

BULLETIN

SECRETS OF THE BRAIN

New Insights on the Brain and Consciousness



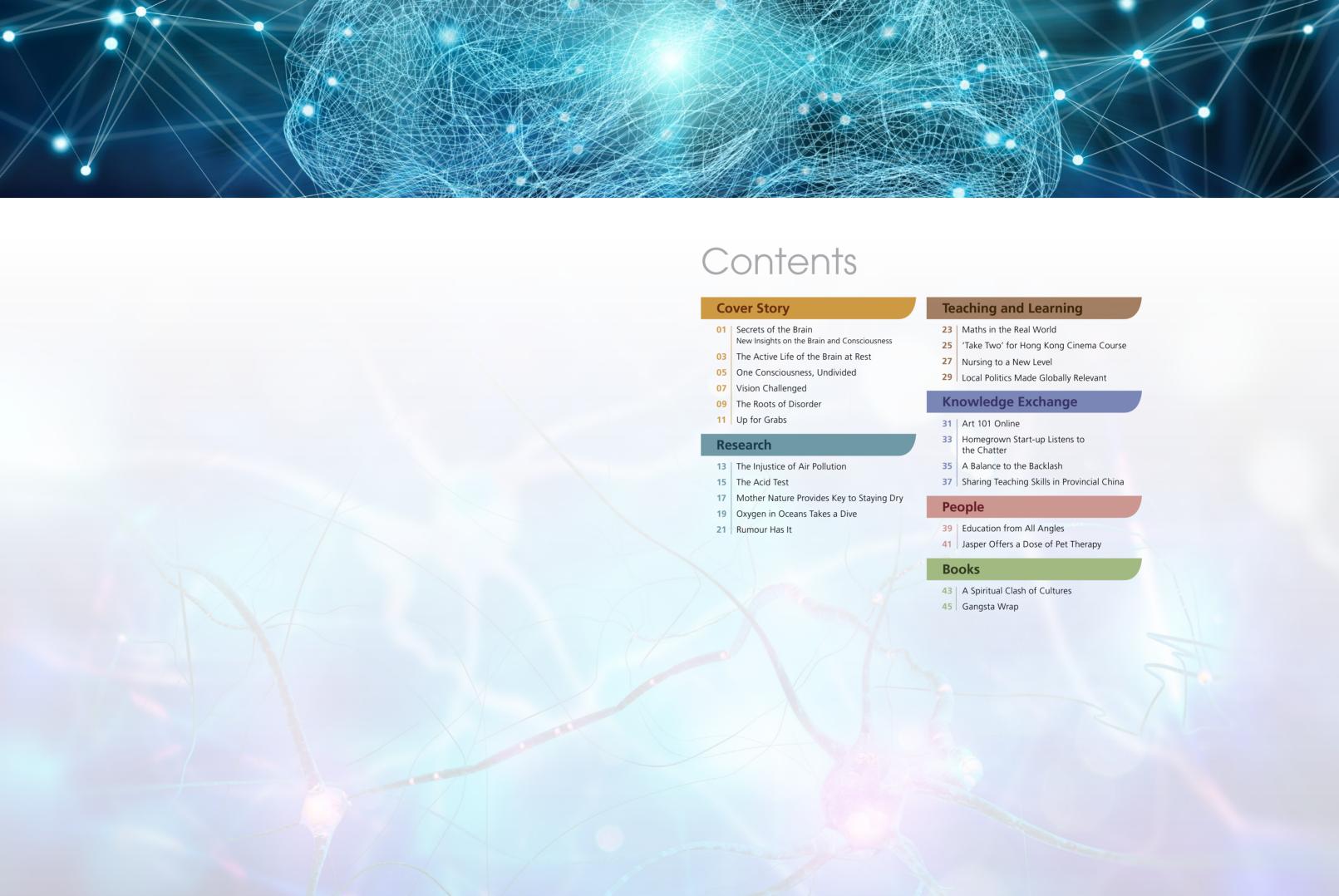
Getting to Know You Jasper – HKU Libraries Resident

Therapy Dog

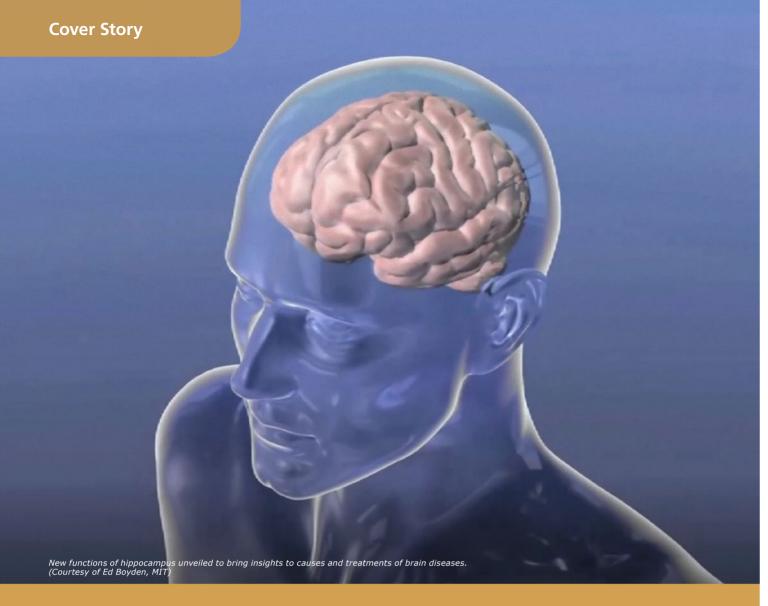


Raising the Alarm Decline in ocean oxygen threatens marine ecosystem









THE ACTIVE LIFE OF THE BRAIN AT REST

A breakthrough discovery at HKU has deepened our understanding of the 'heart' of the brain – the hippocampus – and opened a new therapeutic path for brain-related diseases.

The hippocampus is believed to play an important role in memory and navigation and it has been the subject of a countless number of studies that mostly have fired up and activated this region of the brain to try to understand how it works. But what about when it is at rest? Is it still at work?

The idea of a resting-state of the brain was first floated more than two decades ago, but neuroscientists have not been able to agree whether it even exists. Now, they may have some answers thanks to the work of a team of HKU biomedical engineers led by

Professor Ed X Wu, Chair and Lam Woo Professor in Biomedical Engineering.

The debate has focussed on whether signals picked up through functional magnetic resonance imaging (fMRI) of the brain at resting-state are just a consequence of blood flowing through multiple interconnected regions or signs of actual large-scale neural activity.

Professor Wu's inspired approach to this problem was to apply a basket of tools and measures, including one drawn from the team's earlier work on the somatosensory thalamus that was published in 2016 in the *Proceedings of* the National Academy of Sciences of the United States of America (PNAS).

The thalamus is a region of the brain that acts as a relay for communication among sensory systems and the somatosensory system concerns touch, pain and the like. Previously, it was thought that communication was self-contained within each sensory system, so for example the somatosensory thalamus only communicated with the somatosensory cortex. But the researchers showed that at the low frequencies measured through resting-state



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Professor Ed X Wu

fMRI, different sensory networks actually connected to each other. Somatosensation talked to the visual and auditory senses, so to speak. This offered a possible explanation of how the brain integrates different sensations.

Light work

The finding influenced the team to look further and investigate the effect of low-frequency stimulation in the hippocampus, said Dr Alex TL Leong, who with Dr Russell W Chan is one of the key members of Professor Wu's team.

"The role of the hippocampus in complex brain networks has not been well understood. The literature will tell you that there are many functions that it is important for, but at the end of the day there must be a unifying observation or underlying principle of how the hippocampus actually functions in the brain," he said.

To edge closer to that goal, the HKU researchers applied several kinds of investigations that both activated the hippocampus at low frequencies and revealed the impact on brain functions.

They first combined fMRI with optogenetics, in which they genetically modified excitatory neurons in rats' hippocampus so they were sensitive to light. An optical fibre delivered the light stimulation so the hippocampus could be turned 'on' at different frequencies, with the low range as low as 0.5 to 1 Hz. This resulted in the first important finding: at low frequencies, multiple areas beyond the hippocampus lit up, especially in the visual cortex, but at high frequencies, activity was confined to the hippocampus.

Secondly, they found that low-frequency stimulation enhanced the connectivity of large-scale resting-state fMRI sensory brain networks, including visual, auditory and somatosensory, and augmented sensory functions.

Signals during resting-state

"We already knew that the hippocampus interacts a lot with the cortex at high frequencies, particularly when it comes to memory functions. But here we show that this interaction is predominant at very low frequencies, too," Dr Leong said. This finding indicated that there was an underlying neural basis to the fMRI signals picked up from the brain at resting-state.

The researchers also tested whether disrupting normal hippocampus function would affect the results. They did this by knocking out the hippocampus pharmacologically, which caused connectivity to drop immediately in the treated rats. If the results had still held, that would have indicated the hippocampus was not involved in enhancing brain connectivity.

The findings were published in *PNAS* in August, 2017 and received widespread coverage in the scientific and popular media. Professor Wu said the implications extended beyond simply understanding the brain.

"Only when we understand the functions of the brain circuits or networks can we then design new therapeutic measures which are more effective for treating or curing brain disorders, such as Alzheimer's disease, epilepsy and schizophrenia," he said, adding their work complemented ongoing, high-level projects to understand the brain that have been initiated by both the Chinese and American governments.



From left: Dr Russell W Chan, Professor Ed X Wu and Dr Alex TL Leong.



ONE CONSCIOUSNESS, UNDIVIDED

Experiments using signals delivered to the unconscious mind have reduced the physical effects of phobia. The findings have implications for treatment and for our understanding of human consciousness.

The unconscious mind – when neuronal activity occurs (as recorded in functional magnetic resonance imaging, or fMRI) but there is no corresponding awareness of conscious experience – has an almost mythical status thanks to Sigmund Freud, who was a great populariser of its influence over our actions and conscious selves. But among philosophers and psychologists, its nature has been much debated. Is it really separate from the conscious mind? What determines whether neurons are conscious or unconscious?

Dr Lau Hakwan of the Department of Psychology, who trained as both a philosopher and neuroscientist, has entered into the fray with the modest goal of seeing whether a little science can shed light on the matter.

"Philosophy, after centuries of thinking, has led us to this point where we think the qualitative subjective experience is the core crucial conceptual component of consciousness. But how do you actually translate that concept into an experiment?" he said.

Working with an international team of collaborators, he helped design and run an experiment on phobias that was able to tap into the unconscious mind and transmit more pleasant signals when phobia-associated signals arose. The results were published in the *Proceedings of the National Academy of Sciences of the United States of America* in March, 2018.

The methodology they used was complicated and involved bypassing the conscious brain so as not to trigger the phobia directly. This was important because otherwise subjects might quit or be resistant to the experiment.

Counter-conditioning

Unconscious representations of phobias were first mapped by showing subjects photos of creatures that were related to their phobias,



The experiment here is basically a way of going under the conscious hood, trying to tamper with people's unconscious representations and hoping that would actually change their everyday experience.

Dr Lau Hakwan

but themselves not frightening (for example, other insects or reptiles if they feared spiders or snakes) while they underwent fMRI. The researchers were able to see the detailed pattern of areas of brain activity triggered by the images and this guided them in the main part of the experiment, which was to associate those patterns of brain activity with a positive reward.

The subjects played a game that used unrelated images to tap into the target unconscious regions and were told that they had won money whenever those patterns of brain activity representing the phobic objects were activated.

"This approach comes from a method in psychology called 'counter-conditioning'. You re-expose the patient to the feared object and try to re-associate that object with a positive rather than a negative feeling," he said.

"The problem is, people tend not to enjoy that very much. In extreme cases, like posttraumatic stress disorder (PTSD), asking people to live through trauma is very difficult. As a neuroscientist, I have tried to translate exposure therapy into the brain by pairing a good feeling with the brain representation of the feared object."

The results were intriguing because while the subjects subsequently had a lowered physiological response after seeing a photo of their feared object – such as sweating less and having less activity in the associated region of the brain – they did not report that they felt any less afraid.

"The experiment here is basically a way of going under the conscious hood, trying to tamper with people's unconscious representations and hoping that would actually change their everyday experience," Dr Lau said.

"We have definitely done something about the brain-fear response, but it has not yet translated into the conscious experience."

The 'hard' problem

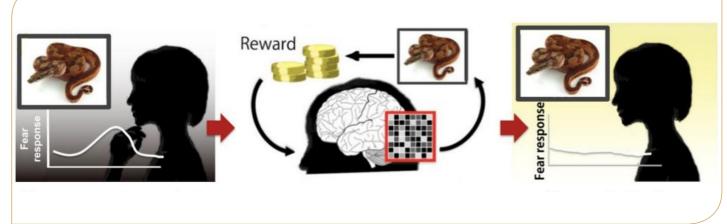
The results are nonetheless important both for possible treatment of such things as PTSD – particularly as it can bypass the triggers of stress or fear – and for our understanding of the interplay between the unconscious and conscious mind.

"If it were true that one part of your brain is conscious and one part not conscious, and the two work independently, then tampering with only the unconscious part may not do much good. It would just help the unconscious part to be less afraid, but you would still consciously be afraid.

"We, on the other hand, think that these are the same representations in the brain for both processes. So tampering with the representations when you are unconscious would eventually translate to a conscious experience. That's what we plan to demonstrate next."

Dr Lau concedes that consciousness is a difficult thing to solve entirely through science – it is not trivial to explain why subjects should feel a certain way when neurons can be seen firing, even if we can map out the patterns of such firing. For this reason, and also because of modern resistance against the Freudian perspective, it is often challenging to get funding for projects about consciousness.

"In philosophy we traditionally think of consciousness as the 'hard' problem because it is not easy to explain the subjective from the objective and scientific point of view. But a problem doesn't have to be a scientific problem for science to shed light on it," he said.



By learning to pair a reward with the unconscious activation of the brain pattern representing the animal, participants can overcome the fear response to an animal.



VISION CHALLENGED

How we see objects in the world may depend on what we are looking at. This finding is upending our understanding of the workings of the brain.

