

# ASIA RISING

Strengthening engagement and partnerships in Asia



**Researching  
reptiles**

New habitats  
for the Siamese  
crocodiles

# CONTENTS

---

Message from the Deputy Vice-Chancellor	1
Conserving Cambodia's crocodiles	2
Building energy foundations	4
Death anxiety in Asian cultures	5
The legislation of alcohol	6
Supporting Indonesia's nurses	8
Malaysia's HIV dilemma	9
Fighting pear scab	10
A successful formula	12

## CREDITS

Cover photo:  
Indi Samarajiva

Other photos:  
Matt Smith  
Malaysian AIDS Council  
Narayanan Zhu  
National Institute of Mental Health

Text:  
Matt Smith

Design  
Chantel Wong Kun

With thanks to:  
Diana Heatherich

# A MESSAGE FROM THE DEPUTY VICE-CHANCELLOR



Welcome to the sixth issue of *Asia Rising*. In these pages find a closer look at some of the developments from our College of Health, Science and Engineering, which emphasise the diverse collaborations between La Trobe University and Asian institutions.

La Trobe University has a significant research strength in the areas of science and health, and with the La Trobe Institute of Molecular Sciences (LIMS) and AgriBio buildings providing the cornerstone of campus redevelopment, there is a demonstrated commitment to the disciplines.

Part of La Trobe University's success in these fields is reliant on strong collaborations with international institutions, as the stories in these pages attest. From heat exchange systems in buildings in China through to helping a rare, endangered crocodile in the mountains of Cambodia, there is a healthy range of research which will give an idea of just some of the collaborations at work.

La Trobe Asia continues to make a strong contribution to leading and supporting Asia-related activity in the University, and as it nears its fifth year of operation it is undergoing some changes.

Professor Nick Bisley has completed an impressive tenure as the Executive Director and has moved on to become the Head of the School of Humanities and Social Sciences at La Trobe University. All at La Trobe warmly thank him for the excellent leadership provided at La Trobe Asia, and know that his success will continue in his new position as a head of school.

We are now in the process of recruiting a new Director, who will undoubtedly bring new ideas and enthusiasm to an already effective team. In the meantime, it is 'business as usual' at La Trobe Asia, with events, grants, podcasts and support continuing uninterrupted.

We look forward to the next chapter of La Trobe Asia and to continuing our close work with colleagues in the region, developing deeper partnerships throughout Asia and continuing our program of activities with both students and researchers.

**Professor Keith Nugent**  
Deputy Vice-Chancellor  
and Vice President (Research)

## Listen to the podcast

*Asia Rising* is also the name of the podcast from La Trobe Asia, with news views and general happenings in Asia's states and societies. Subscribe now on iTunes, Stitcher or SoundCloud to hear interviews with La Trobe University academics and guests on a wide range of Asian countries and topics.



Dr Benjamin Habib (Politics and International Relations, La Trobe University) interviews Dr Robert Winstanley-Chesters (College of Asia and the Pacific, Australian National University) about the North Korean environment.





# CONSERVING CAMBODIA'S CROCODILES

The Siamese crocodile is a medium-sized freshwater crocodile, once found across South-East Asia. It was rarely seen and thought to be extinct in the wild, until 2000 when small populations were found in the remote Cardamom Mountains in southern Cambodia.

There are now thought to be less than 1000 living in the wild and it is considered Critically Endangered by the International Union for Conservation of Nature (IUCN).

The Cardamom Mountains region was one of the last strongholds of the Khmer Rouge, and turmoil in the region has meant that the fauna is poorly known. The region comprises one of the largest and still mostly unexplored forest in South East Asia.

Cambodia is investing significant efforts in their preservation, and Dr Paul McInerney and Dr Michael Shackleton of La Trobe University's School of Life Sciences are assisting with the efforts.

"Wild Siamese crocodiles numbers plummeted during the 20th century due to collection for crocodile farms, hunting, and habitat loss," says Dr McInerney. "Farmed crocodiles have since been hybridised with other crocodilian species to suit market interests, representing a significant threat to the genetic viability of captive breeding programs."



