



MESSAGE FROM THE DIRECTOR

As another year comes to an end I want to take this opportunity to wish you and your family and friends a very merry Christmas and safe and enjoyable holiday season.

This year CEBRA has seen some innovative and effective work delivered and deployed by dedicated people from universities, government and industry. Next year will provide even more opportunity for CEBRA to deliver practical tools and procedures for risk analysis and management, both domestically and internationally.

CEBRA is working on establishing a consultancy arm which will allow the work of CEBRA to go beyond the mandate provided by its relationship with the Department of Agriculture and Water Resources (the department) and the Ministry for Primary Industries of New Zealand (the ministry). It will allow CEBRA to enhance the important work of Biosecurity for the Government. I will tell you more on this front next year.

CEBRA's staff, Andrew Robinson, Tom Kompas, Susie Hester and myself met with our colleagues at the department in Canberra and the ministry in Wellington where we workshopped future research needs in preparation for next year's planning meeting where CEBRA's work plan for 2016-17 will be established. We discussed ideas and concepts to identify research to support departmental and ministry priorities.

Once again our people have been acknowledged for their great work. Our renowned environmental scientist Dr Jane Elith has been awarded the prestigious Australian Academy of

Science Fenner medal. Our Deputy Director, Professor Andrew Robinson has been awarded the University's inaugural Excellence in Engagement award in the category of Public Value. More detail provided later in this newsletter!

It's been another exciting quarter where I have had the opportunity to engage on biosecurity risk thinking both here and overseas. I had the opportunity to showcase the work of CEBRA at the 39th North American Plant Protection Organization (NAPPO) in Memphis where I spoke on 'Economic Impact Models and Pest Risk Management'. It was a great opportunity to collaborate with my colleagues and to describe the work of the department and ministry, which are at the forefront of biosecurity risk thinking around the world.

Professor Ralph Mac Nally, a world leader in whole-of-catchment ecology from the Institute for Applied Ecology hosted a seminar, where I spoke and ran a workshop, both held at the University of Canberra on Friday November 13 on 'The Science of Expert Judgement in Ecology'.

Professor Emma Johnston, University of New South Wales and I delivered the final plenary on Equity and Diversity in Ecology at the 2015 Ecological Society of Australia Conference held in Adelaide in early December. The feedback from people who attended the session in Adelaide was outstanding and consistently supportive, from both men

and women. It was clearly a timely and important topic and we'll continue to support diversity and equity agendas through CEBRA.

Our leadership team is changing next year. 2016 is an important year for us as I take a temporary leadership role at the University as Head of the School of Biosciences. Professor Andrew Robinson and I will be working together to provide leadership for CEBRA during the year.

Take care over the holiday season!

Mark Burgman

Managing Director,

Centre of Excellence for Biosecurity Risk Analysis

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Dr Jane Elith (3rd from right) awarded the 2015 Frank Fenner Prize for life scientist of the year

2016 Fenner Medal

Dr Jane Elith, who recently won the Prime Minister’s Prize for Science (pictured above), has been awarded the 2016 Fenner Medal by the Australian Academy of Science. Dr Elith who is an Australian Research Council Future Fellow within CEBRA, has become one of the world’s most influential researchers in applied ecology.

The purpose of this prestigious award is to recognise distinguished research in biology by researchers up to 10 years post-PHD.

Dr Elith specialises in developing and evaluating species distribution models, statistical models that describe relationships between the occurrence and abundance of species and the environment.

She uses new tools to understand species distribution in the wild, helping to better inform environmental managers and governments on invasive species.

Environmental managers and government make extensive use of her research to plan management of invasive species, improve conservation of biodiversity, and contribute to strategic land-use planning. In this way, Dr Elith has not only substantially influenced academic research, but also impacted environmental management nationally and internationally.

The award will be formally presented at the Academy’s Annual Meeting in Canberra in May 2016.

“Dr Elith has become one of the world’s most influential researchers in applied ecology.”

Development of an Expert-based Model for Improved Biofouling Risk Assessment

How do you estimate the risk posed by hull fouling on vessels when introduction events are rarely observed and physiological models and data about the biogeography of species are poorly developed? Experts can help, but their advice will be best if they are carefully managed. CEBRA's colleagues, led by Dr Simon Barry and Dr Peter Caley of the CSIRO, have developed a novel approach that relies on experts assessing the outcomes of a range of realistic scenarios.

Expert elicitation is a formal, systematic process for obtaining expert judgements on scientific questions. Because of the lack of relevant data, the risks of hull fouling organisms were estimated using expert elicitation. The project involved twenty nine national and international experts each rating the relative risk of twenty comparative scenarios. These ratings were used to construct a statistical model summarising the expert's views.

Shipping can facilitate bioinvasion through two major pathways: ballast water and hull fouling. The risks of hull fouling depend on the physiological and life history traits of the species in question, as well as the conditions of the receiving environment and the conditions through which the vessel has travelled on its way to Australia. Hull fouling species require a life-cycle amenable to attachment to hard services, sufficient attachment strength to withstand voyages, environmental tolerances to survive in new locations and tolerance to anti fouling paint.

An alternative to analysing individual species is to consider the estimation

of aggregate risk for the entire vessel for the established marine species of concern. If this risk can be related to the characteristics of the vessels and the journeys they are undertaking it can be used as a screening tool to support inspections and compliance activities.

