



MESSAGE FROM THE DIRECTOR

Welcome to the latest addition of the CEBRA newsletter. This quarter we've had a few changes to the CEBRA team. In May, we farewelled Steve Lane, who took up a role at WorkSafe in Geelong. Steve made invaluable contributions during his time at CEBRA, both as a researcher and as deputy director. More recently, Rezvan (Rose) Hatami also left CEBRA. On top of her research role, Rose organised a number of highly successful CEBRA seminars. Finally, PhD student Victoria Hemming submitted her thesis and accepted a post-doc at the University of British Columbia in Vancouver. We warmly thank Steve, Rose and Victoria for their hard work and contributions to CEBRA, and wish them all the best for the future. They will be missed!

We'd like to welcome Nathaniel Bloomfield to CEBRA. Nathaniel (BSc Theoretical Chemistry) joins us from the Department of Agriculture, with two and a half years of experience working with the Australian Bureau of Agricultural Resource Economics and Sciences. See this newsletter for more about Nathaniel.

In March, Richard Bradhurst was invited to present his work on modelling Foot-and-Mouth Disease to the European Food Safety Authority and the United Nations. Also in March, Richard presented his Yellow Crazy Ant spread modelling research to a meeting at the Wet Tropics Management Authority. Anca Hanea

recently presented two workshops: a Bonamia risk model workshop in Wellington and an elicitation workshop in Canberra.

In May, I spoke at the 5th World Congress of the Society of Risk Analysis (SRA) in Cape Town, South Africa on biosecurity risk and sampling. This was a great opportunity to mingle with risk researchers across disciplines and keep up our connection with SRA. Also in South Africa, I presented a keynote at the National Symposium on Biological Invasions at the Centre for Invasion Biology.

Also in May, Edith Arndt and Susie Hester attended the National Science Exchange in Canberra, which focussed this year on innovation through collaboration. Susie presented on her work about 'bad' biosecurity behaviour and incentives for compliance, while Edith spoke on her research into the health of the biosecurity system. In June, Susie, Aaron Dodd and I attended the first ever Australian Biosecurity Symposium (more in this newsletter!).

One of the ways in which CEBRA fosters engagement is by holding regular CEBRA seminars, showcasing talks from local and international researchers and practitioners in areas relevant to biosecurity or risk analysis. This forum provides an opportunity for speakers to share knowledge with an engaged audience in a relaxed setting.

Since the last newsletter we have had several excellent speakers including Professor Pablo J. Zarco-Tejada of the HyperSens lab, who fascinated us with a talk on hyperspectral imaging and how drones can be used for remote sensing of potential biosecurity concerns. Other recent speakers include Melissa Welsh from Scion research who spoke about optimising investment and effort in biosecurity, Susan Wei who spoke about deep learning and algorithmic fairness, and Raphael Trouvé, who spoke on sampling methods for border inspection.

It has been a busy year so far and shows no sign of slowing down. Follow us on facebook and twitter to keep updated with the latest news from CEBRA.

Andrew Robinson

Managing Director,

Centre of Excellence for Biosecurity Risk Analysis

IN THIS EDITION

- 1 MESSAGE FROM THE DIRECTOR
- 2 STUDENT SPOTLIGHT: THIRI VINO
- 3 RESEARCH FELLOW NATHANIEL BLOOMFIELD
- 4 AUSTRALIAN BIOSECURITY SYMPOSIUM

Student spotlight: Thiri Vino



Thiripura (Thiri) Vino is a PhD student at CEBRA. Thiri holds a Bachelor of Science (statistics specialty) from the University of Peradeniya in Sri Lanka, as well as a professional accreditation in management accounting from Chartered Institute of Management Accountants, UK. With these skills, Thiri got a job managing the supply chain department of a newly opened hospital. In this role, while managing the inventory and stores, Thiri applied statistical tools such as time series modelling to forecast and plan the demand for hospital inventory, making sure everything was stocked up for patient needs.

After working in this role for a few years, Thiri decided it was time to really focus on her true interests: mathematics and statistics. 'I came across Andrew [Robinson]'s research and thought it was interesting. I'd been thinking about doing a PhD, and thought that studying in Australia would be a great opportunity to get

international exposure.' She got in touch with Andrew and started her PhD at CEBRA in 2016.

Thiri's original project proposal was on 'brain drain' in Sri Lanka, but after arriving at CEBRA, she became more interested in other projects. Following a meeting with researchers from mathematics and statistics, computer science, the Peter Doherty Institute, and population and global health, Thiri settled on her current PhD topic, *Human mobility models with imperfect data*.

Her PhD focuses on two datasets collected in Indigenous communities by the Menzies Institute and Ninti One. The first is a longitudinal dataset from Darwin, covering 25 years. The second is data from a special mobility survey of Indigenous communities in and around Alice Springs. 'It's very rich data,' Thiri says. 'The main objective of using this data is to explore human mobility in rural areas and to explore methods for dealing with imperfect data. The reason to understand mobility is from an infectious disease point of view. How people move has implications for disease spread. Understanding how communities move could help contain spread in the event of an outbreak.'

