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PEOPLE ON THE MOVE

The Human Impact of Migration in Asia



A NEW DROUGHT SOLUTION

Understanding the Role of
Termites in Ecosystem Survival



SOS FROM THREATENED SPECIES

Putting the Spotlight on Hong
Kong's Illegal Wildlife Trade



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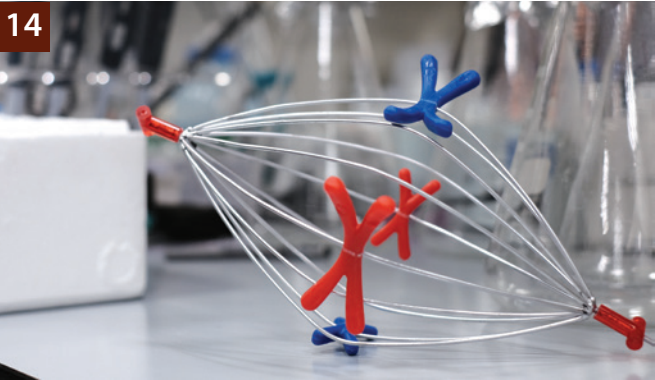
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PEOPLE ON THE MOVE

Hundreds of millions of Asians migrate to other countries or within their own countries for work. HKU scholars have been studying the impact on families and the workers themselves when they leave their homes and all that is familiar behind; assessing the economic and wider societal impact of migrant labour on Hong Kong and China; and seeking to mitigate some of the more negative effects through a project to empower domestic workers in Hong Kong with knowledge.



THE FAMILY EFFECTS OF MIGRATION

People typically migrate to provide better lives for themselves and their loved ones. This has complex effects on the children and caregivers left behind, as Dr Lucy Jordan has found.



At first glance, the findings on migrant families would overwhelmingly suggest migration does harm. They suffer higher divorce and death rates, for instance, and the children face greater likelihood of being institutionalised. But that portrait tells an incomplete story, says Dr Lucy Jordan of the Department of Social Work and Social Administration. She has been systematically assessing the impact of migration on families and children for over a decade to bring intellectual rigour to policies and support services.

“One of the main things I try to beat the drum about is that context matters – the family context, the community, the accessibility to services in the host and origin communities,” she said. “For instance, we can’t say wholeheartedly that migration is why families crumble. The more likely story is that if there are cracks, they may get larger. And higher death rates may be due to poverty in communities that is exacerbated by a lack of care or physical support as adults migrate to jobs elsewhere.”

Dr Jordan’s research started in 2007–2010 when she was part of a team looking at the impact of parental migration on families in the Philippines, Indonesia, Vietnam and Thailand. Their Child Health and Migrant Parents in South-East Asia (CHAMPSEA) project focussed on two cohorts of children, aged 3–5 years old and 9–11 years old, who have been followed up periodically ever since to track their progress.

An early outcome published in 2011, highlighted the complexity of migration. It looked at the impact on children’s psychological well-being based on their age and the duration of time their parent or parents were away, among other factors. “There was a vulnerability among younger children, but less so among the older children,” she said. Tellingly, children in Indonesia showed more vulnerability than those in the Philippines, possibly because of more government and civil society support services for migrant families at the time. Indonesia has since been catching up.

When both parents of children migrate for work, elderly grandmothers may face challenges.

Burden of care

A different but similarly complex story has been found in Cambodia, where Dr Jordan is now doing a consultancy project for the International Organization of Migration. Elderly grandmothers, upon whom childcare tends to fall when parents migrate, have a higher prevalence of depression, anxiety, malnutrition and obesity among the migrating families. But the youngest children, under 12 months old, did surprisingly better when they came from migrant families in terms of nutritional intake, weight and development.

“We haven’t unpacked all the complex inter-relationships, but it may be that caregivers are more willing to give up their own nutritional diversity for the sake of the children,” she said. In any case, the advantages fade by age three.

Migration also seemed to result in teenage boys having higher rates of poor nutrition and stunted growth and less resilience than girls. Yet there were no noticeable differences in overall psychological well-being between teenage children of migrant and non-migrant families.

China is another complicated case because migrants within the country face the obstacle of the *hukou*, or household registration, which determines access to things like healthcare and education based on where one is born. Dr Jordan studied the effects of the system on Chinese-African couples and found Chinese parents reluctant to bring their child to their hometown for registration because of the discrimination they may encounter. This means the family cannot access certain services.



Economic status quo (left) versus growing prosperity (right) among households of migrants in the Philippines illustrate the diversity in migration experiences for the family.



Dr Lucy Jordan (second from left) leading discussion with local policymakers and representatives from international NGOs based on research study findings.