Fish constitute a large component of Siamese crocodile diets and Drs McNerney and Shackleton travelled to Cambodia to assess fish populations among release sites for captive bred Siamese crocodiles. They worked as part of a collaboration with Fauna and Flora International and The Royal University of Phnom Penh.

“There are a number of knowledge gaps in Cambodian freshwater science, and our colleagues expressed that there was a fundamental lack of expertise in fish ecology more specifically,” says Dr Shackleton. “We usually work within the Murray-Darling Basin however, our methods to assess ecosystem structure are transferable to other ecosystems, in this case tropical jungle rivers.”

Drs McNerney and Shackleton completed a pilot study at the sites to survey fish abundance and collected tissue samples to sequence DNA to gauge biodiversity. The two scientists spent three weeks sampling more than 500 fish, collecting length and weight measurements, gut contents and fin clips for DNA sequencing. All genetic information that was collected on the trip has been uploaded to an online database.

The abundance of fish among differing size classes was assessed in order to obtain an idea of the suitability of a site for the release of small crocodiles. The diets of fish were recorded so that food webs for each site could be constructed to ascertain energy pathways within the food chain.

“We came across a number of fish that didn’t match anything we could find in the database,” says Dr Shackleton. “They could be completely unknown or they just haven’t been barcoded. The places we were sampling were extremely remote with poor access, so it’s not surprising really, but it highlights some important gaps and adds knowledge of these systems.”

The Siamese crocodile is timid and largely nocturnal, making encounters in the wild rare. While collecting their samples McNerney and Shackleton only saw one Siamese crocodile in the wild.

“We spent a lot of time on the river in canoes, looking for crocodiles or signs of them, and only seeing one on the rivers of its home territory really drives home how endangered they are,” says Dr McNerney. “Although, considering I found it in the stretch of water where I was having a bath, part of me is glad I didn’t find more.”

How the crocodiles live in their potential habitat and interact with nearby humans is an important factor in choosing a suitable release site. The Cardamom Mountains is home to a number of indigenous villages, and many view crocodiles as a pest, since they often destroy the fishing nets needed to supply enough household food. Poaching has also historically been an issue in a region that is very poor.

“An important part of Fauna and Flora International’s work is in the area of education,” says Dr McNerney. “They employ local crocodile wardens, to keep an eye on released crocs and talk to the local community about the importance of looking after them and keeping them alive.

These crocodile wardens are well paid in comparison to other villagers, so they’re quickly learning the benefit of having crocodiles there.”

“In other areas on the Cardamom Mountains the crocs mightn’t have fared so well,” added Dr Shackleton. “A lot of indigenous animals like sun bears and gibbons are seen in terms of food or poaching. The crocodiles would struggle to stay alive.”

Drs McNerney and Shackleton are currently preparing a manuscript for submission that documents their findings. Their data will be used to inform Fauna and Flora International’s Siamese Crocodile Reintroduction program and form a basis for future collaborations. They also hope that it will form a platform for developing future work within the region.

“Our hope is that our research can help make an informed decision when choosing release sites for Siamese crocodiles,” says Dr Shackleton. “The Cambodian government have shown a great deal of dedication to the project, but the rarity of these crocodiles means that nothing can be left to chance when releasing them to the wild.” ●



Dr Paul McNerney and Dr Michael Shackleton with the 500th fish

# BUILDING ENERGY FOUNDATIONS

**As the global temperature increases, world cities grow, and populations boom, there is an intense desire and need for our buildings to be climate controlled. Most new building developments have a climate control feature by default, and this has intensified research into renewable and sustainable ways of generating energy.**

“The global impact of air conditioning is significant, and only going to rise,” says Associate Professor Hossam Abuel-Naga of La Trobe University’s Department of Engineering. “In China in particular the heating and cooling of buildings is a big industry, and sales of air conditioners have almost doubled over the last five years.”