Studying vision and how we process what we see is a popular and accessible way for neuroscientists to study the brain. For a long time, they thought they had some things worked out: vision was guided by a hierarchical system divided into basic low-order tasks, such as orientation, luminance, depth and motion, and high-order tasks that impart meaning and recognition to the things we look at, with different parts of the brain responsible for each. But research by young scientists like Dr Dorita HF Chang of the Department of Psychology is showing that vision processing, like many matters to do with the brain, is a lot more complicated than the early science indicated

Dr Chang has been focussing on low-order functions in particular. The original thinking was that these were processed almost independently, so if an object moved up or down, the neurons responsible for motion would simply detect the motion and let the

regions responsible for high-order tasks deal with identifying the object.

But Dr Chang has found otherwise. In a series of experiments, she has demonstrated that the nature of the objects can alter the sensitivity of neurons, as measured by functional magnetic resonance imaging (fMRI). The more familiar an object is to us, the more sensitive our low-order neurons become to its motion. Moreover, people who are trained to become familiar with a previously-unknown object develop heightened sensitivity to its motion over time.

Put another way, experience affects what was supposed to be a purely biological function. "Ultimately, what we perceive is not just a reconstruction of which neuron is firing, but a product of experience," she said.

One object that humans are highly experienced in recognising is the human face and Dr Chang used that insight to construct tests that support her point.

In one line of experiments focussed on 3D vision, subjects were asked to indicate whether an object was in front of or behind a reference point while their brain activity was also monitored with fMRI. The object was a simple surface or a face, and it turned out that not only did the two affect position judgments differentially, but there were also more depthrelated neurons activated in the brain in response to faces during the task. An upsidedown face was also used but it did not have the same impact on sensitivities as a face with upright orientation.

Advantage of recognition

"The result was surprising because technically, the task did not involve processing what the object was or its orientation," she said.

"The whole novelty of this research is that the networks we are looking at are not solely modular or standalone. 3D sensitivity would be



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Dr Dorita HF Chang

considered a low-level feature and you would think it should not be influenced by higher-level meaning, but that seems to be happening here."

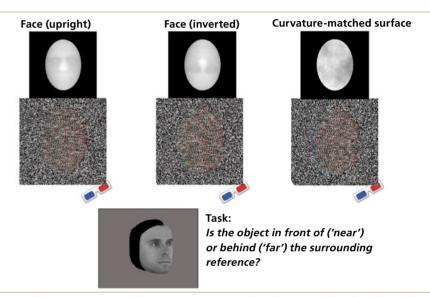
Another set of experiments focussed on the luminance (reflection of light) of objects. Participants were asked to indicate which of two objects was more luminous. There were various pairs of objects – patches of colour, upright faces, upside-down faces, faces of a different race than the participant, and faces of a similar race. Previous studies on high-order processing had shown that people are better at processing faces of their own race. It now turns out that this advantage also holds for low-order processing, too.

"The traditional school of thought would have said that race shouldn't matter because luminance sensitivity is an early critical response and shouldn't be modulated by meaning. But again, we have found that basic visual responses somehow get modulated by this contextual information," she said.

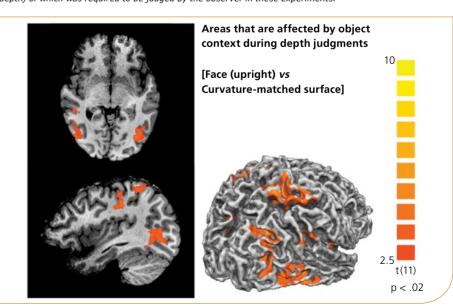
Dr Chang has also begun to study how the brain processes sound, to see how visual training affects auditory processing and *vice versa* – which would lend further support to the notion that the hierarchical, compartmentalised view of the brain needs a rethink.

"We've been showing that we really need to consider an interaction between brain regions to support visual functioning, and to extrapolate that to understand interactions between vision and other modalities as well," she said.

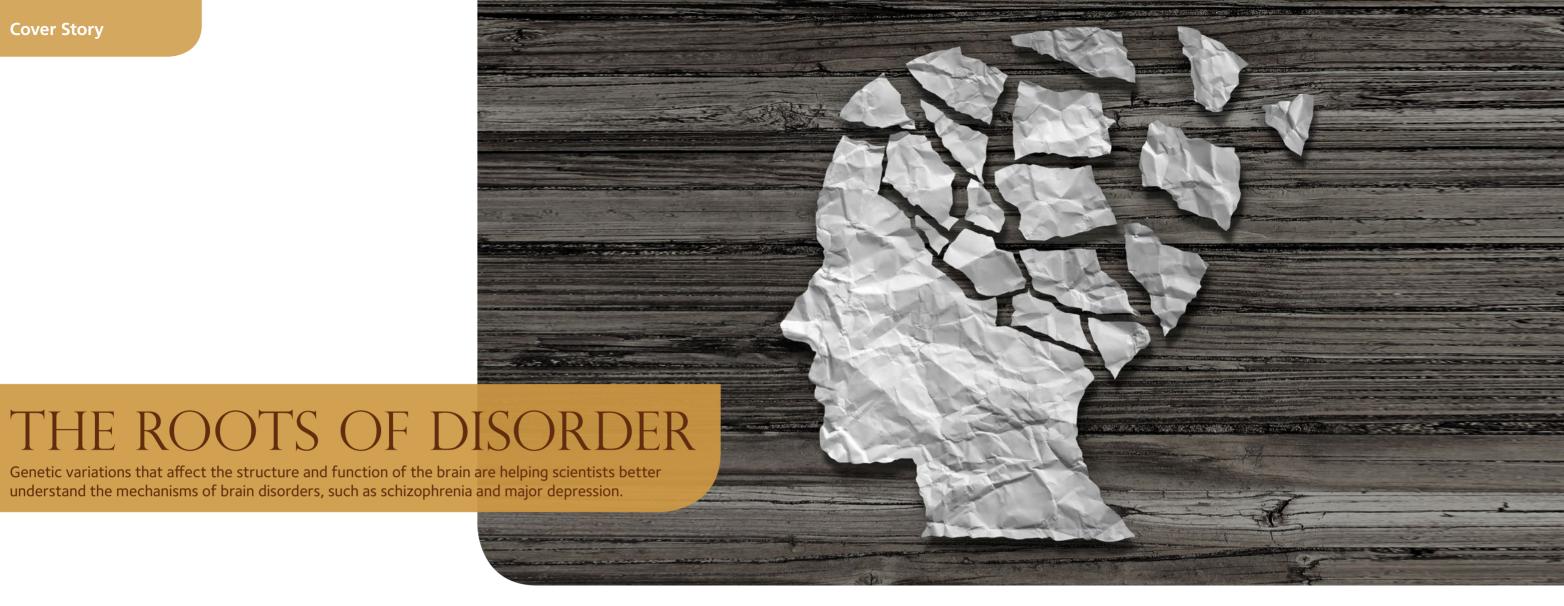
Getting a clearer picture will be a long slow process, given the complexity of the brain and the fact that this line of investigation represents a paradigm shift in our understanding of how the brain functions. "One hundred years from now, we'll know a lot more," Dr Chang added.



Sample images shown to participants in the 3D experiments. Faces (upright or inverted) and non-face surfaces were depicted in terms of special 3D stimuli called stereograms. These stereograms provide separate images to the left and right eyes when special glasses are worn. The resulting percept is of an object in 3D, the position (in depth) of which was required to be judged by the observer in these experiments.



fMRI results from the 3D experiments superimposed on the brain of a representative participant. Depth judgments don't require explicit identification of object content. Yet, human observers' behavioural sensitivity to judging the position of objects along the depth plane is significantly altered by object meaning. Corresponding context-based modulations of depth responses are found along intermediate (V3), dorsal (parietal), and ventral (inferotemporal) cortex.





We now have a number of new leads into the molecular changes associated with schizophrenia although there is still a long way to go before we have a detailed understanding of the mechanisms.

Professor Sham Pak-chung

The astonishing frontiers that have opened over the past decade or so with the completion of the human genome project and the development of new genotyping technologies are leading to a deeper understanding of the brain and the potential for new treatments for disorders. Professor Sham Pak-chung, Suen Chi-Sun Professor in Clinical Science and Chair Professor of Psychiatric Genomics, has been at the forefront of this research.

He participated in an international consortium that in 2014 reported on the largest molecular genetic study of schizophrenia or any psychiatric disorder, a genome-wide association study (GWAS) involving 36,989 schizophrenia patients and 113,075 controls. The researchers were able to detect 108 genetic loci (positions on a chromosome) associated with schizophrenia, a disease for which there currently are no biomarkers or diagnostic tests.

"We have known for a long time that psychiatric disorders are likely to be complex and involve multiple genes, but we didn't really have a good idea of how complex they are. It

was only with the GWAS that we have been able to get answers," Professor Sham said.

They also showed that the associations were not random but converged on genes expressed in certain tissues and cellular types. Schizophrenia was associated with proteins involved in synaptic function – synapses are the connections that allow neurons in the brain to communicate with each other - as well as certain neurotransmitters. While it was previously known that the neurotransmitter dopamine played a part, the research also identified glutamate and gamma-aminobutyric acid as important, suggesting possible new targets for treatments.

Professor Sham said the findings also supported the idea that schizophrenia may have origins early in life, long before the onset of clinical symptoms, and perhaps even before birth.

The strongest schizophrenia-associated locus was found to contain a gene important in brain development. Normally, the process involves both creating and pruning back

neurons to establish properly functioning neuronal networks.

"But in animals, if this gene is excessively activated or expressed, it can lead to too much pruning of neurons. Indeed, one of the consistent differences in the brains of patients with schizophrenia is that there is a reduction in brain volume," Professor Sham said. Interestingly, they also found evidence of an overlap between genes associated with schizophrenia and those with mutations responsible for intellectual disability.

"We now have a number of new leads into the molecular changes associated with schizophrenia although there is still a long way to go before we have a detailed understanding of the mechanisms."

Other insights

Taking that understanding forward, Professor Sham and his colleagues have also been investigating the impact of genetic variations on gene expression (or activity). They gathered evidence from GWASs about the gene

expressions of seven psychiatric disorders, including schizophrenia, and compared this with the changes in gene expressions produced by thousands of drugs that have gone through clinical or pre-clinical trials. These drugs may not be in use for various reasons or may be used for other purposes, but the research showed that some of these drugs may reverse the gene expression changes seen in psychiatric disorders. Promisingly, some anti-psychotic drugs showed up as a potential match for schizophrenia and some anti-psychotics and anti-depressants for bipolar disorder. "It would be much easier to use existing drugs than to try to develop new ones," he said.

In yet another study, Professor Sham has also started looking at the genetic origins of major depression with Professor Tatia Lee Mei-chun, May Professor in Neuropsychology and Chair Professor of Psychology. They recently obtained access to the UK Biobank, which has genetic data from half a million people. They are comparing the data with brain images of 10,000 people of that group, as well as detailed health and lifestyle information drawn from questionnaires, to see how these factors

interact with each other and influence the risk of depression.

Professor Sham is also Co-Director, with Professor Lee, of HKU's State Key Laboratory of Brain and Cognitive Sciences, whose members are producing other insights on brain and mental health. For example, work by Professor Lee has shown how the brain changes in response to psychological stimulation such as meditation. Professor So Kwok-fai, Jessie Ho Professor in Neuroscience and Chair Professor of Anatomy, has shown how physical exercise may mitigate the effects of depression by reversing the reduction in neurogenesis in the hippocampus, thus enabling more new neurons to be created. And Professor Eric Chen Yu-hai, Chi-Li Pao Foundation Professor in Psychiatry, and his group have demonstrated the value of early intervention in improving the outcome of patients with psychosis.

"Our overall strategy is to improve brain health and mental well-being by creating models that can integrate brain imaging, genetics, biomarkers and human behaviour," Professor Sham said.



UP FOR GRABS

Engineers working at the brain-computer interface are developing technologies that enable people to control computer activity and even robotic devices with their minds, and reduce pain.

Imagine the scene on the paediatrics ward of the Duchess of Kent Children's Hospital when Dr Hu Yong and his team asked for patient volunteers to help test an invention that uses electrical signals from the brain to direct activity in a computer game. The response was immediate enthusiasm. "Even though they could use computers with their hands, they very much liked playing the game without their hands," said Dr Hu, a biomedical engineer who is Director of the Lab of Neural Engineering and Clinical Electrophysiology in the Department of Orthopaedics and Traumatology.

Bringing such joy is one of the aims of his research, which seeks to develop new rehabilitation technologies for the physically

disabled or impaired and improve the quality of life among the elderly. It is a fast-growing field thanks to advances in computer technologies.

The technology tested at the children's hospital is but one example of his work. The subjects there were fitted with a cap of electrodes that transmitted their brain signals to a computer as they mentally selected characters from a keyboard and moved a mouse around the screen. The technology is not yet 100 per cent accurate, but Dr Hu and his team are continuing to refine it in the hope that it may help people who cannot speak or type communicate with the world.

A more immediately promising line of work uses robotics for rehabilitation. Dr Hu and his

team have already developed a robotic hand prototype with the Institute of Biomedical Engineering of the Chinese Academy of Medical Sciences which can respond to sensory stimulation and grab objects. This won the best presentation award at the 2nd competition of China Brain-Computer Interface in 2015. The technology is being further refined to identify finger joint movements, so the potential range of movements can be increased.

"We want to see how well the hand grips, and if there is any spasm because spastic motions can cause fingers to jerk. We're trying to see if the robotic hand can make the grabbing motion smooth and fast," he said. "This could help patients with spasms but also a lot of



66 If you rely on taking painkillers, you would need to take them every day, but there are side effects to these drugs. This device can help patients feel more comfortable by reducing pain in their daily life.

Dr Hu Yong

elderly patients who have lost their normal hand function due to neurological disorders."

Trying to improve function

Dr Hu said they also wanted to use the technology to improve function, rather than simply compensate for loss of function. One line of research is trying to help patients improve control over spasms by training their neural systems. This involves applying electric stimulation to subjects' hands and asking them to mentally identify if it is the right or left hand while the computer monitors their brain activity.

Another line of exploration involves an exoskeleton that can walk and move its arms in response to signals from the brain. This could conceivably be done through voice control, but Dr Hu said employing the brain-computer interface instead could help enhance neurological repair by activating the sensory and motor neuron system. The project is expected to start in 2018 and also involves colleagues from the Li Ka Shing Faculty of Medicine and Faculty of Engineering at HKU, as well as the Hong Kong University of Science and Technology and the City University of Hong Kong.