On the other hand, cross-border children, who have one parent from Hong Kong and the other from Mainland China, have both advantages and disadvantages. Dr Jordan participated in a study that surveyed 2,000 such children, some of whom travelled to Hong Kong every day for school, while others lived in Hong Kong with their parents.

Nuance factors

“There have been concerns that the kids travelling across the border may be vulnerable because they have this pretty long commute and may be discriminated against, but we haven’t found unilaterally bad outcomes. It depends on the nuance factors – they have bigger homes in Shenzhen and certain aspects of the quality of their lives may be better due to the higher cost of living in Hong Kong,” she said. “So again, context matters. I’m not sure it’s actually migration but other factors that make migration harder to cope with.”

The obvious solution is to provide more resources and support for migrants both at the host and origin countries. A better understanding of migrants and their families can also help.

Dr Jordan is currently looking at the neglected field of inter-generational transfer of migration in which children of migrant workers become migrant workers themselves. She is going back to the 9–11-year-old cohort from Indonesia and the Philippines, who previously were adamant they would not follow in their parents’ footsteps because of the effects on family life.

“These kids are now entering their 20s and we suspect some of them may have now become migrants,” she said. “There is an argument that without structural changes in the origin countries to create labour markets offering more sustainable wages, that kind of migration will keep happening.”



DR LUCY JORDAN

“Context matters. I’m not sure it’s actually migration but other factors that make migration harder to cope with.”

A CITY FUELLED BY MIGRANTS

Hong Kong's economic success has crested on three waves of immigrants who injected fresh ideas, skills and labour into the city. That story must continue if Hong Kong is to sustain its economy in the coming years, says Professor YC Richard Wong.

"Hong Kong has always been a city of immigrants," says Professor YC Richard Wong, Chair of Economics and Philip Wong Kennedy Wong Professor in Political Economy, a description that still applies long after revolution and war sent hundreds of thousands of people scurrying into the city. The percentage of first-generation Mainland China immigrants who have arrived since the late 1970s currently totals nearly a quarter of Hong Kong's population. When their offspring are included, it reaches nearly one third.

These immigrants have provided the only source of labour growth in Hong Kong in recent times, particularly immigrant women. Although they are less entrepreneurial than immigrants of the past, they have nonetheless been critical to the city's economy because of the ageing population. "Without them, we would not have an adequate labour force," he said.

It is a conclusion that could apply to much of Hong Kong's modern history.

Professor Wong has been analysing census data dating to 1921 to track the impact of immigration on Hong Kong's economic development. He has identified three waves and drawn parallels and comparisons between them to show the impact of each wave.

The first wave came before the Second World War, when people could traverse the Mainland border with relative ease. "There was a small local population, but most people were men who came from the Mainland, laboured here and went back to their hometown. The elites among them worked with British companies and set up local stores. That would be the beginning of the city," he said.

Rapid growth with second wave

The second wave came in the 1940s and 1950s, after the end of the war and China's 1949 revolution. From 1945 to 1951, Hong Kong's population nearly quadrupled from about 600,000 to 2.3 million.

"Most of the arrivals came from Guangdong province, while a smaller group were from all over China. These were mostly businessmen and professionals who were sometimes euphemistically lumped together as 'people from Shanghai'," he said. "They brought a variety of skills – manufacturing, shipping, movie-making, banking – and they began to do business in Hong Kong with labour from workers who mostly had come from Guangdong province. This created rapid economic growth largely based on export-oriented manufactured goods."

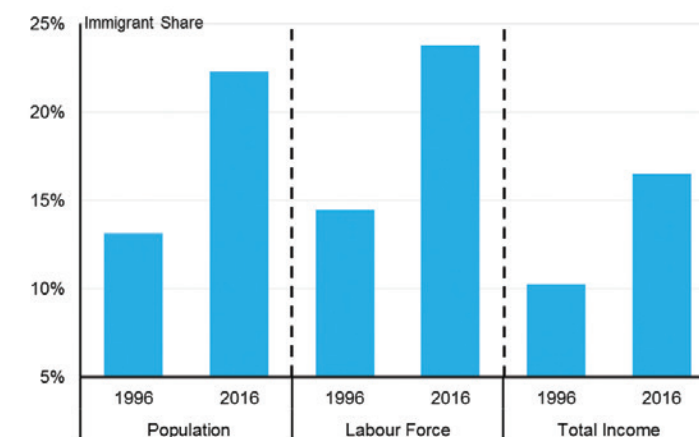
The demography of this group also differed from the first wave. Both men and women came, they were relatively young, and their average family sizes were large. As their children grew into young adults, they boosted Hong Kong's industrial labour force of the 1960s and 1970s.

The third and current wave started with China's opening in 1978. Initially, there was a rush of 300,000 new immigrants due to Hong Kong's 'touch base' policy that allowed them to stay if they reached the city. The policy ended in 1980 and was followed by a more orderly daily quota for family renewal that started at 75 per day and later increased to 150. This quota has been filled largely through cross-border marriages.