Collaborating with Professor Han-Long Liu of Chongqing University in China, Dr Abuel-Naga has been exploring methods of heating and cooling buildings by exchanging heat with the ground through deep building foundations (piles).

“These new piles could be called ‘energy piles’ and can be described as dual-purpose structure elements,” says Dr Abuel-Naga.

“Buildings require a ground-concrete element as structural support, and this can also be used as a heat exchange unit.”

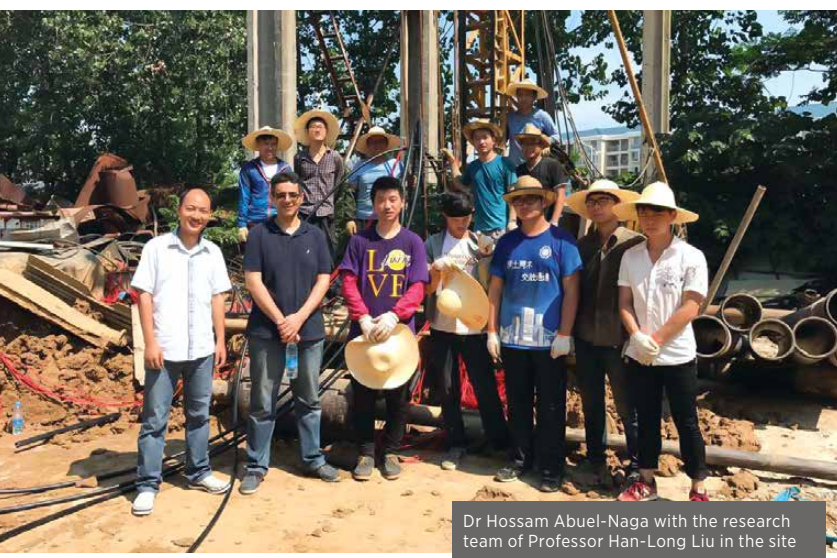
At 5 metres depth below the ground surface level the temperatures are relatively stable regardless of the ambient air temperature, and the energy piles can effectively serve as a heat sink for the heat pump (HP) system.

“In the heating mode, the HP extracts heat from the ground through energy piles and pumps it via a refrigeration cycle into the building,” says Dr Abuel-Naga. “In the cooling mode, the reverse occurs, with heat extracted from the interior of the building and rejected into the earth through the energy piles. The energy pile design differs from the conventional pile as it is subjected to mechanical and cyclic thermal loads, so more research is needed in this field.”

Several full-scale field tests of energy piles have now been installed by Professor Liu’s research group in China, and the results of these tests can further develop and refine the engineering behaviour of the energy piles and heat exchange process. So far the successful collaboration has resulted in two published journal papers, and Dr Abuel-Naga has been named an Adjunct Professor of Chongqing University.

Dr Abuel-Naga and Professor Liu have also been granted a patent for a method for injecting a bacteria into the soil which causes a calcite precipitation and provides a strengthened foundation for building.

They hope that their success will contribute to energy solutions in Australia and China as well as encourage future collaborations between both institutions. ●



Dr Hossam Abuel-Naga with the research team of Professor Han-Long Liu in the site







# DEATH ANXIETY IN ASIAN CULTURES

**Social psychology research has shown that the anxiety about death can have negative impacts on wellbeing and social behaviours. While much is known about responses, the strength of death anxiety and how it may vary across cultures is still unknown.**

“Humans are shaped by cultural and personal experiences, and anxiety at the thought of death can vary greatly,” says Dr Emiko Kashima, an Associate Professor from the Department of Psychology and Counselling at La Trobe University. “In China it is taboo to talk about or mention death in public. It’s this taboo that seems to be at the base of Chinese concerns against notifying terminally ill patients of their imminent death. In western countries there could be a greater reliance on faith in an afterlife. All of this shapes how we feel about death.”

Dr Kashima’s research examined the awareness of mortality across four distinctly different cultures - Australia, China, Japan and the United States. Working with Professor Shihui Han of Peking University in China and Dr Kuniaki Yanagisawa from Kyoto University, participants underwent two different experiments.