Apart from using the brain-computer interface to enable movement, Dr Hu and his team have also developed a device that uses transcranial direct current stimulation for pain relief in patients with chronic pain. Subjects were fitted with a cap of dry electrodes and a little box about the size of a mobile phone charger that sends signals to the brain to modulate the

sensation of pain. In clinical trials, patients reported that the pain intensity was reduced by about 20 per cent on a scale of 1 to 10, in about 80 per cent of the cases. This approach could be particularly effective for problems like chronic lower back pain, which can flare up unexpectedly, he said.

"It is not easy to guess when the pain will come and go. If you rely on taking painkillers, you would need to take them every day, but there are side effects to these drugs. This device can help patients feel more comfortable by reducing pain in their daily life," he said.

He hoped to be able to translate more research into clinical applications. "My Lab's main concern is to develop new technologies that can benefit more and more people, especially the elderly. In future we may be able to provide a robotic assistant device at home that could help them with lifting heavy objects or doing simple daily activities, and improve their quality of life." he said.



Brain-computer interface (BCI) Game Centre at the Duchess of Kent Children's Hospital. A boy is playing a computer game by using BCI.



THE INJUSTICE OF AIR POLLUTION

HKU researchers show how poorer people are exposed to worse pollution than others by using an interdisciplinary approach that combines artificial intelligence, big data analytics and environmental management policy.

In 2016 *The Economist* unveiled the results of a year-long comparison of air pollution levels in 15 major cities in Asia, Europe and North America, in which Hong Kong was found to be the second most polluted, just behind Seoul. This result, coupled by growing wealth inequality in Hong Kong, motivated Professor Victor OK Li, Cheng Yu-Tung Professor in Sustainable Development and Chair of Information Engineering, and Dr Jacqueline CK Lam, Associate Professor, to embark on a study that sought to quantify the link between air pollution exposure and social deprivation through artificial intelligence and statistical techniques.

They had just established the interdisciplinary HKU-Cambridge Clean Energy and Environment Research Platform (CEERP) with the University of Cambridge and the air pollution study

became HKU-Cambridge CEERP's first major study. Its results, released in January, 2018, provide the most detailed picture yet of air pollution in Hong Kong and the populations that are most affected.

"The Government has only 16 air quality monitoring stations throughout the city, but air quality can actually change across just a few city blocks," Professor Li said. "We wanted to provide a more accurate and fine-grained estimate of air quality."

He and his team combined relevant information—including not only the Government's air quality readings, but traffic flow data, meteorological information and urban morphology—and input that into an artificial intelligence model that created 110,000 different virtual 'stations' across Hong Kong, each covering an area

measuring 100m x 100m. The model estimated the air quality for each of these areas in real time and had an accuracy of 82 per cent compared to the government readings, which was significantly better than the 50 to 60 per cent accuracy achieved by other data-driven models.

To measure the human impact of air quality, the researchers collected data on social deprivation, including income, education level, profession, and housing ownership or rental, and found that people living in the most socially-deprived areas of Hong Kong were exposed to higher levels of PM2.5 (Particulate Matter of width 2.5 microns or less), a particularly harmful type of pollutant. "There is a statistically significant correlation between social deprivation and PM2.5 exposure, leading to environmental injustice," Dr Lam said. The



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Professor Victor OK Li

districts of Yuen Long, Kwun Tong, Wong Tai Sin and Sham Shui Po were the hardest hit.

In addition to defining the problem, the researchers also suggested remedies, such as funding tree-planting, pedestrianisation, and other schemes that reduce air pollution in the most affected areas.

Personalised air pollution readings

They are also in the process of taking their research to a new level through a HK\$50 million Theme-based Research Scheme project, co-led by Professor Li and Dr Lam, called 'Big

Data for Smart and Personalised Air Pollution Monitoring and Health Management'. The project began in 2018 and is funded for five years and it will improve the quality of data collected and make the readings widely accessible to the public.

Additional data will be gathered and fed into a deep-learning artificial intelligence model to sharpen accuracy and develop forecasting capabilities. New apps will be developed to tell people their air pollution exposure at any place and time in Hong Kong. Users would also have the option of inputting information from their Fitbits or other wearable devices about their personal activity levels and other health-related

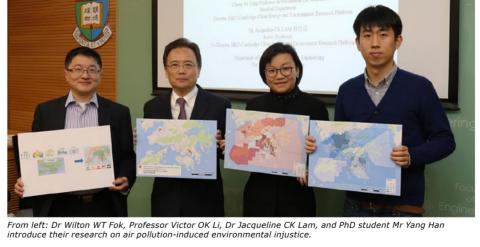
data, to obtain personalised air quality information. They may opt to receive alerts about avoiding active sports in certain areas with high pollution, or be shown how to avoid heavily-polluted areas as they move from one part of the city to another.

A more intensive health study is also part of the project. Young asthma patients will be given electronic devices to measure individual air pollution exposure, lung capacity and inhaler use to understand how these factors may be correlated. Professor Lau Yu-lung and Dr Lee So-lun of the Department of Paediatrics and Adolescent Medicine are involved in this part of the study, which is among the first of its kind internationally. Furthermore, Professor John Bacon-Shone of the Faculty of Social Sciences is also helping the team develop statistical techniques for data analysis.

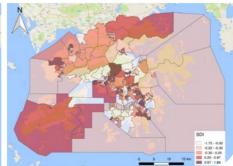
Dr Lam said they also intend to develop a happiness index to correlate air quality levels with emotional well-being.

"We will make some of this information freely available to the public," Professor Li said, adding that their work will benefit the healthcare and information technology industries, too, because they will be able to access the project's technologies and database through a licensing arrangement and develop new apps and other products from them.

The work also has relevance beyond Hong Kong. The air quality model from the first study has been applied in Shenzhen using that city's data. It is ready for adoption by other cities that want to obtain a detailed picture of air pollution exposure for their residents.







Visualisation of PM2.5 pollution estimates and Social Deprivation Index (SDI) at the constituency area level in Hong Kong. Darker colours correspond to higher values of air pollution and SDI.

Professor Li's team is currently recruiting postdocs and research associates, and anyone interested is welcome to contact him at recruit@ceerp.hku.hk



THE ACID TEST

Experts from HKU's Department of Medicine collaborated with colleagues from the Department of Pharmacology and Pharmacy on research which confirms a long-held suspicion that the long-term use of proton pump inhibitors – medicines that suppress acid production in the stomach – is associated with increased risk of stomach cancer.

Professor Leung Wai-keung, Li Shu Fan Medical Foundation Professor in Gastroenterology, and Clinical Professor of the Department of Medicine, said the study focussed on patients being treated for *Helicobacter pylori* (HP) infection and being prescribed proton pump inhibitors (PPI). HP infection is considered to be the most important risk factor for stomach cancer development, estimated to increase chances of contracting it three-fold.

He explained: "Helicobacter pylori is bacteria in the stomach. Its discovery was huge – and Australians Barry Marshall and Robin Warren won the Nobel Prize in Physiology or Medicine in 2005 for making that discovery. Prior to that, it was believed peptic ulcers were caused by stress and bad lifestyle such as sleep deprivation and spicy food. People are infected by HP bacteria as children, but for most it is asymptomatic and they only know about it much later if they develop symptoms such as pain, ulcers, bleeding or stomach cancer."

Previous studies have suggested that the risk of gastric cancer development could be reduced by about 40 per cent by elimination of HP, yet a considerable proportion of patients continue to progress to stomach cancer even after successful HP eradication.

\$60-million question

The team was able to look into the link between the two. "The reason we were able to focus on a possible link between the two was that the Department of Pharmacology and Pharmacy alerted us to the fact that they had identified a large cohort of HP patients while doing another study. This gave us the opportunity to ask the \$60-million question: does PPI usage effect the development of stomach cancer?"

To do so, they studied clinical data on more than 63,000 HP-infected patients who had received HP eradication therapy between 2003 and 2012. They discovered that 153 (0.24%) of the patients developed stomach cancer with a median follow-up of 7.6 years. During this timeframe, 3,271 (5%) of the patients were treated with PPIs, and they showed a 2.44-fold increase in risk of developing stomach cancer. More frequent use was associated with a higher cancer risk, with daily use linked to a 4.55-fold higher risk than that of a non-user.

The effects of PPI use on stomach cancer development in patients who had received HP eradication therapy were compared to non-users, after adjusting for various differences in the baseline characteristics between the two groups.

"The studies showed the longer PPIs were used, the greater was the risk of developing stomach cancer, rising to five-fold after more than a year, to more than six-fold after two or more years, and more than eight-fold after three or more years," said Professor Leung.



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Professor Leung Wai-keung



From left: Dr Esther Chan Wai-yin, Associate Professor of Department of Pharmacology and Pharmacy; Professor Leung Wai-keung, Clinical Professor of Department of Medicine; and Dr Michael Cheung Ka-shing, Specialist in Gastroenterology and Hepatology, Department of Medicine.

"We found that the long-term use of PPIs doubled the risk of stomach cancer development even after successful HP eradication. The risk rose in tandem with the dose and duration of PPI treatment."

Proton pump inhibitors are drugs commonly used for dealing with excess stomach acid, and to treat stomach ailments such as peptic ulcer, acid reflux, dyspepsia. They are sold over the counter to the patients directly in the UK and US (though not Hong Kong) and are frequently prescribed. Indeed, while acknowledging that PPI is a potent acid suppressant and an important drug, Professor Leung said it is

over-prescribed. "The possible link between PPI usage and cancer has been made before, but what is unique to this study is that it only looks at patients who had been infected with HP and who had received treatment to eradicate it."

"Other studies have looked at general patients," he added, "but this is a stronger message: Since HP therapy eradicates the infection it has been thought that it is safe to use PPIs, but this research says it is not safe. People have struggled to accept that this is true. We have had a lot of commentary on the paper and people are now beginning to accept that PPIs may have negative effect."

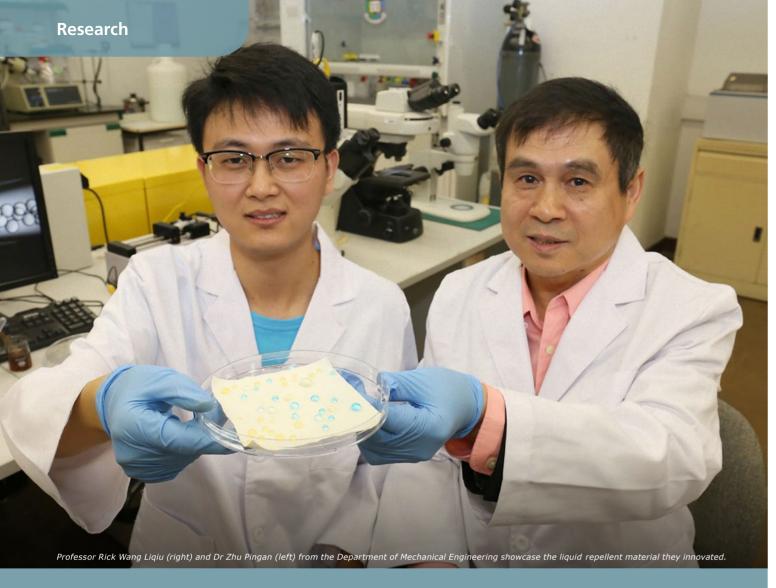
At the same time, Professor Leung emphasised: "This is an observational study and therefore not conclusive regarding causality, so we are not discouraging the use of PPIs completely but recommending that doctors regularly review the indications of a prescribed PPI and use the minimum effective dosage, frequency and duration."

Best evidence now

However, he also said that this study, though observational, "may represent the best evidence we can get for now. The next level of research would be a controlled study which randomly assigns patients to either a PPI or placebo and that is unlikely to happen for several reasons; first, ethical, it could put some patients at risk, and second, timing – the study will take many years."

He suggested that H2-receptor antagonist, a less potent acid suppressant may be a safer alternative for the patient. "It is also cheaper so why not use it?" he said. "Some people erroneously believe that the most expensive drug is the best."

The findings, which are attracting a lot of attention, have been published in the latest issue of the prestigious international scientific journal, *Gut*. They could represent a major step in the prevention of stomach cancer, which is the fifth most common cancer and the third leading cause of cancer-related death in the world. It is particularly prevalent in East Asia, accounting for more than 70 per cent of the cases globally.



MOTHER NATURE PROVIDES KEY TO STAYING DRY

When refining liquid-repellent surface technology, a team of mechanical engineers was bio-inspired.

Liquid-repellent surfaces or coatings have myriad uses – from water-repellent clothing through self-cleaning buildings to friction-reducing surfaces for ships – but until recently the technology was either too expensive to produce, too unstable or simply not robust enough. Bio-inspiration is the key to the engineering team's liquid-repellent breakthrough – material that is robust, versatile and cheap to produce. The technology has also just won the TechConnect Global Innovation Award for 2018.

Professor Rick Wang Liqiu and his team from the Department of Mechanical Engineering turned for inspiration to the springtail – an arthropod whose habitat is wet soil which is frequently flooded. Arthropods are invertebrates with an exoskeleton, segmented body and paired joint appendages and include insects, arachnids and crustaceans in their number. The springtail has adapted to its environment by evolving cuticles capable of repelling liquids and with high mechanical durability to resist friction from soil particles.

The porous surface the team designed is composed of honeycomb-shaped micro-cavities that are interconnected thereby ensuring stability, and which have a re-entrant structure which in turn ensures highly effective liquid repellency.

Professor Wang said: "The robust liquidrepellent structure is 21-times more mechanically stable than similar surfaces. The key to the technology is the unique design of the liquid-repellent structures and the



Our liquid-repellent structures can repel at least 10 types of liquids, including surfactant solutions and organic solvents, as well as oil and water.

Professor Rick Wang Liqiu

microfluidic-droplets-based fabrication. The former resolves effectively the conflict between liquid repellency and mechanical stability, while the latter offers low-cost and scalable production of well-defined structures with precision and controllability."

Oil and water

Comparing the new product to existing ones, Professor Wang said: "Other technologies can repel oil or water, ours is capable of repelling both. In fact, our liquid-repellent structures can repel at least 10 types of liquids, including surfactant solutions and organic solvents, as well as oil and water.

"Other technologies use chemistry to make the repellent, ours uses physical structure to repel liquids and is therefore more environmentally-friendly. Some other technologies have used physical structure as the repellent too, but they are structurally weak, while ours is stable. And finally, while others are expensive to produce, ours is commercially viable as we can produce it on a large scale at low cost."

The cost for one square metre of material made with this technology is approximately HK\$1, and the team has already signed an agreement with a major international company which intends to use it to make clothing.