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The Marine Growth Risk Assessment (MGRA) screening tool indicates the following should be considered when determining the aggregate risk for the entire vessel:

- Vessel biofouling management regime such as presence and age of anti-fouling coating,
- History of recent hull survey and marine growth inspection,
- Evidence of seawater pipe work treatment,
- Duration of stay in overseas locations, and
- Duration in Australian ports and coastal waters.

The model developed in this CEBRA project evaluates biosecurity risk (likelihood of marine pest establishment) based on the vessels movement history and the characteristics of Australian ports and is suited to risk ranking applications. It cannot be applied to determine absolute risk and therefore given a threshold, whether the risk is acceptable. This project enables additional information on vessel biofouling risk to be incorporated into overall risk assessment systems, potentially resulting in more comprehensive risk assessment outcomes. Cost to industry may also be reduced as risk management will be focussed around the highest risk vessels. It benefits both the Australian environment and the international shipping industry.



Inaugural CEBRA Policy Exchange Fellowship announced

CEBRA is delighted to announce that Philip Tennant from the Department of Agriculture and Water Resources' Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) has been awarded the inaugural CEBRA Policy Exchange Fellowship (PEF).

CEBRA Policy Exchange Fellowships promote the sharing and flow of knowledge and expertise between CEBRA and its stakeholders. The Fellow is embedded in the CEBRA research community and works on knowledge exchange opportunities that arise from CEBRA funded projects. Mr Tennant will be working on "Data mining for the Continuous Sampling Plan (CSP)" with Professor Andrew Robinson, based at the University of Melbourne.

Previous CEBRA work has already introduced the CSP to the management of biosecurity risk for Imported Plant Products Pathways. CSP is a recipe that tentatively decreases intervention in

pathways that have been identified as low risk, using recent inspection history as a basis for assessing short-term risk. CSP has been implemented in a number of low-risk imported plant products pathways, however it is important to the success of the CSP project to identify more pathways for its potential application. The aim of this PEF is to develop skills in data mining using the free open-source statistical environment R with the specific goal of identifying pathways that would be suitable for inspection under a CSP algorithm, and to identify low-risk pathways for which risk-based management using CSP would be advantageous.

'Our goal is that by partnering Mr Tennant with CEBRA's statisticians, both the Department and CEBRA will see the implementation of CSP flourish' said Professor Robinson.



Philip Tennant - Department of Agriculture and Water Resources - ABARES

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CEBRA Policy Exchange Fellowships promote the sharing and flow of knowledge and expertise

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PROJECT UPDATE

The following final reports have been endorsed by the Biosecurity Research Committee:

Project 1401D

AIMS and SAC text mining

Project 1402A

Development of a Marine Spatial Analysis Model for improved risk assessment

Project 1304A

Cost-effective surveillance of Food-and-Mouth Disease

Project 1405C

Torres Strait risk and resource allocation project

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Melbourne Engagement Excellence Award

The Deputy Director of the Centre of Excellence for Biosecurity Risk Analysis (CEBRA), Professor Andrew Robinson, has been awarded the University of Melbourne's inaugural Excellence in Engagement award in the category of Public Value. The University places a strong emphasis on engagement as an integral element of the institution's academic mission. The Melbourne Engagement Excellence Award recognises Professor Robinson's achievement in advancing the university's engagement priorities through his biosecurity risk analysis work with CEBRA.

The award acknowledges the significant impact and pivotal role Professor Robinson has made in engaging with the Australian Federal Department of Agriculture and Water Resources and New Zealand's Ministry for Primary Industries to address challenges of national and international biosecurity

importance. He has engaged vigorously with biosecurity regulators and inspectorates globally to help protect economies, agriculture and the environment from invasive pests. His work has focussed on developing more efficient and more reliable interventions at national borders, as well as better protection outside the border and more efficient capture of critical information inside the border. His activities in pursuit of these outcomes have included team leadership and project management, data science, mathematical modelling, statistical design, risk analysis and critical problem solving.

"Working with CEBRA has been and continues to be a perfect platform for developing and delivering creative and useful solutions to important biosecurity challenges that face governments worldwide, but most particularly both the Australian and New Zealand governments" said Professor Robinson.



Professor Margaret Sheil, the Provost of the University presents Professor Andrew Robinson his award

The University places a strong emphasis on engagement as an integral element of the institution's academic mission

Trusting Judgements: How to get the best use of experts

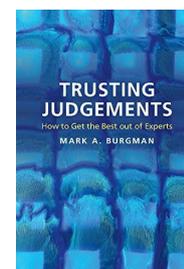
Professor Mark Burgman, Managing Director, CEBRA is the author of a new book, *Trusting Judgements: How to Get the Best out of Experts*, published by Cambridge University Press.

Policy and decision-makers in government and industry constantly face important decisions without full knowledge of all the facts. They rely routinely on expert advice to fill critical gaps in scientific knowledge. There are unprecedented opportunities for experts to influence decisions. Yet even the most experienced can be over-confident and error-prone, and the

hidden risk is that scientists and other experts can overreach, often with good intentions, placing more weight on the evidence they provide than is warranted.

This book describes how to identify potentially risky advice, explains why group judgements outperform individual estimates, and provides an accessible and up-to-date guide to the science of expert judgement. Finally, and importantly, it outlines a simple, practical framework that will help policy- and decision-makers to ensure that the advice they receive is relatively reliable and accurate, thus substantially

improving the quality of information on which critical decisions are made.



The book is available at

<http://www.cambridge.org/au/academic/subjects/life-sciences/life-science-professional-development/trusting-judgements-how-get-best-out-experts?format=HB>