“Subjects in Japan and China were scanned using an fMRI while being

briefly exposed to death-related words,” says Dr Kashima. “This let us study the immediate response to the concept of death. The threat detection in the brain activates very quickly, and it triggers another wave of activities to counter-regulate the threat reactions.”

“In Japan we found evidence that stronger death-anxiety was associated with greater activities in brain areas associated with rewards, which is interesting. Otherwise, we found that the biological responses are quite similar regardless of the home country, although more research is required.”

The second experiment involved participants completing a questionnaire on subjects such as faith, preparation for death, grief, and superstition.

They were asked to mark their response on a grading scale, and the results were compared by country of origin, religion, and gender.

“We found that there is much more anxiety about death in Japan and China than there was in Australia and the United States, and Chinese respondents by far felt the most angst,” says Dr Kashima. “In all countries, women were consistently much more anxious about death than men. We also found that anxiety about death goes down with age



**Dr Emiko Kashima**  
ASSOCIATE PROFESSOR, DEPARTMENT OF PSYCHOLOGY  
AND COUNSELLING, LA TROBE UNIVERSITY

in every country except for Japan, where it always stayed relatively high.”

“These results show that all humans have similar biological responses, but society and culture are important influencers on how we experience death anxiety. Those in Australia and the USA were predominantly Christian (thus believe in an afterlife), and interestingly, more religious people reported more death anxiety in these countries. In China and Japan, in contrast, religiosity and death anxiety were totally independent.”

In the future Dr Kashima would like to extend the results to other countries and compare how death anxiety relate to diverse human motivations across cultures. Her results will also provide valuable data in fields of health and stress research. ●



# THE LEGISLATION OF ALCOHOL

China is a country with an alcohol problem. It is one of the few places in the world where there is no minimum age for purchasing alcohol, and it has limited legislation regarding its sale, manufacture or marketing.

When alcohol is exported to China, notices relating to legal limits, alcohol content or standard drink amount are removed, with custom Chinese labels maximising the lack of regulation.

“When it comes to alcohol there really is no restrictions or policing,” says Dr Jason (Heng) Jiang, a research fellow in the Centre for Alcohol Policy Research (CAPR) at La Trobe University. “International companies take advantage of this

absence - why attempt to limit alcohol intake if you aren't required to by law?”

Dr Jiang grew up in the Hubei province of China and remembers being a child and buying alcohol for his relatives. There was little attempt to inform or educate the strong drinking culture.

“Alcohol is everywhere in China and it is a strong part of the way of life and culture,” says Dr Jiang. “It is

easy to buy, it is advertised everywhere, and there's no desire to limit or legislate it.”

Dr Jiang has been researching the implementation and effectiveness of alcohol and drug policy, with a particular focus on Asia. He collaborated with Chinese alcohol epidemiology and policy researchers at the Central South University, Changsha, Hunan, to conduct a review of journal papers with a focus on alcohol consumption across eight different Asian countries.

“We found that alcohol consumption per capita in Asian countries is comparatively lower than western countries, but those that are drinking are drinking a lot,” says Dr Jiang. “In countries like





India, South Korea, Thailand and Vietnam it's very pronounced. Asia has become the fastest growing alcohol market - with over 30% of global alcohol sales in 2014, and an estimated increase of 176% from 2000 to 2019."

"This is of major concern as the effects of excessive alcohol consumption can be life changing. Alcohol can lead to problems with physical and mental health, it affects the family and society, it leads to all kinds of social problems like stress, violence, injuries, suicide, sexual and other risky behaviours."