"We also have a deal pending with another international company which will use it for coating electronic devices such as mobile phones," said Professor Wang. "Currently the coating they use is chemical and not envirofriendly. Ours has no environmentally-unfriendly elements in it."

The technology has several applications for clothing. As well as the obvious advantages for rainwear, it also means that clothes will have to be washed less often, which has implications for the environment as it reduces power usage. It can also be used on kitchenware, making

kitchen surfaces easier to keep clean and cookware much easier to wash, and windows which will need to be washed far less frequently.

There are lots of potential uses for transport too – water-repellent surfaces drastically reduce the drag on water vehicles, enabling cargo ships to move faster and saving on energy consumption. Liquid friction drag contributes to 60 to 70 per cent of the total drag for large cargo ships and 90 per cent for underwater vehicles.

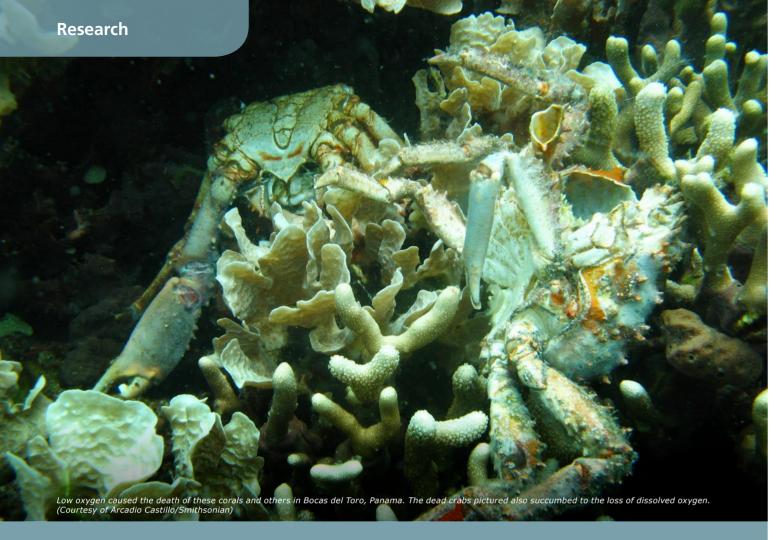
At present Professor Wang and his team are doing further work on underwater applications, such as military submersibles. "Liquid-repellent surfaces reduce the friction drag by creating an effective slip boundary enabling the ship to move faster and use less fuel," he said. "We are also looking into further uses for the product in fields ranging from automobiles, chemical engineering and electronics to biomedical industry and advanced manufacturing."



A soil-dwelling springtail with dew (body length: approximately 2.5mm). (Courtesy of Brian Valentine)



A piece of ordinary cloth (left) can become liquid-repellent (right) simply with a layer of porous surface material (middle).



OXYGEN IN OCEANS TAKES A DIVE

The health of our oceans is facing threats on multiple fronts. One of the most serious is oxygen deprivation, which could devastate marine life and biodiversity. Marine biologist Dr Moriaki Yasuhara is part of an international team looking to find a solution.

Such is the situation that in 2016 the United Nations' Intergovernmental Oceanographic Commission set up the Global Ocean Oxygen Network (GO₂NE), comprising a team of scientists from around the world to search for solutions. Dr Yasuhara was asked to join the team and contribute his expertise as a paleoecologist, specialising in oxygen in historical and geological records.

"Paleoecology relating to oxygen was part of my thesis," said Dr Yasuhara. "The decline in ocean oxygen ranks among the most serious effects of human activities on the marginal marine environment, and the Asian coast including Hong Kong is one of the most seriously effected." In early 2018, GO₂NE produced its first paper revealing the network's findings on the causes of oxygen deprivation, and offering solutions on how to raise oxygen levels. The report, which was published in the journal *Science*, was unique in that it covered both the open ocean and coastal waters.

Among its worst discoveries was that the amount of water in the ocean containing near zero oxygen has increased more than four-fold in the last half-century. The scientists said they expect those oxygen levels to keep dropping, both as the Earth continues warming and because of eutrophication, which is when run-off from the land leads to excessive richness of nutrients in water causing dense growth of

plant life. Since 1950, low oxygen sites in coastal water bodies, such as estuaries and seas, have increased more than 10-fold.

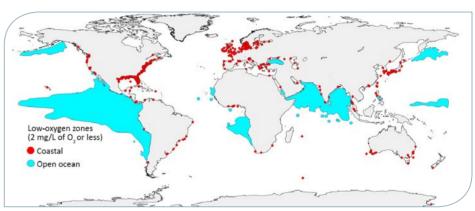
Dead zones

"Clearly, this is not good news, but methods to alleviate the problem are relatively straightforward," said Dr Yasuhara. "We need to address the issues which are causing oxygen levels to fall, namely climate change and nutrient pollution in our oceans. It is a combination of these two factors which increases what we refer to as dead zones, that is, places where the oxygen levels are too low to support marine life. Quite simply marine animals suffocate and die and fish avoid the areas."



We need to find answers to how oxygen, or the lack of it, changes the marine ecosystem and biodiversity, how it is associated with long-term climate change and how it effects other things such as the acidification of our waters.

Dr Moriaki Yasuhara



Low-oxygen zones are spreading around the globe. Red dots mark places on the coast where oxygen has plummeted to two milligrams per litre or less, and blue areas mark zones with the same low-oxygen levels in the open ocean.

(Courtesy of GO_2NE working group. Data from World Ocean Atlas 2013 and provided by R J Diaz)

"Another problem in the wider Southeast Asia

region is that there is not enough research, so

we do not have enough information. In some

access – although sometimes that is simply the

result of language barriers as there are many

countries data may exist but it is difficult to

The Asian coastline is particularly bad because of the fast industrialisation of the area. Europe and the US had their industrial revolutions 200 years ago, but in Asia it has occurred in the last 50 to 100 years. Many countries in the region have begun developing relatively recently and very rapidly this century.

Around Hong Kong, the waters are suffering especially because of rapid industrialisation and the sheer density of the population, meaning a relatively small area produces a lot of waste and pollutants. "Across Southeast Asia things could be dying out in the waters around us at a rapid rate," said Dr Yasuhara. "For the US and Europe it has been a long-term problem, and there has even been some improvement recently as there is more regulation and awareness there."

On the plus side, he feels that Hong Kong could be a leader in instigating a drive to improve the situation in Asia. "In Hong Kong there is a good sense of what needs to be done to achieve conservation. NGOs work hard here and the younger generation is very aware. Hong Kong could take the lead in Asia on environmentally-friendly production and reducing waste, as well as cleaning up the oceans.

to have better data across the globe. At the moment the US and Europe – the northern hemisphere – have good data, but Southeast Asia does not.

"As paleoecologists, we learn from history – we examine at the characteristics of ancient environments and their relationships to ancient lives. It is looking to the past to learn about the future. We need to find answers to how oxygen, or the lack of it, changes the marine ecosystem and biodiversity, how it is associated with long-term climate change and how it effects other things such as the acidification of our waters."

GO₂NE's report has attracted much attention, and been published or aired by more than 300 media organisations around the world. Dr Yasuhara said it is a major first achievement for the newly-formed group and the hope now is that governments will respond to the findings and introduce measures to reduce waste and improve water treatment.



Members of the Global Ocean Oxygen Network (GO_2NE) working group in Monterey, USA: (Courtesy of Francisco Chavez)



The paper, entitled 'The Power of Whispers: A Theory of Rumour, Communication and Revolution', is by Dr Heng Chen and Professor Wing Suen of the Faculty of Business and Economics, and the starting point for the research behind it was in the context of revolutions and the role the rumour plays in

sparking or enflaming collective action.

RUMOUR HAS IT

It was 2011 and the Arab Spring protests were taking place. They began with revolution in Tunisia, and guickly spread to five other countries – Libya, Egypt, Yemen, Syria and Bahrain – where either the regime was toppled or major uprising occurred. As they progressed, considerable attention became focussed on the role of social media and digital technologies in the protests, as participants circumvented

state-operated media channels and used the internet to call for collective activism.

"The influence of social media on political activism during the Arab Spring has been much debated," said Dr Chen, "I wanted to contribute to that discussion."

Protests took place both in states with a very high level of internet usage (such as Bahrain with 88 per cent of its population online) and also in states with low internet penetration such as Yemen and Libya. The use of social media platforms more than doubled in Arab countries.

Stories – both true and false – abounded, and one in particular struck Dr Chen as interesting.

"The opposition to the status quo put out a rumour that Egyptian President Hosni Mubarak's son and his family had left Egypt for London taking with them 97 suitcases. It was the luggage part that made it interesting – and interesting is what a rumour must be in order to spread. In fact, whether it is interesting is more important to its efficacy than whether or not it is true, and is the key factor in its likelihood to succeed in sparking collective action."

The rumour – which was not true – was soon being reported in media around the world. For example Britain's Sun tabloid said: "The panic-stricken family of President Mubarak has reportedly fled Egypt for the luxurious refuge of their £8.5million London townhouse. The leader's son Gamal, 47, is said to have

The fake news of 2016 was not that different to previous elections, what is different is social networks dominate our lives. Rumours used to travel by donkey – now they have a high-speed train! Their production is easier and faster, and you can see over the internet what many people believe, not just your neighbour.

Dr Heng Chen

spearheaded the move, flying to Britain on a private jet with his own family and NINETY-SEVEN pieces of luggage."

Call to collective action

"Clearly the revolutionaries put the rumour out hoping to mobilise more people to their cause," commented Dr Chen. "It is a spark to collective action – if people think the status quo is about to be toppled they are more likely to join. They also want to be part of history, so they will go out on the streets.

"Fast-forward to the US election in 2016 and rumours abound - Russia. Clinton's emails. numerous stories about Trump. There is nothing new in that, what is new is the way Trump attacked the media and started making 'fake news' claims."

The common aspect is 'collective action', for which you need 'complimentarity' whereby growing numbers of people go along with the rumour, and as they do so more join them as they don't want to miss out.

Dr Chen said: "Amid the turmoil of politics – whether an election or a revolution – you know someone will cook up something to get a reaction and cause people to take a stance or to take action. Rumours always surround collective actions, which leads us to one of the

main questions we wanted our research to answer: Why do people believe these stories? What makes a rumour – particularly an outlandish rumour - so effective?"

They realised that communication is key, and therefore the rumour must be interesting enough for people to want to talk about. "The stories that are most effective are those that are close to what people already believe. For instance, the story Trump put out questioning Obama's birthplace. Hence, firstly a popular rumour occurs when people already have certain suspicions which the rumour seems to confirm."

"Second, it has to be something people will discuss. Information exchange must occur to keep the rumour alive. It is a signal for people to assess what they do and don't believe, to consider the veracity of the rumour and to be influenced by what others believe."

Truth is less interesting

By the same token, trustworthy news is often less effective – simply because it is true. If it is a fact then there is nothing to discuss and no opportunity for an exchange of views on its veracity. It is because rumours are not 100 per cent verifiable, that they leave room for people to think about them. It is the uncertainty that keeps them alive.

Dr Chen said: "The fake news of 2016 was not that different to previous elections, what is different is social networks dominate our lives Rumours used to travel by donkey – now they have a high-speed train! Their production is easier and faster, and you can see over the internet what many people believe, not just your neighbour. The second new aspect is that Trump is attacking the media, Obama and Clinton tended not to comment."

The research has practical applications, addressing how governments and corporations can deal with rumours. "Leaving the situation uncertain is a bad strategy," said Dr Chen. "People will keep talking if there is uncertainty about a story. Therefore turn a soft rumour into hard news – either refute the rumour or verify it. Ensure people know if it is true or untrue – that leaves it unworthy of discussion.

"Blocking information is also not the way to go – people will infer what they want to believe from the silence, so you create more uncertainty and therefore more interest. Again, it is uncertainty that is key – to stop the gossip, be clear about what the situation really is. Erase the uncertainty."





MATHS IN THE REAL WORLD

A compulsory course for first-year science students asks them to go beyond their textbooks and learn to apply maths in the real, data-driven world. It also solves a problem for their teachers.

How long does it take a burning cup of coffee to cool down to a drinkable temperature? At what point will a multiplying population of bacteria in a glass of orange juice become harmful to someone who consumes it? What is the best way to manage traffic flow through a set number of toll booths?

Questions like these, drawn from everyday life, have become a solution to a problem facing teachers of the first-year 'Scientific Method and Reasoning' course.

When Hong Kong education was reformed in 2012 to add a year to university education and subtract one from secondary school, they faced a wide disparity in maths knowledge among their students. Some had taken up the option of additional maths courses under the new high school curriculum, but the majority had not. Since 'Scientific Method and Reasoning' was compulsory, the teachers had to find a way to bring all students to a similar level of knowledge and understanding.

"Our job is to equip students with basic quantitative techniques and a good sense of data literacy so they can look at problems from a quantitative perspective," said Dr Eddy Lam, who leads the teaching team. "At the same time, we wanted our course to meet the University's educational aim of tackling ill-defined problems."

Ask the right question

Their efforts entailed two key things. One was infrastructural. They set up an e-learning platform with 45 videos of three or four minutes each to explain key mathematical concepts. Each video also has associated exercises so students can test their knowledge.



The teaching team has transformed the e-learning platform into a mobile app, which contains video tutorials that are five to 10 minutes long and are accompanied by automated quizzes, for bringing the knowledge of calculus to more interested learners in the general public.



Our job is to equip students with basic quantitative techniques and a good sense of data literacy so they can look at problems from a quantitative perspective.

Dr Eddy Lam

"Rather than everyone sitting in the same space and time and following the same lecture, they can learn by themselves. If they find the work easy, they can skip ahead. If they need more help, they can read more at their own leisure and take their time," he said. The videos have also been developed into an app that is accessible to the public.

The second thing was to introduce content based on real-life cases that do not readily fit into an equation out of their textbooks. Initially, students are provided with examples such as the coffee question above, which came from a court case in which a customer tried to sue McDonald's because their coffee was too hot.

Students are subsequently expected to come up with their own examples and frame questions that they can answer with data. For instance, one student project tried to determine the best time to find a seat in the Chi Wah Learning Commons, which also had to take into account the fact students save seats for others. Another group set up a data-based experiment on whether switching lights on and off wasted energy, after being admonished by a parent not to do so.

