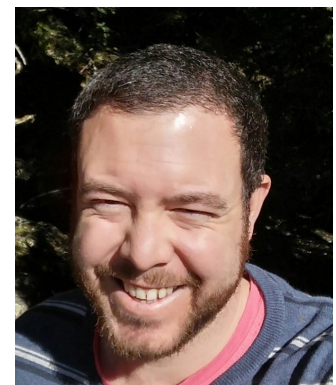
Dr Steve Lane, a self-confessed geek, loves all things data and programming. He is also living his research career aspirations, in the complementary fields of statistics and biosecurity, as a Research Fellow with CEBRA. "My aspiration is to be a leader in both fields conducting cross-disciplinary research" said Steve. "CEBRA is fantastic to work for. I'm working with great colleagues and mentors while achieving my career goals".

Steve began working at CEBRA in February this year. He is currently leading the Ministry for Primary Industries (MPI) project - Development of a generic sample size tool for the importation of small seed lots. "It's been a great introduction to CEBRA for me - not only am I developing technical tools I've also met and worked with some wonderful MPI colleagues. A big shout out to Rose Souza Richards and Claire McDonald."

Other interesting projects he's worked on include air travelling profiles, where he compared different machine learning and statistical approaches for prediction and their properties in some targeting metrics. This profiling builds on the work of Richard Gao and Matt Chisholm. He is also working on model averaging/stacking for air travellers in the US with Dr Barney Caton (USDA, Animal Plane Health Inspection Service, Plant Protection and Quarantine). Modelling averaging/stacking is a way to combine diverse models into a super-model. Both projects will assist our Policy colleagues further refine their targeted risk management approaches.

This month Steve presented at the Australian Statistical Conference 2016 held in Canberra - Big Data: mining, analysing, teaching. His topic was on "how simple statistical models

can provide great insight" with the case study presented on fruit imports. "CEBRA has really provided me with some great opportunities to advance my research thinking and skills. These network opportunities are invaluable" said Steve.



## 2016 - Year in Review

The last ten years have been an incredible journey for CEBRA and its predecessor. The Australian Centre of Excellence in Risk Analysis (ACERA) was established in 2006, and ACERA II, our reboot, in 2009. Building on this proud history, and with the joint support of the Department of Agriculture and Water Resources (DAWR), the Ministry for Primary Industries and the University of Melbourne, CEBRA was established in 2013. This first CEBRA contract will conclude in 2017, and with its conclusion comes much change.

Professor Mark Burgman, Managing Director of CEBRA, has provided steadfast and energetic leadership and vision since the inception of ACERA. Mark has accepted a post at Imperial College as Professor of Risk Analysis and Environmental Policy, and Director of the Centre for Environmental Policy. It's a wonderful opportunity for Mark, and the CEBRA community wishes him the very best. We shall feel his loss keenly. A/Prof. Andrew Robinson has accepted the position of Managing Director starting in 2017. Andrew has been embedded in CEBRA since 2013, and is one of its most enthusiastic and energetic proponents. Andrew has been deputy since 2013 and, during 2016, he shared leadership responsibilities with Mark while Mark was Head of the School of BioSciences in the University.

Furthermore, Dr Ron Sandland, Chair of the CEBRA Advisory Board, will step down at the end of this year. In his role as Chair, Ron has guided ACERA and CEBRA through some extraordinary times. Ron's wisdom, experience, and dry wit have been constantly invaluable to the Board and the Centre's leadership. Dr Colin Grant, formerly with DAWR, has accepted our invitation to chair the Advisory Board. We eagerly look forward to Colin's engagement, as he was one of the originating members of the board, and was central in articulating the vision that began with ACERA and has matured through ACERA II to CEBRA.



Dr Ron Sandland AM FTSE  
 Chair, CEBRA Advisory Board

Ms Angela Brown accepted a post as precinct manager for the Schools of Geography and Mathematics and Statistics, after several years of outstanding service as our Business Manager. Angela moves onward and upward with CEBRA's very warmest wishes. CEBRA has been fortunate to recruit Ms Cassie Watts to take on this key role. Cassie has previously worked with ACERA, and her timely return is very welcome.

Finally, two board members also changed in 2016, with Dr Marion Healy replacing Ms Louise Van Meurs and Mr Peter Goodday replacing Ms Karen Schneider as DAWR's Biosecurity Plant and ABARES representatives respectively.

The Australian Government's Agriculture Competitiveness White Paper positioned and guided CEBRA's themes and projects for 2016/17. The paper outlined the initiatives and commitments by the Australian Government for agriculture. CEBRA's three focusing themes are;

- Strengthening Surveillance – surveillance and analysis reduces the risk of new entry of pests, disease and weeds and to better target the risks that matter most.
- Building Scientific Capability – science remains effective and cutting-edge in an increasingly complex biosecurity environment by building our capacity and developing professional networks and collaborations.
- Data and information – optimise the use of data and information in biosecurity risk analysis.

## 2016 - Year in Review Continued

Our year has also been characterised by outstanding academic achievement. CEBRA's environmental scientist Associate Professor Jane Elith was awarded the prestigious Australian Academy of Science 2016 Fenner medal. The purpose of this award is to recognise distinguished research in biology by researchers up to ten years post-PhD. Jane, who is an ARC Future Fellow, is one of the ten most highly cited environmental scientists in the world.

Other developments will improve our ability to deliver high-quality biosecurity-related research. The Centre for Environmental and Economic Research (CEER) – a new research consultancy and high level training group at the School of Biosciences at the University of Melbourne was launched as was CEBRA's Facebook page. The new look CEBRA website, which is under construction, will be launched in the new year.

Doctors Susie Hester and Anca Hanea, and Professors Mark Burgman, Tom Kompas, and Andrew Robinson have facilitated and presented at many national and international conferences. One of particular note was a conference at the British Ecological Society Symposium at the Cambridge Conservative Initiative meeting on the interface between policy and science. The conference looked at how to make science work for government. The governance systems that support the relationships between CEBRA, DAWR and Ministry for Primary Industries are world-leading and quite unique.

This year has seen some innovative and effective work delivered and deployed by dedicated people. In the last 12 months, we have had the following reports endorsed by the Biosecurity Research Steering Committee:

- 1304C Incentives for Importer Choices
- 1401C/D SAC free-text mining – review of results and feasibility study
- 1402B Tools and approaches for invasive species distribution modelling for surveillance
- 1402A Development of a Marine Spatial Analysis Model for Improved Biofouling Risk Assessment

The following are complete and are under review.

- 1305B Plant-product pathways and the Continuous Sampling Plan
- 1501F Performance Indicators for Border Compliance

### New look for **CEBRA**

CEBRA has launched a new Facebook page.

Please follow us and you will receive regular updates.



<https://www.facebook.com/cebrauom/>

The new look CEBRA website is under construction and is progressing well.

The layout is a more modern and streamlined design which allows for easier use with mobile phones and tablets.

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