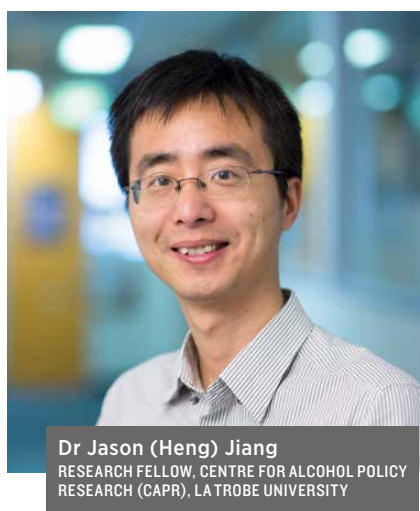
The review also highlighted that the drinking problem within the youth population of Asia is predominantly amongst males. In the majority of Asian countries in the study, over 15% of total deaths among young men and

6% among young women aged 15-29 years are attributable to alcohol use.

"There's a high cost associated with excessive drinking in Asian cultures, and it's the youth that is paying for it," says Dr Jiang. "Effective alcohol control policies are the potential means to reduce harmful use of alcohol and related harm among young people in Asia."

Most countries in the world have effective alcohol policy, such as restricting purchase and consumption to 18 or 21 years, strict legislation in place dictating use of advertising, licensing of sales, and labelling requirements for alcoholic containers.

In Asia there is a range of approaches - from no age restrictions in China and Cambodia, to the sale of alcohol to Muslims being legally banned in Pakistan.



**Dr Jason (Heng) Jiang**  
RESEARCH FELLOW, CENTRE FOR ALCOHOL POLICY  
RESEARCH (CAPR), LA TROBE UNIVERSITY

"Many countries around the world have implemented effective policies to restrict harmful use of alcohol, or just make the practice of excessive drinking less attractive," says Dr Jiang. "Asia is falling behind in this. It is seen as the next big market for alcohol sales, and manufacturers are making the most of the unrestricted opportunities."

Dr Jiang is now working on a new project examining the effects, effectiveness and cost benefits of alcohol tax in reducing risky drinking among populations in Australia. It is an intensely debated issue, and he hopes his research will provide the data needed for effective alcohol tax reform.

The study is being funded by a National Health and Medical Research Council (NHMRC) grant.

The research will also provide a model for alcohol tax and pricing policy analysis which can be applied to other countries. This would give researchers the opportunity to draw comparisons and assess effectiveness with their own alcohol tax policies.

"While controlling alcohol price is one way to reduce the access to alcohol and limit drinking, it can be deeply unpopular, particularly with alcohol manufacturers and retailers," says Dr Jiang. "Careful research is required to provide national health, and that is what our data will provide in Australia." ●

**In the past three decades Indonesia has made significant progress in economic and human development, resulting in a longer life expectancy and a growing population of older people. Reforms to the nursing profession in the past decade have laid the groundwork for addressing some of these concerns, although widespread implementation of new government policies around access to healthcare for all is challenging.**

In 2015 Dr Sonia Reisenhofer travelled to Surabaya, the capital of the East Java province of Indonesia, and became aware of the need for ongoing professional education for nurses working in Indonesian hospitals. The medical system is extensive, with more than 2.5

million nurses across Indonesia; providing nursing care for a population of more than 261 million people.

“Nurses are a crucial part of any healthy country, but to remain relevant and provide the best possible care for a patient they need regular professional development,” says Dr Sonia Reisenhofer, a researcher from the School of Nursing and Midwifery at La Trobe University.

Dr Reisenhofer and a team of educators are working closely with Dr Hans Wijaya, CEO of National Hospital Surabaya, to better understand and meet the post-registration education needs for nurses across Indonesia.

“In Indonesia there are two issues that have created a sizable gap between doctors and nurses,” says Dr Wijaya. “The first is a cultural perception that nurses are the servants to doctors. We need to change that mindset but that is going to take time.”

“The second is a lack of leadership skills and specialisation amongst current nurses, and to address and encourage these qualities, we need to ensure they are instilled from the first day of training and supported after nurses start working in the healthcare environment. Indonesia needs to be prepared to meet the challenges of a large and ageing population, and we need well-educated, confident nurses.”