But even when students can frame their questions, they may have difficulty interpreting the data. Some see only the equations, not the implications, which are not always precise, said Dr William Cheung, who is a member of the teaching team. "A lot of students think that every question must have an exact answer in university education, but this is not how the real world works. We try to help them find their own answers. I think this is the main goal of this course."

Collaboration off-shoots

Students are not always keen on the approach – some still want to be spoon-fed

content, he said – but overall the course has succeeded in bringing all first-year science students to a similar level of data literacy. That success has inspired the teaching team to share videos with other programmes that also require students to work with data, such as biology, psychology and education. In addition, after presenting their work at the 13th International Congress on Mathematical Education in 2016, they have started discussions with overseas counterparts on setting up a shared database of teaching materials.

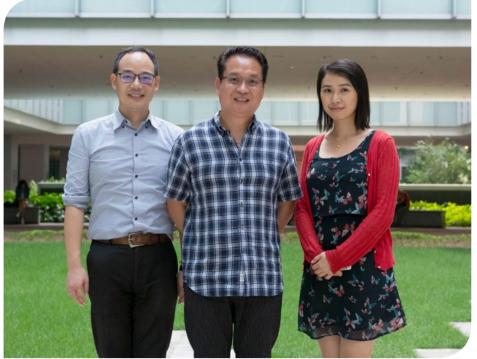
The course is also continuing to develop.

Dr Rachel Lui, who has been active in developing these initiatives and teaching the course, has also set up a related Facebook page where she responds to individual students – an important personal touch given more than 300 students

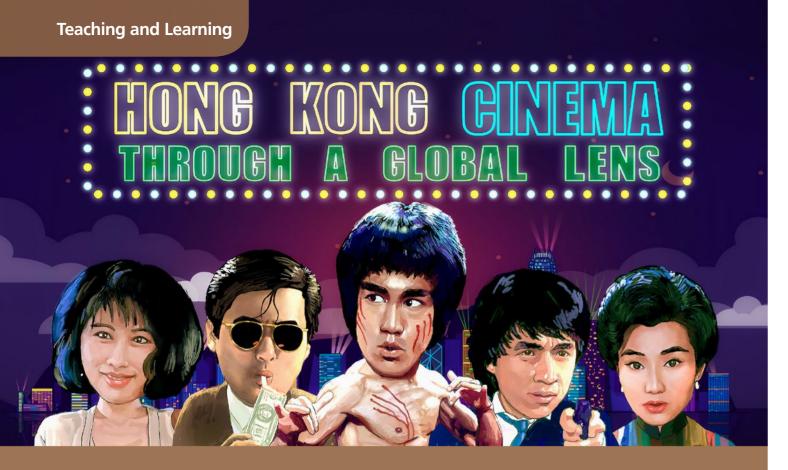
are enrolled in the course – and has livestreamed a revision lesson

"We are now developing a game for the course where students can get materials to build a spaceship when they answer a certain number of correct answers. There will be at least seven levels of spaceships for them to build and they can collaborate with other students who have answered correctly. We also want them to compete to see who can build the most spaceships," she said. The beta version of the game will be ready for take-off in the next academic year.

Dr Lam added: "This course has forced us to look for opportunities and solutions. Maybe if we had an easier course to teach, we wouldn't be doing so many new things."



The teaching team – (from left) Dr William Cheung, Dr Eddy Lam and Dr Rachel Lui – received the Faculty Award for Teaching Innovations in E-learning in 2017.



'TAKE TWO' FOR HONG KONG CINEMA COURSE

A Common Core course that evolved into a MOOC (massive open online course) has become an experimental ground for getting local and overseas students to engage with each other.

When Professor Gina Marchetti and her team launched the MOOC 'Hong Kong Cinema through a Global Lens' in 2016 on the back of a successful Common Core course, they were determined to make it more than another online programme. They wanted to push down boundaries between the global and local classrooms and see what each group could learn from the other.

"MOOCs are great for institutional publicity and they also allow people to understand what you do in terms of your research, but people have not taken them seriously as an on-campus way of providing students with an understanding of other learners from around the world. What we wanted to do was use our MOOC to get students to engage with their peers abroad," she said.

Their first step was to introduce a point during both courses when the students could share comments and open a window to other views. The obvious choice was Jackie Chan, who is a film star both in Asia and the West. The Common Core and MOOC groups were each asked to reflect on Jackie Chan in specific ways and upload their comments on the MOOC for all to see.

The Common Core students were asked what they felt people outside Hong Kong may not understand about Jackie Chan – the comments ranged from the pride Hong Kong people take in him to condemnation of his perceived arrogance and political positions.

The MOOC students were asked to consider what puzzled them about Jackie Chan and

Hong Kong cinema in general that local people might help clarify. Examples of the responses included a Singaporean who felt the confined environment of Chan's martial arts sequences seemed to be something particular to Hong Kong, while an American pondered how the 'other' in Hong Kong films was the West but in Chan's American films, he was the 'other'.

"These sorts of comments encourage HKU students to think about the numerous ways in which a global star like Jackie Chan can be understood differently inside and outside of Asia," said Dr Stacilee Ford, who is part of the Common Core and MOOC team and also teaches a related course called 'History through Film'. "We've tried to customise the questions to encourage dialogue and enhance local-global interaction."



66 What we wanted to do was use our MOOC [massive open online course] to get students to engage with their peers abroad.

Professor Gina Marchetti

Crossing the transcontinental divide

Dr Ford also extended the dialogue when she used the MOOC to 'flip' one of her history classes. Students were asked to complete a unit of the MOOC before class and use the class time to discuss the content. Three students, from Hong Kong, France and South Korea, were then invited to join the Weekly Round-up of the MOOC, a filmed discussion of the week's content led by moderator Dr Aaron Han Joon Magnan-Park, who is also part of the Common Core and MOOC team. The topic was Bruce Lee and the discussion gave a new kind of global take on his fame.

"The French student mentioned growing up watching Bruce Lee films where he speaks French, in Paris, and she thought she was fantasising. But I explained that when Bruce Lee died, everyone wanted to find a new Bruce Lee, including a French producer who created a fake French Bruce Lee. So that was not a false memory that she had," he said.

The MOOC has also been a learning experience for the teachers, who have had to adapt their teaching style to a video format and bridge the gap between local students who are mostly straight out of high school and MOOC students who are usually older, working and better educated.

Another challenge is that they are able to require local students to follow and participate in the MOOC, but cannot make the same demands on MOOC students. This limits interaction possibilities. Professor Marchetti therefore is seeking one or two universities overseas that could pair up with the Common

Core course for one or two MOOC units for a structured transcontinental discussion.

"I am hoping someone teaching Asian or Hong Kong films in say, England or the US will be willing to flip the materials on a film like in the same week as we do, so our learners can engage with peers elsewhere and use their experiences to reflect on the local-global connections. We could then put those reflections onto the MOOC for even more people to participate. That's my big dream,

but we haven't done that yet," she said – although maybe not for long. Professor Marchetti hopes to have such an arrangement in place by this September, when the next round of the MOOC will be launched.

The 'Hong Kong Cinema through a Global Lens' MOOC is on the edX platform; the next session will start on September 11, 2018. Further information can be found at its dedicated Facebook page www.facebook.com/



Three members in the 'Hong Kong Cinema through a Global Lens' Common Core and MOOC [massive open online course] team – (from left) Dr Aaron Han Joon Magnan-Park, Dr Stacilee Ford and Professor Gina Marchetti.



NURSING TO A NEW LEVEL

HKU's School of Nursing has taken its commitment to training excellence up a level with the development of state-of-the-art simulated training wards and a new course in advanced clinical nursing.

Dr Veronica Lam Suk-fun, Senior Lecturer in the School of Nursing, and Chairperson of the Quality and Safety Education Subcommittee, was instrumental in the development of both the wards and the course. She explained that the newly named Li Shu Fan Medical Foundation Nursing Clinical Skills Laboratory and Simulation Training Centre is a redevelopment of a previous, smaller and less sophisticated sim ward.

"Simulation technology has become an effective teaching tool for many professions. It enhances students' ability to provide care to patients competently and safely," said Dr Lam. "We have created three simulated hospital ward environments, complete with men's and women's sections (housing four beds apiece) and equipped with everything a real ward would have – from bedhead and medical trunking, nurse call system and medicine trolleys to a phone line to a doctor should the nurse need help.

"The renovated wards offer nursing students the chance to work in a hospital environment

The control room is equipped with the latest audio-visual and computer equipment which allows teachers to monitor in real time as the students carry out tasks.

but takes away the risk factor. Nursing students cannot practise a complicated or high-risk procedure on a real patient in a real busy hospital arena – it's not fair on the nursing students nor on the patient. But they can practise this kind of procedure on a high-fidelity simulator without risk of doing harm."

HKU has been using sim mannequins for eight years now, having originally bought five adult and five baby manneguins back in 2009. These are all still in use but for the new sim wards six additional high-fidelity adult simulators were purchased. Uncannily realistic, they have pulses over limbs, a heartbeat, are able to bleed and urinate, and they have eyes that automatically blink, water and appear to watch. Student-nurses can practise everything from wound dressing and changing blood bags, to giving artificial respiration and caring for conjunctivitis.

On the wards, nursing students train using a mixture of various levels of manneguins and 'standardised patients', a term for actors

who feign symptoms of an illness, which the students then have to assess, diagnose and proffer the correct treatment.

In the middle of the wards is the control room equipped with the latest audio-visual (AV) and computer equipment. As the students go about their tasks, the AV records everything on computer. The teachers/trainers can then show the young nurses the video and debrief them on what they did right and wrong and how they could have done it better. Sometimes teachers monitor in real time as the students carry out tasks, at others they record and go through it later. But whether a teacher is there or not, the fact that the nurses are on wards on their own really boosts the efficacy of the exercise.

"It feels like they are on a real ward, doing a real job and they are making decisions themselves based on what they have been taught," said Dr Lam. "The students can immerse themselves in the ward environment. The best lessons are when we have a mix of





A group photo taken at the naming ceremony of the Li Shu Fan Medical Foundation Nursing Clinical Skills Laboratory and Simulation Training Centre.



The sim wards and community rooms introduce new technology for the new generation, and we want to show them that with the skill set they will learn, you can work in the community, or overseas, or teach - and whatever you do, you enrich your environment.

Dr Veronica Lam Suk-fun

the mannequins and standardised patients on the ward - it feels uncannily real."

Inter-professional training

In future, there are also plans to use the sim wards for other professional training, such as pharmacy students and trainee doctors. "We plan to have inter-professional training," said Dr Lam. "It's all about making it real – in real life nurses don't work alone.'

In addition to the hospital wards, the Nursing School has set up separate scenarios for students to practise their community nursing. There is a cramped one-room apartment with bunk beds, an old people's home, a public housing estate flat and a more up-market private apartment equipped for a person in a wheelchair.

"These are all situations in which students will have to work if they become involved in community nursing," said Dr Lam. "The rooms simulate the realistic challenge of having to, for example, change a wound dressing in a cramped, and perhaps none too clean, flat."

The School of Nursing has also had some fun with their state-of-the-art 'androids', which

they used to do a Mannequin Challenge for the School of Nursing Facebook group, all set to Justin Bieber's song If I Was Your RN. It is impressive that in the video the only person who blinks is one of the mannequins!

Dr Lam, who is in the video, said: "As well as being fun, the Manneguin Challenge is an attempt to reach out to the younger generation and encourage more to go into nursing. There is a shortage of nurses throughout the world and we're finding new ways to show youngsters that it's a meaningful career that can take you to so many places. The sim wards and community rooms introduce new technology for the new generation, and we want to show them that with the skill set they will learn, you can work in the community, or overseas, or teach – and whatever you do, you enrich your environment."

The commitment to new technology is ongoing at the end of 2021, the nursing training facilities will be moved to a larger space on Sassoon Road where they will have room to expand to six sim wards, six nursing laboratories and six virtual reality laboratories.





The School has also set up separate scenarios including a cramped one-room apartment with bunk beds, an old people's home, a public housing estate flat and a more up-market private apartment equipped for a person in a wheelchair, for students to

Training future trainers

Enhancing the existing skills of experienced nurses and training the mentors of tomorrow are two of the main objectives of the introduction of the Advanced Training in Clinical Nursing Education programme, a collaborative effort with Hong Kong Sanatorium & Hospital, a network of partner hospitals and the School of Health Sciences at the University of Melbourne. The programme is funded by a charitable donation made by the Li Shu Fan Medical Foundation.

Comprising two workshops (Elementary and Advanced), the course aims to help experienced nurses, clinical mentors and nurse educators from both the public and private sectors in Hong Kong and staff in HKU-Shenzhen Hospital to improve and sustain their competence and expertise in clinical nursing practice. Around 270 nurses have benefitted so far.

"The idea is to 'train the trainer'," said Dr Lam.

"They learn skills to take back to their own

institutions, so they can foster a culture of mentoring there. Subjects covered include learning how to supervise new graduates and student-nurses in clinical and professional behaviour and how to give constructive feedback to students. We asked hospitals to recommend practising nurses who would make potential mentors. The programme benefits them by expanding possibilities for their future career potential."



LOCAL POLITICS MADE GLOBALLY RELEVANT

In his 'Hong Kong Politics' course, Dr Mathew Wong faced a dilemma increasingly common among internationalised universities. His local students were deeply familiar with the local situation, but foreign exchange students were not – some did not even know Hong Kong was once a British colony. So he set out to bridge the gap.

The Umbrella Movement of 2014 attracted intense media attention from around the world and in so doing, also created a challenge for teachers of Hong Kong politics. More and more foreign exchange students started to enrol in their courses, but they struggled to keep up with their local counterparts, many of whom had participated in the movement. The foreign students were mostly unaware of the factions and divisions of local politics, could not follow developments in the local Chinese media, and some did not know that Hong Kong was a British colony until 1997.

"There was a huge imbalance in prior knowledge about Hong Kong," said Dr Mathew Wong who teaches the third-year course 'Hong Kong Politics', which has no prerequisites. "I realised that I needed to do something to address this situation so I could teach to such a diversified profile of students."

He applied for and received a Teaching Development Grant (TDG) in which he asked a question fundamental not just to his course, but any locally-focussed course at HKU and, indeed, in any university. "We talk about internationalisation as an important part of the University's mission, but how do you teach a local course in the age of globalisation?" he said.

To find answers, he started by surveying political science courses at top universities around the world, where he found a mix of approaches. American universities, for example, tended to have many courses focussed exclusively on their country, while European universities focussed on comparative offerings.