By applying a generalised linear mixed effects model, Thiri is exploring which factors affect long and short-term

mobility based on population characteristics by incorporating an individual's propensity to move. Imperfect data is another challenge faced by researchers. Thiri is also looking at statistical methodologies to deal with missing data and how to combine and make meaningful inferences when there is no single high-quality data set.

'The best thing about being a student at CEBRA is the flexibility!' Thiri says. 'I had the opportunity to select my own project, my ideas are always considered, and that I've had a great opportunity to collaborate with different groups.'

Thiri plans to finish her thesis later this year, after which she will be looking for a postdoc. If you have an interesting postdoc for Thiri, please contact her at

tvino@student.unimelb.edu.au

Research fellow Nathaniel Bloomfield



Nathaniel Bloomfield completed the Bachelor of Philosophy (Science, Hons.) program at the Australian National University in 2016. He started the program taking a breadth of science subjects including psychology and biology but quickly found that his main interests lay in mathematics, chemistry and scientific computing. 'At the end of my second year, I realised I was terrible at mixing chemicals and was better off sitting at a computer, so I moved into theoretical chemistry, which uses quantum mechanics to try and model chemical reactions,' Nathaniel says. Through the mini research projects that make up part of the PhB, Nathaniel was exposed to matlab, python, R and other computer languages. 'Once you learn one language, it's a lot easier to pick up a second,' Nathaniel says.

After completing his undergraduate degree, Nathaniel was accepted into the ABARES (Australian Bureau of Agricultural

Resource Economics and Sciences) graduate program at the Department of Agriculture. He was placed with the quantitative sciences team, which immediately got him working on a range of exciting projects. One of these was about ballast water, which is seawater that vessels take on to remain steady in the water when they're not carrying freight.

'Ballast water is a major biosecurity concern, as it can potentially contain coastal marine organisms and move them elsewhere,' Nathaniel explains. 'North Pacific Seastar, which has devastated benthic ecosystems in Tasmania and Victoria, was likely introduced through ballast water transfer.'

At the time, the International Maritime Organisation's convention requiring the treatment of ballast water, which Australia had ratified, was about to come into force. 'Basically, they were now going to be using water treatment systems to treat the ballast water that goes into the ships, to kill everything that's in it,' Nathaniel says. Together with other members of ABARES, Nathaniel was able to show that the risk to the environment associated with these systems would likely be minimal.

During his graduate year, Nathaniel also did a placement with the plant health surveillance team, researching the

effectiveness of the surveillance grid for Asian Gypsy Moth. 'This moth would have severe impacts if it established in Australia. We were able to show that even if the probability of an incursion occurring was small, it was still worthwhile conducting surveillance,' Nathaniel says.

Nathaniel was familiar with CEBRA's work through his role at ABARES and hearing Andrew Robinson speak at the National Science Exchange and other events. When a chance came up to work at CEBRA, he was excited for the opportunity to take his biosecurity research career to the next level and decided to apply.

At CEBRA, Nathaniel will be working on project 190801, applying image recognition to automate image processing for identifying biofouling. He will also be assisting on project 190808, trying to identify low risk pathways to allow the department to better allocate resources at busy times such as during surges of Brown Marmorated Stink Bug infestation, and project 190810, improving the department's profiling for airline passengers. Nathaniel will also contribute to James Camac's proof of freedom work, which was featured in the last CEBRA newsletter.

Recap: Australian Biosecurity Symposium

From June 12–13, CEBRA Director Andrew Robinson, together with Deputy Directors Susie Hester and Aaron Dodd, attended the first Australia Biosecurity Symposium on the Gold Coast. The event was hosted by Animal Health Australia, the Invasive Species Council Australia and the Centre for Invasive Species Solutions and was attended by almost 400 delegates across academia, government and industry.

Andrew presented on 'Undelivered risk: a counter-factual analysis of the biosecurity risk avoided by inspecting international mail' and chaired a session on 'Optimising policy decisions and investment'. Susie spoke on 'Bad biosecurity behaviour or rational reaction to rules? Aligning stakeholder incentives through insurance' and Aaron presented on 'Estimating the monetary value of Australia's biosecurity system'. Andrew, Susie and Aaron found it to be an excellent networking opportunity and were impressed by the quality of the talks.



13th Annual Meeting of the International Pest Risk Research Group

When: 3–6 September 2019

Where: Poznań, Poland

The Institute of Plant Protection, in conjunction with the European and Mediterranean Plant Protection Organization, is hosting this meeting. More details: www.pestrisk.org/iprrg-2019/

15th Conference on Ecology and Management of Alien Plant invasions

When: 9–13 September 2019

Where: Prague, Czech Republic

The conference will bring together scientists, managers and policy makers from around the world involved in plant invasions, who will interact and explore ways to face global and regional challenges imposed by alien plant invasions. Conference registration open now: <https://emapi2019.org/>



Follow CEBRA on Facebook

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



Follow CEBRA on Twitter

https://twitter.com/CEBRA_UoM?lang=en

To subscribe to the CEBRA newsletter visit <http://cebra.unimelb.edu.au/engage/contact-us>