Dr Reisenhofer and her colleagues from La Trobe University and Universitas Pelita Harapan in Jakarta are using a survey tool developed by the World Health Organization to assess the post-registration education of nurses. The survey explores the needs of nurses including improved clinical skills, advanced practice roles, mentoring junior staff, and communication skills with patients, colleagues and senior staff. More than 1300 nurses have already responded to the survey and the team is looking forward to deepening their understanding of what nurses state they need to enhance their nursing practice and improve patient outcomes.

“Nursing is a relatively lowly paid profession with a need to enhance professional respect in Indonesia, but nurses show an intense desire to help their patients and they desperately want to provide the best care,” says Dr Reisenhofer. “With the relationships we are currently developing in Indonesia, La Trobe University is in an excellent position to support the existing post-registration education sector and address some of these challenges.” ●

## Supporting Indonesia's nurses

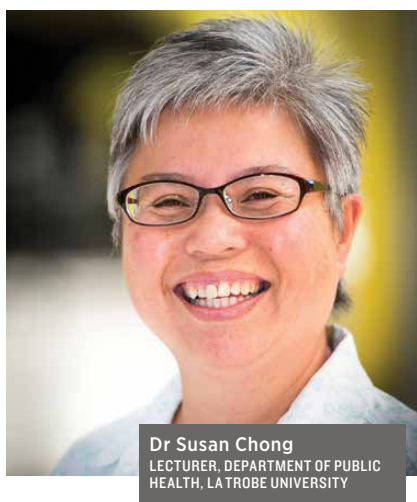


Dr Sonia Reisenhofer, Professor Lisa McKenna, Dr Hans Wijaya, Professor Rachel Huxley and Associate Professor Anthony McGillion.



# MALAYSIA'S HIV DILEMMA

The first cases of HIV and AIDS in South East Asia were reported in the 1980s, and since then countries have been experiencing concentrated epidemics affecting key populations. There has been a dramatic reduction in new cases reported as major advances have been made in treatment therapies and the scale-up of prevention.



**Dr Susan Chong**  
LECTURER, DEPARTMENT OF PUBLIC  
HEALTH, LATROBE UNIVERSITY

Malaysia fits this pattern, with 112,000 reported cases of HIV in 2016. Dr Susan Chong, a lecturer in the Department of Public Health at La Trobe University, believes that although Malaysia has made significant progress managing the epidemic, particularly among people who inject drugs, strategies are needed to tackle the rise in HIV cases through sexual transmission.

“Any money spent on HIV is needed, but the majority of the HIV budget is allocated to the broad area of treatment,” says Dr Chong. “This leaves the small remainder for prevention, particularly to stem sexual transmission.”

Dr Chong has worked in the field of HIV and AIDS for more than 25 years, and had previously coordinated an Asia Pacific network of non-government organisations. Her



AIDS awareness ribbon outside Pavilion Kuala Lumpur (2016)

current research is focused on hepatitis C treatment, HIV policy and advocacy for those living with the disease.

“Unfortunately, the Malaysian public associates HIV with illicit and illegal behaviors. This is fueled by sensationalised media coverage of law enforcement raids on brothels, gay venues or rounding up drug users,” says Dr Chong. “The threat of arrest causes considerable worry among marginalised populations and the community workers who work with these groups. It drives them underground, and makes it a challenge to reach out to them and discuss HIV prevention and treatment.”

Dr Chong is working with Professor Adeeba Kamarulzaman from the University of Malaya to research what causes the delay in treatment seeking among people living with HIV. A preliminary survey has been conducted, with the aim to further extend it throughout Malaysia.

“A very high percentage of people living with HIV are not presenting to hospitals in time to be effectively treated,” says Dr Chong. “By understanding their motivation we can start to encourage people who are at risk to test for HIV, and if infected, to start anti-retroviral treatment.” ●

# FIGHTING PEAR SCAB

‘Pear scab’ is a fungal disease that causes costly economic losses in Australia’s agricultural industry. It results in lesions on the fruit, making it undesirable and unmarketable to customers and supermarkets.