66 We talk about internationalisation as an important part of the University's mission, but how do you teach a local course in the age of globalisation?

Dr Mathew Wong

"At Cambridge University they don't have an outright course on British politics. It is grouped under a module on European politics. This was very interesting because they have put in these international comparative perspectives but perhaps sacrificed domestic content," he said.

Keeping a balance

The lesson he drew from this was that it might be possible to combine both approaches. Local content could and should be relevant – as in the American universities – but comparative perspectives like the European universities had done could make the content more globally relatable.

"Even though foreign students might not know that much about Hong Kong, they can still apply theories they may have previously learned to Hong Kong politics. This could also benefit local students by helping them understand how the situation of Hong Kong can relate to politics in other democracies," he said.

Dr Wong realised that foreign and non-local students also needed access to more information – in particular, Chinese-language content. With the TDG, he arranged for translations of news and commentary articles from the Chinese media. He focussed on one key event per year since 1997 and posted this on a website that is accessible to all.

The change in approach and the new materials were introduced in 2016 and enrolment of both exchange and non-local students subsequently more than doubled to about 20 of the 120 students taking his course – a ratio that is similar to enrolments in other courses offered by his department that do not focus on Hong Kong.

"My project is a small one, but I hope it has made the learning experience better for both foreign students and local students," he added.

The Wikipedia project

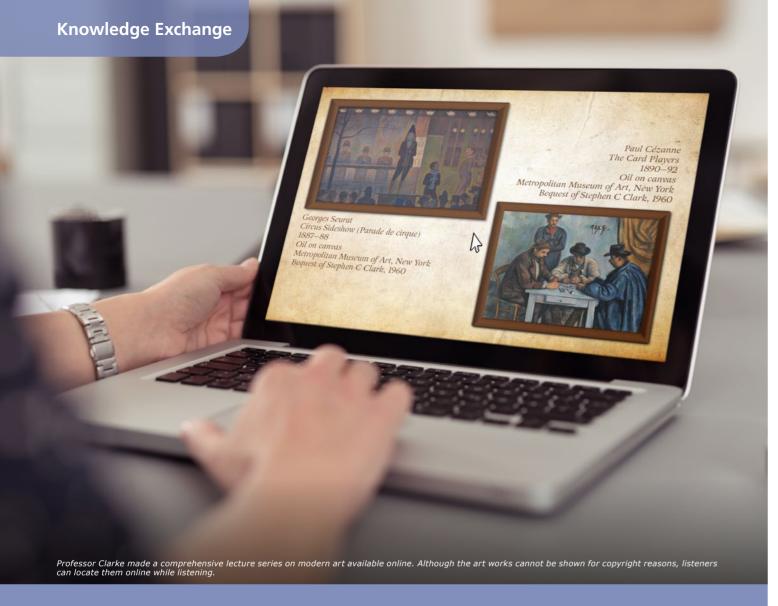
Wikipedia's pages on Hong Kong Government and politics are often incomplete or out-of-date. Now, through the efforts of Dr Kwan-nok Chan's third-year students, they are getting a breath of life.

Dr Chan requires students of his 'Public Administration in Hong Kong' course to do a Wiki page project for assessment. The idea is that they translate what they have learned in class into a format accessible to the public and upload that to Wikipedia.

"Wikipedia is a valuable public resource, but it has relatively few entries on Hong Kong and many of the existing articles need updating. Given this state of affairs, I thought it would be a meaningful way for students to improve the Wikipedia knowledge base about public administration in Hong Kong," he said.

In the 2017–2018 academic year, the students contributed entries to 22 pages on such topics as the Office of the Ombudsman and the detection of heavy metals in drinking water in 2015. Dr Chan said he hoped the project will continue (he is on sabbatical next year) so that the knowledge base about Hong Kong can be kept as up to date as possible.





ART 101 ONLINE

A commitment to the concept of universities without walls and a love for the friendly intimacy of radio, prompted art historian Professor David Clarke to make a comprehensive lecture series on modern art available to all online.

Professor Clarke retired last year after three decades as a teacher in the Department of Fine Arts. Retirement from lecturing has not meant he has stopped working however, and he is currently developing three major projects. The first is his comprehensive online lecture series, 'A History of Modern Art in 73 Lectures', which is a linked series of three courses he originally taught at HKU in 2015–2016.

The lectures cover modern art from 1880 to now. The first course, 'Vision in Crisis', looks at 1880–1914, starting with a discussion of Post-Impressionist artists Van Gogh, Gaugin and Cézanne, then covering Matisse, Picasso and early 20th century Chinese modern art. The second, 'Modernity and its Discontents',

focusses on art between the two world wars including Futurism, Abstraction, Russian art around the time of the Revolution, certain trends in Chinese art, German Expressionism, Dada and Surrealism. 'Towards the Global' is the final part, looking at art after World War II and covering everything from Abstract Expressionism, through Pop Art and Minimalism to Environmental and Performance Art.

For copyright reasons, Professor Clarke is unable to show the images referred to, but included with each lecture is a list of the art works, so listeners can easily locate them on the internet or in books and study them while listening. He is very fond of radio and felt that if he did audio recordings people could listen like they would to

a podcast or radio show, perhaps even while doing other things.

"Like radio, this is an intimate experience, so not having visuals is not a bad thing," he said. "The series offers a chance for people to experience a little of what a university education is like. Art history enhances your life, so it's not just a study tool – I hope people will listen for interest and pleasure too. It is also attracting people already studying art history – they view it as another resource"

Professor Clarke feels the value of the course is its completeness. "Others have put individual lectures or courses online, but I believe this is the first time such an extended linked sequence



The series offers a chance for people to experience a little of what a university education is like. Art history enhances your life, so it's not just a study tool – I hope people will listen for interest and pleasure too.

Professor David Clarke

of lectures has been shared freely on the internet," he said. "People could follow the whole sequence of lectures through to gain a comprehensive introduction to modern art, or they can simply dip in and out – just listen to the parts about their favourite artists, or look at it for background before they visit an exhibition of an artist's work."

The lectures were recorded over 18 months, originally as a resource for his students. Each lecture as first given was two hours with a break in the middle, but for the purposes of his online series, Professor Clarke has split them into two one-hour sound files as he thinks this is a more manageable duration for listeners. The resource went online in the summer of last year and the introduction alone has received more than 2.000 clicks.

Hong Kong Art Archive

This is not the first online art resource Professor Clarke has created. Fifteen years ago he developed the Hong Kong Art Archive.

Mainland Chinese contemporary art was going through a boom at the time, but while Hong Kong artists were doing interesting work it had less obvious signifiers of 'Chineseness' so attracted relatively little attention overseas.

"Few artists had websites then and there was little information elsewhere about Hong Kong art," he said, "so I went out and found it. I have tried to be neutral in deciding what is included in the archive and not make an aesthetic quality judgement. If an artist has had several exhibitions we will include them – it is then up to researchers and the public using the archive to make up their own minds."

Professor Clarke's other ongoing projects include a book about contemporary Chinese art called *China – Art – Modernity: A Critical Introduction to Chinese Visual Expression from the Beginning of the Twentieth Century to the Present Day,* which is due to be published by the Hong Kong University Press in early 2019. He is also creating an archive of his own photos, representing 25 years of Hong Kong from 1995 to 2020.

"I hope this photo archive will be a useful resource for people in the future who want to see what everyday life was like in Hong Kong now. I have an academic, as well as artistic, approach when taking pictures. Photography is like good wine, it matures over time and hopefully these images will develop a rarity value in due course.

"The particular value of photos lies in their indelible link to a particular time and place, and also in their repleteness – that is the way in which information can be found in all parts of the image. This excess of information over and above what the photographer might have deliberately been trying to capture can be accessed by later viewers according to their own interests."

'A History of Modern Art in 73 Lectures' www.youtube.com/playlist?list=PLsYxtdAdqBSf NEVf2Y9WsN1YyOe-5G52i



Hong Kong Art Archive finearts.hku.hk/hkaa/revamp2011/





A photo of performers representing judges in the British colonial government farewell ceremony, at the Tamar site for a rehearsal, taken by Professor Clarke on June 28. 1997.



A photo of participants in a pro-democracy rally, taken by Professor Clarke on July 1, 2007.



HOMEGROWN START-UP LISTENS TO THE CHATTER

Language processing technology developed at HKU is the foundation of one of the city's most successful start-ups.

In 2015 Dr Miles HF Wen was nearing completion of his studies and pondering what to do next. He had completed a BEng degree and PhD in electrical and electronic engineering at HKU and was a Fulbright scholar at the University of California-Berkeley, with the world at his feet.

"I could have worked at Google or maybe Facebook, earned some money and then thought later about how to do a start-up," he said. But that was not enough for a young man who was hungering to launch out on his own. As his mentor and PhD supervisor, Professor Victor OK Li, Cheng Yu-Tung Professor in Sustainable Development and Chair of Information Engineering, recalled: "When Miles was very young, still an undergraduate student, he wanted to create a start-up. We've been talking about this for many years."

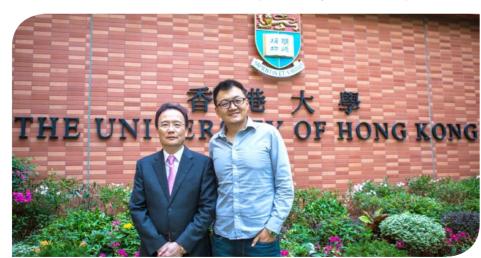
So in 2015 Dr Wen returned to Hong Kong, lured not only by the call of home but also opportunities in the form of new institutional support for start-ups in Hong Kong.

The Government had introduced the Technology Start-up Support Scheme for Universities

(TSSSU) in September, 2014 to provide retroactive funding for start-ups at the end of their first year. HKU sweetened that offer by advancing successful applicants (who can be professors, alumni and/or students) the TSSSU funds at the start of their first year, to be reimbursed later on. "HKU was actually taking the risk and providing us with an interest-free loan. That's why I say HKU is actually our investor," Dr Wen said.

Finding a niche

The University was betting on a pretty sure thing. Dr Wen had developed an artificial intelligence (AI) technology for renewable energy during his doctorate studies that he and Professor Li subsequently developed into new speech and natural processing technology. With the TSSSU funding, they launched the HKU spin-off Accosys to market their platform.



The two founders of Fano Labs - Professor Victor OK Li (left) and Dr Miles HF Wen (right).



We believe there is much business intelligence in those recordings, but there's no way for a human being to listen to all of those conversations. That's where we come in.

Dr Miles HF Wen

Their first project was a smart concierge service for shopping malls, but they saw greater potential in providing back-room support to regional call centres. China requires all customer call centres to record all conversations. "We believe there is much business intelligence in those recordings, but there's no way for a human being to listen to all of those conversations. That's where we come in," Dr Wen said.

Their Al can recognise different languages and dialects and can even understand when someone is speaking a mix of languages, for example combining Cantonese and English in one sentence. It can deal with spoken and written language (such as text messages) and recognise vocal tone, for instance if someone is angry. These capabilities were all useful for quality and compliance assurance and training, as well as customer service.

The facility with multiple languages is particularly important because the start-up is focussed on the 'smaller' market of regional dialects such as Cantonese (about 100 million speakers) and Sichuanese (about 300 million), that are otherwise not served by larger speech recognition providers such as Google.

"One thing I have learned as an entrepreneur is that you want to stay away from head-to-head competition with the giants in the early days. You're never going to win until you've grown yourself into a giant," Dr Wen said.

"We have our niche and we are focussing on what we do best in areas that they have overlooked now but that still have large potential."

Advocating a culture change

In pursuit of the market, the founders changed their start-up's name to Fano Labs in 2017 – after one of the pioneers of AI, Professor Robert Fano – and subsequently became the first Hong Kong start-up to be awarded funding by Horizons Ventures, the private investment arm of Li Ka Shing. In March, 2018, Fano Labs also received Gold and Grand honours in the Smart Business category of the Hong Kong ICT Awards.

Their technology is being used mostly for language analysis of call centre recordings, although it has also detected when an employee has shouted at a customer. Clients include several large state-owned enterprises in

Mainland China, as well as Hong Kong firms such as CLP Power, which uses the platform as a 'chat-bot' service to provide initial contact with customers, and major property and telecommunications companies.

Dr Wen said they intended to keep their base in Hong Kong despite attractive offers to relocate elsewhere. "When we started in 2015, things were really bad. People said to me, why do you want to do a start-up? Go work for a bank or another company, it will be better. But if we walked away just because the start-up culture was bad, others would do that, too, and it would never improve. Somebody has to make a change here. We're not just running a good company, we want to set an example for others to follow."

He is also trying to do this at a personal level by mentoring students at HKU and making himself available to give talks to aspiring entrepreneurs on campus. "Miles has been very good at helping promote an innovative start-up culture at HKU. I'm happy to do that, too," Professor Li said.



Fano Labs was awarded Gold and Grand honours in the Smart Business category of the Hong Kong ICT Awards 2018.



Dr Wen giving talks to aspiring entrepreneurs on campus so as to promote an innovative start-up culture at HKU.



A BALANCE TO THE BACKLASH

Asia Global Online, launched in January, 2018 by the Asia Global Institute, aims to offer much-needed policy-relevant insights on global issues from Asian perspectives.

Brexit, the Trump presidency and the looming threat of trade wars have cast a dark and gloomy shadow over globalisation, which is being blamed for rising inequality, 'unwanted' immigrants and social disruption. Much of the overly negative public discourse on the topic, however, has been dominated by Western perspectives – even as Asia is becoming the pivot of global transformation.

Enter the Asia Global Institute (AGI) at HKU, which is bringing essential Asian perspectives to

global discourses on such critically-important phenomena as globalisation.

Professor Chen Zhiwu, Victor and William Fung Professor in Economics and Director of the AGI, said the Institute aims to provide a platform for scholars and others in the region to speak up more. "A lot of voices and perspectives have been coming from the US and Western Europe. Asian scholars and players have not contributed too much to the discussion," he said, which he attributed to the dominance of the English

language and the more reticent traditions of Asian cultures with regard to public discourse.

It has also been too easy to focus on the negative side of globalisation. "Most people can relate to the obvious consequences of globalisation, but the more subtle and intangible benefits can be easily ignored; we take globalisation as a given and we don't connect it with how we live our lives," he said. "With its unique legacy, Hong Kong is a special place for such debates. It is also a hub with expats



We don't just want to write white papers for our own private consumption. If anything, we are more interested in influencing larger societal thinking on global issues and globalisation.