More than 100,000 tonnes of pears are produced in Australia each year, but a crop can be heavily reduced by fungal infections. The fungus can spread quickly and the current preventative treatment involves spraying crops fortnightly with pesticides, especially during damp weather conditions which are favourable for disease. Finding a solution to pear scab disease would mean an increased crop yield and greater profits for the agricultural sector.

“There are two distinct species of pear scab fungi: *Venturia pirina*, which targets European pears, and *Venturia nashicola*, targeting Asian pears,” says Dr Kim Plummer, a Senior Lecturer in the Department of Animal, Plant and Soil Sciences at AgriBio, La Trobe University.

“While the European pear scab fungus is found all over the world, the Asian pear scab fungus is only found in Asia. This means Asian pears (e.g. nashi) can be cultivated in Australia and around the world (outside Asia) without excessive fungicide spraying for scab control.”

The two pears are distinctly different - European pears are generally green, have soft flesh when ripe and have stronger flavour, perfume and taste, compared to Asian pears which often have tan skin and more firm, crunchy flesh with a milder taste. The respective fungi are specialised to their pear hosts. They cannot infect the other pear, and neither will infect a Eurasian pear hybrid. Finding out the reason for this is the key to increasing a pear’s resistance to scab disease.

Dr Plummer leads a team at La Trobe University’s AgriBio which has successfully sequenced the genomes of both fungi. One of her team, PhD student Shakira Johnson, has made two trips to Japan to collaborate with Professor Hideo Ishii of Kibi International University Minami-Awaji, Hyogo, Japan.

“Working with Professor Ishii has been important to the project, and he has a significant reputation in the field,” says Shakira Johnson. “It is from this collaboration that we were able to get samples of the Asian pear scab fungus which were used to sequence the genome.”





Shakira Johnson (PhD student), Dr Kim Plummer (AgriBio) and Olivia Lines (Honours student) working towards solutions for pear scab control.

Shakira Johnson is supported with an Australian Postgraduate Research Award, a scholarship top-up from the CRC Plant Biosecurity, and travel scholarships from the Australia-Japan Foundation, Phytopathology Society of Japan and the Australasian Plant Pathology Society.

The research project is a collaboration between scientists from Kibi International University, Japan; Plant and Food Research New Zealand; Massey University, New Zealand; and the National Institute of Horticultural and Herbal Science, Rural Development Administration Naju, Korea.

The complete fungal genomes have been used to identify hundreds of proteins that the fungus secretes during infection of pears. Some of these proteins may be recognised by the resistant pears to then mount a defence against the attacking fungus.

“The next step is to test the individual fungal proteins to determine whether the resistant pears can react to individual fungal proteins, thus preventing infection by the opposite fungus,” says Dr Plummer. “Once we’ve determined which genes are responsible we can use those in cultivating future generations of pears which have a better resistance to the fungi and don’t need spraying for scab disease.”

Future applications include comparison with the closely related apple scab fungus, development of fungal detection procedures, and further development of more marketable pear characteristics.

“There’s a lot at stake for global food production in this research, which is demonstrated by the variety of institutions involved in the collaboration,” says Dr Plummer. “A potential solution to the pear scab fungi could also have

implications for the related apple scab fungus. Sequencing the genome could also mean the development of harder pears that appeal to different markets.”

The mapping of genomes can also lead to the development of new diagnostic tools for detecting the pear scab fungi, which could potentially be used to ensure the Asian pear scab fungus never enters Australia.

Resistance to pear scab fungi would also mean a higher crop of scab-free fruit, and reduce the need for pesticides which have both an environmental and economic cost.

“About a third of the crops grown worldwide are lost due to interference by pests and pathogens,” says Dr Plummer. “By working to prevent these fungal diseases we’re taking valuable steps towards increasing the crop production.” ●

# A SUCCESSFUL FORMULA

The flow of water through soil is a crucial aspect of agriculture, and a research collaboration between La Trobe University and Kyushu University in Japan has been studying the theoretical mathematical framework of the process.

The research is headed by Professor Philip Broadbridge from La Trobe University's Department of Mathematics and Statistics and Professor Kenji Kajiwara from the Institute of Mathematics for Industry (IMI) at Kyushu University in Japan. They formed a strong working relationship after meeting five years ago at an international conference.

"We both found we had an interest in the application of discrete integrable systems to boundary value problems," says Professor Kajiwara. "Professor Broadbridge is interested in continuum aspects, while my focus is discrete. We've found a common ground for mathematical modelling and it has led to a productive collaboration for us."

Their joint research has resulted in the publication of a paper in the journal *Studies in Applied Mathematics* with more in development.

"There is a lot of potential for practical applications when approximating the conservation laws in nature, in particular for water volume," says Professor Broadbridge. "Integrable discrete systems can model water flow through unsaturated soil, which is very important in fields such as agriculture and civil engineering.

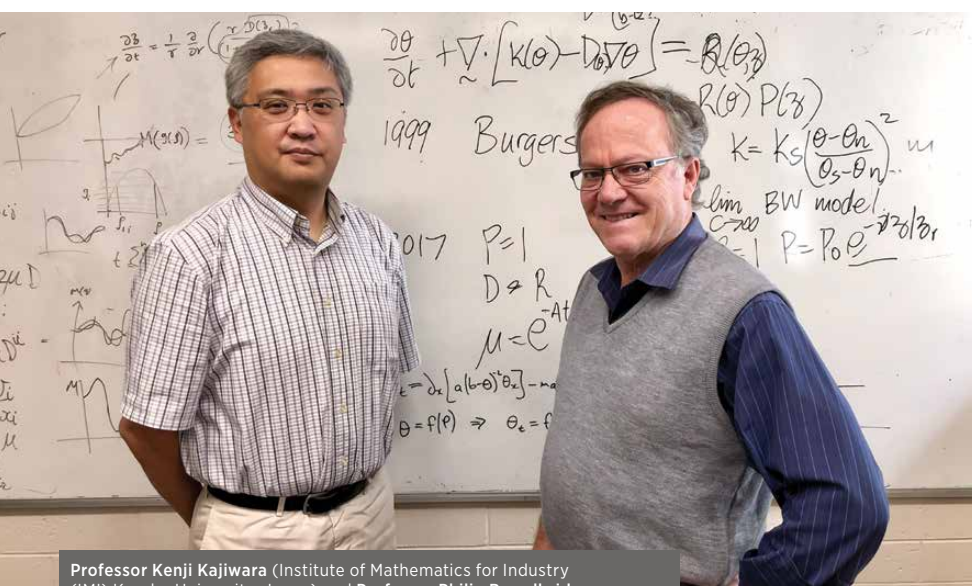
"For example, a classic boundary value problem would be to predict the water distribution beneath the soil surface that has a prescribed irrigation schedule. External factors

such as water absorption by roots during the supply to plants could help to establish fundamental discrete model practical applications."

This is just one of a number of collaborations between La Trobe University and Kyushu University, with further projects in agriculture, education and political sciences. The hope is that these will lead to a closer formal working relationship between the two universities.

La Trobe University also hosts the Australia Branch of the Institute of Mathematics for Industry, a Joint Use Institute funded by the Japanese Government. A current visitor from Kyushu is Dr Daniel Gaina who works on the logical foundations of computer science.

"Kyushu University has the reputation as one of the foremost institutions for mathematical sciences in the Asia Pacific, and there is much we can gain from working with each other," says Professor Broadbridge. "It's a crucial part of maintaining a strong regional scientific community." •



Professor Kenji Kajiwara (Institute of Mathematics for Industry (IMI), Kyushu University, Japan) and Professor Philip Broadbridge (Department of Mathematics and Statistics, La Trobe University).





This issue features  
La Trobe University  
collaborations with...

## CONTACT DETAILS

**La Trobe Asia**  
La Trobe University  
Melbourne Victoria 3086  
Australia  
**T** +61 3 9479 5414  
**E** [asia@latrobe.edu.au](mailto:asia@latrobe.edu.au)  
**Twitter** @latrobeasia