Professor Chen Zhiwu

from around the world living and working here. Without globalisation, there would not be Hong Kong."

In January, 2018, the Institute launched the *AsiaGlobal Online Journal*, a platform on which scholars, professionals, civil society leaders and others especially from Asia are invited to write on a range of topical issues. The journal publishes two short and thoughtful original pieces every week. Nobel Laureate Michael Spence, who is AGI's Advisory Board Co-Chair, inaugurated the journal with an article on inequality and social stability. Other writers include Xu Guoqi, Kerry Group Professor in Globalisation History in the AGI, who reflected on the significance of sports diplomacy, such as the Olympic Games in South Korea and the implications on the South-North Korea relationship.

Dr Séverine Arsène, Managing Editor of the journal, said the *AsiaGlobal Online* team helps authors keep the articles short and jargon-free so they are accessible to a wider audience interested in global issues. "We're trying to provide more space for different points of view. We also want to demonstrate what HKU can do in terms of putting forward interesting and thought-provoking ideas."

Capacity-building is also on the agenda

In addition to the digital platform, AGI convenes regular dialogues and events to exchange ideas. Its annual flagship conference, the Asia-Global Dialogue, features high-powered speakers from government, academia, international institutions and businesses.

Another major initiative of the AGI is the AsiaGlobal Fellowship programme, the mission of which is to cultivate future leaders and influencers with a deep understanding of global issues from Asian perspectives. The interdisciplinary and intensive leadership programme is developed for mid-career professionals from around the world. The first cohort consisted of 15 fellows from 14 countries who spent three months at HKU and other parts of Asia in 2017.

Professor Chen said the Institute is also launching three research programmes on topics where they think HKU can provide strong expertise: policy issues related to the Quadrilateral Security Dialogue between the US, Japan, Australia and India, to which the Institute has added China (the 'Quad + 1'); religion and globalisation; and FinTech policy. He hopes these research efforts, like the other work of AGI. will have impact beyond academia.

"Whatever we do, I want us to have a clear and direct impact on the larger society. We don't just want to write white papers for our own private consumption. If anything, we are more interested in influencing larger societal thinking on global issues and globalisation," he said.

The Asia Global Institute

(www.asiaglobalinstitute.hku.hk) was inaugurated on July 1, 2015 with a generous endowment from the Victor and William Fung Foundation. Its mission is to generate and disseminate innovative thinking and policyrelevant research on global issues from Asian perspectives.

Subscribe to the *AsiaGlobal Online Journal* at www.asiaglobalonline.hku.hk/





Madame Christine Lagarde (right), Managing Director of International Monetary Fund, was invited to deliver a keynote address in the Global Thinkers event in April, 2018.



SHARING TEACHING SKILLS IN PROVINCIAL CHINA

An innovative experiential learning programme has senior students in the Education Faculty helping English language teachers in a provincial city in northeastern China enhance their professional development and hone their curriculum design to meet the needs of their pupils.

The programme, now in its second year, is bringing big benefits not only to the teachers in China but also to the 20 HKU students, all of whom are studying for their Bachelor of Arts and Bachelor of Education in Language Education (English Language), who have taken part.

Mr Benjamin Moorhouse, Lecturer in the Education Faculty's Division of English Language Education, set up the programme and has accompanied the groups on both of the two-week trips, the first in 2017 and the second in January, 2018: "The students found the experience empowering," he said. "It gave them the chance to take a few risks, try new things and engage with others in the same profession as they have chosen but working in an unfamiliar environment."

The project came about after the Fan Family Charitable Trust approached the Education Faculty for help. "The charity's founders had taken over the Huizhen Academy, a school in the city of Ningbo in Zhejiang province, rebuilt it and resourced it well, but they wanted our cooperation in supporting the professional development of the English language teachers there," he said. "We felt we could work with them to support the school and at the same time provide opportunities for our student-teachers to develop their pedagogical skills and expose them to different educational contexts."

Mr Moorhouse and Dr Gary Harfitt, Associate Dean (Learning and Teaching) of the Education Faculty, made an initial visit to the school in October, 2016, and then provided the HKU student-teachers with information about the context and teaching approaches used there. This helped them plan their English lessons and the extra-curricular activities (ECAs) they would be teaching in Ningbo.

Huizhen Academy is a through-train establishment, meaning it has primary and

secondary school students, which is unusual in Mainland China. It is a government school not a private one, so it serves the community and must accept any students it is given and work to Education Ministry guidelines. Mr Moorhouse discovered that one of the problems of this was that teachers there had to use textbooks that he considers to be pedagogically unsound.

"These books are government-approved, and so must be used, but they are not effective teaching tools," said Mr Moorhouse. "As a result of that, plus the fact that most of the students receive private tutoring on top of their school education, the curriculum was too easy for the students there. Their English levels are better than these books, so teachers struggle to find ways to cater to their more advanced needs. We helped them enhance the tools they have so they are more effective."

In Ningbo, each of the HKU team was paired up with one of the Huizhen Academy teachers to



Our students learned how to collaborate with teachers in different contexts and hone their teaching skills through the constant, planning, delivery and reflection on their lessons.

Mr Benjamin Moorhouse

conduct co-teaching lessons. "The HKU student-teachers took the lead in designing the lessons, then taught them alongside their Huizhen Academy partners," said Mr Moorhouse. "Afterwards, they reflected on the lesson, improved it and taught it to another class."

Lessons included getting the children to create their own story books, analysing texts then writing their own, and using stories to teach the children vocabulary. In addition to the classroom teaching, they held storytelling sessions before school started, as well as lunchtime speaking activities and ECAs such as drama, craft-making and even creating slime. This all helped enrich the English language learning environment of the school.

Mutual learning experience

Mr Moorhouse feels that the visit this January was even more successful than the first one. "We now have a better handle on what is there and what is needed. The first time there were

lots of unknowns on both sides," he said. "This time we were able to plan better, we knew what their materials would be and could work from that. Also, it is unusual in Mainland China even to have student-teachers helping teachers so the teachers there were unsure of their role the first time round. It was different for our students too: whereas usually in Teaching Practice they learn from the teacher, in Ningbo it was very collaborative, a far more mutual learning experience."

Asked what he found most revelatory about the project, Mr Moorhouse said: "The readiness of the Huizhen Academy teachers for change. In Hong Kong there is a reluctance, and a lot of contextual factors preventing change, but these teachers were happy we could give them ideas, happy to try new things and they were open to being observed.

"In fact, the observation aspect was good for my students too, as usually when you are being observed you are being assessed, so this was observation without pressure. The fact they were teaching same lesson to two different classes also offered a valuable opportunity to put feedback to work immediately. They could see the progress they were making and it was highly valuable to me to see how quickly they could make the changes. It made me rethink the value and need for effective feedback – both from a teacher such as me and from their colleagues and peers."

Overall, Mr Moorhouse views the programme as a success and feels it has taken the first steps to achieving its objectives. "Through the close collaboration and use of a lesson study approach, both parties were able to develop professionally. Huizhen Academy teachers were exposed to more student-centred activities and ways to use authentic texts in the classroom. They raised their expectations of their learners and saw how lessons could be used to scaffold learners towards the completion of a product.

"At the same time, our students learned how to collaborate with teachers in different contexts and hone their teaching skills through the constant, planning, delivery and reflection on their lessons. Hopefully too, they gained confidence that their teaching approaches had a positive impact on the students and teachers in the school and saw that we instigated real change. In fact, one of the students who went this January, now plans to return and teach in the school for a year.

"We still have a long way to go to show them that teaching can be different and still be effective," he concluded. "We need to find more ways to help them in the key areas of curriculum and assessment, but this is an ongoing process – a proposal has been made for a third visit in January, and both sides are keen to go ahead."



Mr Benjamin Moorhouse (third from left in the back row) has accompanied students in the Faculty of Education on both of the two-week trips to a provincial city in northeastern China. (Courteey of Cedia Wong)



EDUCATION FROM ALL ANGLES

The new Dean of Education comes to HKU with a skill set that spans teacher education, curriculum development and research, as well as administration and management experience gained in more than two decades at Columbia University's renowned Teachers College.

While a newcomer to HKU itself, Professor A Lin Goodwin was born in Hong Kong, moving to Singapore as an infant where she was schooled, then heading to the United States – and Teachers College (TC) – for her degrees. Her ties to Asia are strong, having made frequent visits over the intervening years during which she has delivered lectures at both the Chinese University of Hong Kong and the Hong Kong Institute of Education (now the Education University of Hong Kong). She also has close associations with the National Institute of Education in Singapore with whom TC collaborates regularly.

"I feel very much at home in Asia," she said.
"But I also think it is beneficial that my
education and career background are from a
completely different place and perspective,
so I can take an outsider's overview and ask
why things are done a certain way. It is a
privilege to be able to do so."

This is Professor Goodwin's first deanship, although she was Associate Dean and then Vice Dean at TC for over a decade, as well as being a Vice-President of the American Educational Research Association (AERA). As TC's first Associate Dean—a role that was created to provide a link between the academic and administrative sides of the institution—she gained a new perspective on academia. "I got to work across faculties and to speak to all sides, I've been through the system from all angles—on-the-ground teacher educator, researcher, manager, as well as out in the field."

She wants to draw on that experience now, and aims to pay attention to the big picture as well as the detail. "I look at all the pieces, not just singularly but in relation to one another. I think that is my job as Dean. It is hard for people within the Faculty to do this as they are so close to their own work. I see this as one of the benefits of being in a leadership position. It is

the business of a leader to look at the big picture, and it is the benefit of leadership that you can do so."

Professor Goodwin started at HKU in November, 2017 and has had time to familiarise herself with the Faculty, which she describes as comprising "a group of energetic, hardworking people, palpably passionate about their work and invested in the Faculty. There is deep loyalty, many are alumni and the notion of HKU as family is apparent. It is a good working environment, and a respectful atmosphere. People also seem open to change. There is a lot of energy and activity focussed on innovation – programme revision for example – and an openness to self-evaluation."

Her visions for the future include making the Faculty more recognised on the international stage and having more communal goals. "I want us to be the go-to university. There is a wide

Mentoring for both faculty and students should be deliberate and across the board. Everybody should feel that we are supporting their work, their development and them as human beings.

Professor A Lin Goodwin

array of things the Faculty is doing very well, but I would like us to be more focussed. I strongly believe in everybody doing their individual thing, but at the same time I don't want people or resources to be spread too thin. As a Faculty, we should focus on one or two signature ideas for which we'll be known in the region and globally."

Debate and challenge

She would like to find better ways to collaborate and to encourage Faculty members to debate and challenge each other, but to do so constructively and without negativity, so that the collegial spirit remains strong.

"Any world-class university is grounded in this idea of debate and peer review. Mentoring for both faculty and students should be deliberate and across the board. Everybody should feel that we are supporting their work, their development and them as human beings. It is part of being a community – there needs to be both an intellectual community and a social one."

Asked to discuss some of her own work, Professor Goodwin cited an innovative teaching residency programme called 'Teaching Residents at Teachers College' (TR@TC), that she initiated, designed, received multi-million-dollar funding for and launched in 2009. Nine years on she still maintains an advisory role.

Based on residencies which medical students undertake, the premise for TR@TC is that student-teachers are immersed in authentic teaching by apprenticing with experienced teachers in high-needs public schools in New York City. "It is akin to a medical residency," she said. "That is, deep immersion in practice while you are also engaged in theoretical learning about the field. Your preparation immerses you in the professional context, where you are guided, mentored and instructed and where you are approximating the real work, at the same time that you are simultaneously immersed in rigorous academic preparation. The residency model advocates both practice and theory together."

Professor Goodwin also maintains an active research agenda and is a well-published scholar. Her research focusses on teacher and teacher educator identities and development; multicultural understandings and curriculum enactments; the particular issues facing Asian/Asian American teachers and students in US schools; and international analyses/comparisons of teacher education practice and policy.

She was most recently involved in an international study of teacher education practices and policies in seven high-performing jurisdictions. Her area of focus was Singapore where she and colleagues gathered data on teaching and teacher education through interviews, on-site observations, and document

and policy analyses. The study concluded in 2017 and is documented in her latest book, *Empowered Educators in Singapore: How High-performing Systems Shape Teaching Quality* (with co-authors Low Ee Ling, NIE, Singapore, and Linda Darling-Hammond, Learning Policy Institute, US).

Finally, the interview turns to the fundamental requirement of all education faculties – to develop and inspire the teachers of tomorrow. Asked what makes a good educator, Professor Goodwin said: "The teaching profession today is a dramatically altered landscape that poses daunting challenges, which include: complex educational policies; the increasing diversity of all students; a world reshaped by globalisation; and the imperative to ensure that all students succeed.

"We need academically strong teachers who possess content knowledge, are ready to focus on learning and student achievement, and are prepared to meet the needs of all learners, including many with multiple vulnerabilities. It is up to institutions like HKU's Faculty of Education to mould and inspire such teachers, and prepare them to be educators capable of working anywhere in the world."



Professor Goodwin (centre) at the programme booth at the HKU Information Day for Undergraduate Admissions 2017.



Professor Goodwin (second from left) at the 'Signs and Wonders African Night' event held on November 24, 2017.



JASPER OFFERS A DOSE OF PET THERAPY

Jasper the Old English Sheepdog is the latest fixture at HKU, providing current students and staff with therapeutic petting sessions and helping promote better treatment of animals.

Universities around the world have introduced animal visits on their campuses on the back of studies and stories about how these encounters reduce stress. Now, HKU has introduced its own resident dog, Jasper, a nine-year-old rescue dog who has become an on-campus celebrity.

A press conference to introduce him in December, 2017 attracted more than 40 iournalists and generated more than 65 reports in local, Mainland China and Taiwanese outlets including print, radio, video and social media. He also made an appearance at the annual spring reception at the University Lodge in February and has his own Facebook and Instagram accounts. People are encouraged to look out for him on campus and give him a pat and post a photo.

Most importantly, though, Jasper is the centre of a new pet therapy programme for students and staff that has been set up under the Library's Take a Break marketing initiative, which began in 2016 and includes yoga, stretching and kickboxing sessions coordinated with HKU's Centre for Sports and Exercise. "The assessment period can be a stressful time and we wanted to provide students and colleagues with some relief," said Jasper's owner Mr Gary Chin, who is also the Libraries' Public Relations and Development Manager.

Take a Break initially included a Santa Paws visit by an international NGO but scheduling was a challenge. Jasper was suggested as a replacement therapy dog but Law Librarian Irene Shieh proposed taking things further by having a Resident Therapy Dog Programme for the HKU Libraries. She set this up with Mr Chin, who had served four years on the executive committee of the Society for the Prevention of Cruelty to Animals (SPCA).

Jasper was an ideal candidate, having already trained to the standards of the Dr Dog organisation (it took two attempts - he failed the first when he could not resist pawing someone who held food) and having visited centres for the elderly.

Pilot sessions with Jasper were organised on campus in December, 2017 comprising 18 30-minute blocks over six days in the Law Library and Main Library. Some 332 applications were received for 78 places.

who each had an opportunity to pet and hug Jasper, play tug-of-war with him and give him treats. Mr Chin was on hand to talk about Jasper and animal welfare in Hong Kong and



1 The pilot programme was developed to accommodate as many students as possible but ensure Jasper would not be overwhelmed by a large number of participants or experience any ill effects.

Mr Gary Chin

Participants also completed a survey afterwards and nearly unanimously agreed or strongly agreed that they felt more relaxed and a sense of general well-being after the encounter. "Jasper is very calm and well-behaved and he helped me feel less anxious. I would definitely recommend others to join the programme," said Lillie Lai Lam-fong, a first-year Master of

Mr Chin said some animal welfare activists had raised concerns about Jasper's welfare, but he was careful to ensure his dog was properly cared for. "The pilot programme was developed to accommodate as many students as possible but ensure Jasper would not be overwhelmed by a large number of participants or experience any ill effects." After Jasper became comfortable with the designated locations, he settled in nicely. "Who wouldn't want to come to work and get massages and treats and play games?"

Nonetheless, the programme has been adapted to take account of Jasper's age and needs. The second round of Take a Break was held in April,

but only two sessions were held each day rather than three to reduce the demands on Jasper. Mr Chin expects that in a couple of years, it will be time for Jasper to retire and another dog will need to be found to fill his big paws.

Animal welfare advocate

In the meantime, Jasper is not only providing furry comfort, but is also helping promote the libraries and animal welfare.

"We've been trying to market our libraries to encourage students to make better use of library services and collections. This is a challenge that we know other libraries are also facing," Mr Chin said. "The programme helps raise our profile on campus."

The attention received has led to Mr Chin and Jasper being invited to a session of the Common Core course 'Some We Love, Some We Eat: Human-Animal Relationships in the Global Marketplace' to discuss animal welfarea topic close to Mr Chin's heart not only through his SPCA work but also the experiences of his other rescue dog, Cooper, who had suffered abuse.

"One of the guestions that students sometimes ask me is why pet ownership is so hard in Hong Kong. There are challenges like the limited physical space and the cost, but the most important factor is education. People aren't educated on how to handle an animal," he said.

"Education falls under our scope as a university." The Take a Break programme is trying to educate people and help them learn about animals. We hope it becomes contagious so that other universities in Hong Kong will find it worthwhile, too."

Check out Jasper's Facebook and Instagram accounts:

Jasper HK

jasperhk8



Each session accommodated four or five people, answer questions.



Jasper made his first appearance at the press conference that took place in December, 2017, and attracted more than 40 journalists.



The new pilot programme 'HKU Libraries Resident Therapy Dog' aims to enrich students' campus life and to relieve their stress in examination period



A SPIRITUAL CLASH OF CULTURES

What happens when Western Daoists go on a pilgrimage to find the 'real Dao' in China? A new book follows these pilgrims, tracing the impact on the participants and the monks they visit and offering insights on the state of modern spirituality.

In 2004, Healing Tao USA, one of the main promoters of Daoism in that country, organised a 'China Dream Trip' to sacred Daoist sites as well as the Great Wall and other attractions. They were accompanied by Dr David Palmer of the Department of Sociology and Professor Elijah Siegler of the College of Charleston, who wanted to study what happened when these spiritual tourists came face to face with traditional Daoism. What they discovered was a story of unrepentant cultural appropriation, disillusion, and the search for spirituality in the modern world.

The story, described in the recently-published *Dream Trippers: Global Daoism and the Predicament of Modern Spirituality*, focusses on Huashan, a sacred Daoist mountain with monasteries and hermits living in caves. The scholars joined several Healing Tao tours to the region and separately interviewed the monks and hermits. From the start, they found the two

cultures were at odds. "The Dream Trippers and the monks for the most part have quite different ideas about the meaning of the Dao and how to access it," Dr Palmer said.

The Americans hoped to absorb the energies of Dao through *qigong* and other practices based on what he calls ontological individualism, "the idea being that you yourself are the ultimate authority and so spiritual practices are really about knowing yourself." The monks, on the other hand, believe the authentic Dao is not about knowing the self, but about practising ritual, cultivating a master-disciple relationship and respecting a formal lineage in order to achieve 'cosmological attunement'.

Adding further complexity to the story is the presence of a leading American scholar and practitioner of Daoism, Professor Louis Komjathy, who happened to be in the same town as the Dream Trippers after one of the Huashan visits.



Master Chen, a Daoist monk of the Order of Complete Perfection. (Courtesy of Michael Winn)



Christianity has a lot of negative baggage for Westerners, which is why some are interested in Daoism, which they see as a pure spirituality. For many Chinese it is the opposite.

Dr David Palmer

A purist, he was on a quest to find an authentic Daoist tradition in China and wanted nothing to do with the consumerist Dao of his compatriots. He followed Dr Palmer's casual suggestion to visit Huashan and ended up becoming a disciple of one of the leading monks, Master Chen. "Komjathy and the leader of Healing Tao, Michael Winn, are engaged in a polemic against each other in the book on what is the true Dao and how to promote Daoism in the US," Dr Palmer said. "Meanwhile, even as he remained critical of both approaches, Chen was both a consultant for Winn's tours and the lineage master in Komjathy's spiritual apprenticeship."

Chen related the tensions between the different views on Daoism to a container of water:

Komjathy paid too much attention to the container – the practices, organisation and lineage – while Winn wanted to bring the water, the Dao, to America without a container.

Invented liturgy

These approaches would ultimately prove fateful for the two players. Chen's monastery was highly politicised, due to both external forces and internal in-fighting. Chen decided to quit and live a low-key life as an urban hermit, while Komjathy became disillusioned by the state of Daoism in China and returned to the US. "While he deeply appreciates that tradition still exists in China, by the end of the summer of 2011 he felt there was not much more he could learn there," Dr Palmer said.

Winn displayed growing appreciation of the Daoist tradition as understood in China, but at the same time was unapologetic about his approach. In 2012 he organised a Daoist wedding at a secluded spot atop Huashan, even though this ritual does not exist in Daoist tradition. Dr Palmer was a witness.

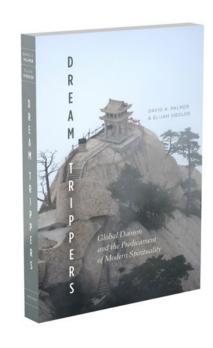
"They had a completely invented liturgy with invented Daoist rituals that talked about the sexual coupling of the yin and yang energies of the bride and groom uniting on this sacred mountain," he said. The final scene in the book is of the wedding guests joining in a group hug, chanting 'Ohm'.

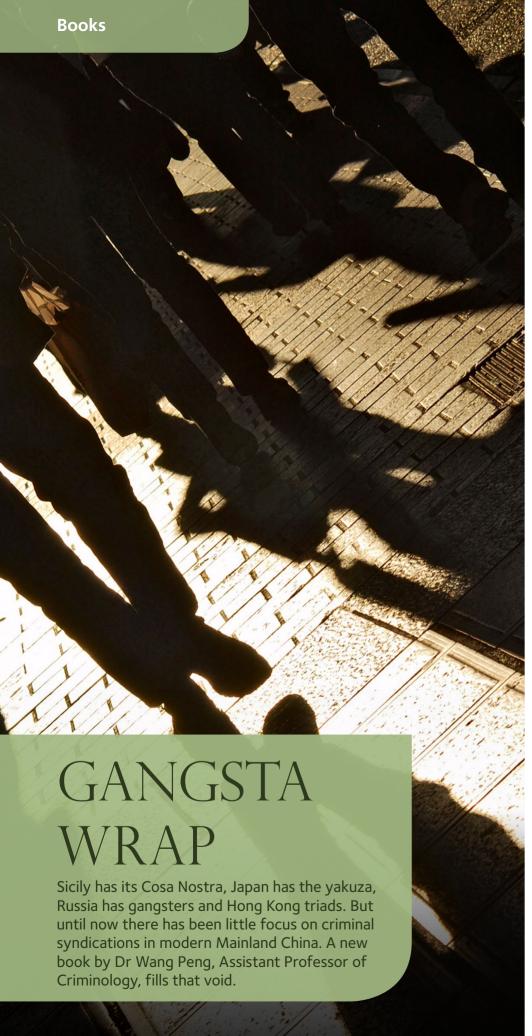
Dr Palmer shared the manuscript with the main protagonists and their responses were telling. Winn provided 60 pages of comments with academic references. Komjathy, who had been most critical of the project, made some factual corrections. Chen, when asked if there were any factual errors about him he would like corrected, replied cryptically that if the book gave a bad impression of him, he deserved it.

Dr Palmer said the fragmentation around questions of authenticity and authority that he and Siegler observed is not confined to Daoism – Christianity, for instance, is also deeply splintered as more people resist having an authority or institution mediate their religious experiences.

"Christianity has a lot of negative baggage for Westerners, which is why some are interested in Daoism, which they see as a pure spirituality. For many Chinese it is the opposite – they see Daoism as representing the backwards and dark aspects of Chinese history and culture and Christianity as something new and fresh," he said. "These are the predicaments of modern spirituality."

Dream Trippers: Global Daoism and the Predicament of Modern Spirituality is published by the University of Chicago Press. ■





Such has been the speed of China's expansion over that past 40 years that the circumstances which leave room for criminal gangs to grow – namely, times of social upheaval and weak law enforcement creating a power vacuum – have been ripe, enabling organised crime in China to evolve from street gangs to criminal syndications.

Dr Wang's book *The Chinese Mafia – Organized Crime, Corruption, and Extra-Legal Protection* looks at that evolution and reveals how the focus of these syndications has changed from traditional illegal activities such as gambling, organised prostitution and drug trafficking to specialising in selling extra-legal protection.

"It's a rapidly expanding business – with two prominent syndications existing side by side – the Black Mafia which are street gangs, and the Red Mafia, comprising corrupt government officials," said Dr Wang. "A key issue examined in the book is the hierarchical relationship which exists between the Red Mafia and the Black Mafia, both of which have different functions to criminal gangs in other parts of the world.

"In Sicily, for instance, the mafia can wield its power to influence elections," he said. "In China there is no universal suffrage so this aspect does not exist. But the corrupt officials of the Red Mafia safeguard criminal gangs who seek out their protection, while the Black Mafia do their dirty work such as collecting debts and evicting people from their homes so the developers can move in."

A more unusual arm of this style of illegal services is the widespread practice by Chinese hospitals of hiring extra-legal Black Mafia organisations to deal with disturbances instigated by patients or their family members. By the same token though, if the Black Mafia do not create a strong relationship with the real police force, then the police will swiftly crackdown on them.

Another unique aspect of the Chinese mafia is the role of *guanxi* – networking or social capital – in its operations. Dr Wang said: "Guanxi can be more important than the law – it represents your status, your face and your reputation, and you depend on it for reciprocity in gaining inside information, protection or even a coveted position in government. It is a mechanism used by private company executives and government officials alike to facilitate the building up of networks. To the mafia's advantage, it also allows for information to be kept within a network."

He pointed out too though that networking is an integral part of the culture of China and it has its positive side. Indeed, it was his own



Guanxi can be more important than the law – it represents your status, your face and your reputation, and you depend on it for reciprocity in gaining inside information, protection or even a coveted position in government.

Dr Wang Peng

guanxi that gave Dr Wang the connections to gather the empirical evidence he needed to write the book. As an undergraduate, he attended the Shanghai-based criminal justice college from 2005 to 2009, where he built a network of colleagues who are now policemen, prosecutors and judges and who helped him contact the right people to speak to reap information.

A kind word and a gun

One of his most important discoveries was the emergence of what he terms 'soft violence' – which, while not the exclusive *modus operandi* of Chinese mafias, certainly seems to be employed often and most efficiently in China. American gangster Al Capone famously once said: "You can get much further with a kind word and a gun than you can with a kind word alone," but Dr Wang suggests that China's mafias are taking a different approach, with the introduction of verbal violence as opposed to physical.

"Gangs use 'soft violence' to create psychological stress," he said. "They stalk, harass and humiliate people, threatening them so they live in fear but not actually doing them physical harm. It is very effective. The police will not tolerate actual violence, because their power as law enforcement officials must be seen to prevail – particularly since President Xi Jinping introduced his anti-crime campaigns to ensure the Party State looks strong. Hence, gangsters have turned to soft violence to intimidate, so it appears they are adhering to the anti-crime drive without actually doing so."

In addition to covering the mafia in today's China, the book provides historical perspective, with brief histories of criminal organisations such as Shanghai's infamous Green Gang, which rose to great power in the 1920s and 1930s when they helped Chiang Kai-shek by acting as low-level enforcers enabling him to gain control of the big banks. Chiang was in fact a member of the gang for a while, but the relationship deteriorated after the defeat of Japan in 1945. Indeed Green Gang leader Du Yuesheng is quoted as saying: "Chiang Kai-shek treats me as a urinal device: he only comes to me when he is in need, otherwise he puts me under the bed."

Having completed the book, the focus of Dr Wang's current research is on the recent crackdowns on the mafia in China. "When

organised crime is perceived by the public to be a serious problem, then police have to do something," he said. "Anti-corruption campaigns have been a hot topic in China for four to five years. The Central Commission for Discipline Inspection (CCDI), which is the highest internal control institution of the Party, is tasked with enforcing internal rules and combating corruption within the Party. The campaigns are a challenge for China's legal system, but the Party cares about the success not about the procedure, and the aim of the campaigns is to show the Party still has the power to solve crises." How the mafias, both Black and Red, deal with this remains to be seen.



The Chinese Mafia – Organized Crime, Corruption, and Extra-Legal Protection was published by Oxford University Press in 2017.

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