"This third wave of immigrants has been heavily dominated by women who have relatively less schooling than the post-war generation. But they have subsequently become important for Hong Kong's labour force," Professor Wong said, filling jobs such as security guards, waitresses and gas station attendants, particularly in the New Territories. But many now occupy skilled and professional jobs.

China's opening in 1978 has brought a steady flow of immigrants into Hong Kong. In 1996 they constituted 13.2 per cent of the population, 14.5 per cent of the labour force, and contributed 10.3 per cent of total earned income. By 2016, they were 22.3 per cent of the population, 23.8 per cent of the workforce, and producing 16.5 per cent of total earned income.

Contribution of immigrants from the Mainland arriving after China's opening



(Source: Hong Kong By-Census Sample Datasets)

Part of Hong Kong's fabric

The youthfulness and labour participation rate of recent immigrants set them apart from local residents. Between 1996 and 2016, 43 per cent of recent immigrants were of the prime working age of 25–44 against only 26 per cent of the non-immigrant population. And 55.6 per cent were participating in the labour force, against 51.3 per cent among the rest of the population.

"If we had not had a constant stream of recent immigrants, the ratio of elderly to working age population would have been even worse and our economic performance would have been more challenging," Professor Wong said.

He draws comparisons with Japan. In 2015, about 22 per cent of Hong Kong's working age population was elderly (65 or above). When Japan reached this level in 1995, it coincided with the onset of economic stagnation that has persisted to this day.

"The two events are not coincidental but in fact intimately related. Today, Japan's elderly population is 47 per cent of its working age population. By 2030, Hong Kong will reach this stage." The answer, he believes, is to continue to look to immigrants to sustain Hong Kong's labour force and to consider ways of scaling up efforts to attract quality immigrants. And

to remember that immigrants are part of Hong Kong's fabric.

"Very often politicians complain about this third wave as competing for public resources. But the important thing to remember is that they are members of a household in which overwhelmingly one of the members is local. They have migrated here for family reunion," he said.



**PROFESSOR
YC RICHARD
WONG**

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TWO TAKES ON CHINA'S MIGRANT WORKERS

Government museums dedicated to China's migrant workers glorify their 'sacrifices' for the country's economic development, while a museum operated by workers focusses on their struggles. Geographer Dr Qian Junxi has been exploring the odd phenomenon of migrant worker museums and what they reveal about this group's place in Chinese society.

Migrant workers have long had a poor image in China. When they started to flood into cities in the 1980s and 1990s to fill factory jobs, they were regarded by both urban residents and official state media as uncivil, disorderly and crime-prone and they were denied *hukou* permits that allow access to services and housing. This negativity provoked rising labour unrest and other problems of governance of a population that numbered at least 200 million, which led to a softer approach from the government.

This century, the government has romanticised migrant workers in the popular media and provided them with cultural recognition through two state-sponsored rural migrant museums that opened in Shenzhen in 2008 and Guangzhou in 2010.

Dr Qian Junxi, Assistant Professor of Geography, and his collaborator Dr Eric

Florence of the French Centre for Research on Contemporary China have been studying the contents of these museums, as well as another founded by migrants. Their findings suggest the state still has a long way to go in depicting the life of migrant workers as they experience it.

"At the centre of the state representation is an East Asian Confucian meritocracy where if you contribute to society's development and to the economic prosperity of our country, then you have earned our respect. This respect is not because you are a citizen, but because you have proven yourself to be economically useful," Dr Qian said.

State's preferred models

The state museums offer two overlapping and interrelated models of migrant workers. One model is docile and industrious and willing

to sacrifice himself or herself for the country's economic development by working for relatively low economic returns.

"This is a glorified image of rural migrant labourers and it does not recognise that their labour should be properly rewarded. Because by talking about a noble cause, you don't need to be concerned about rights and economic returns," he said.

The other model is the self-driven, entrepreneurial worker who achieves economic success. "This type of worker represents the neoliberal mentality that you take responsibility for your own economic well-being and improvement – there is no collective responsibility of the public sector. But only a very small proportion of rural migrants achieve this success. The vast majority suffer from institutional discrimination and inadequate access to

农民工博物馆



The entrance of the Museum of Migrant Workers in Guangzhou.

resources and opportunities and protection of rights. So it is very difficult for migrants to follow the template of those successful figures," Dr Qian said.

The state migrant museums also emphasise the state's generosity and care towards workers. Various levels of government have given them growing access to services and labour protection, and the living conditions in migrant villages have improved. "However, all these piecemeal modifications tend to obfuscate the fact that the *hukou* system remains, which is the primary source of rural migrants' marginality," he said. As a result, strikes, protests and collective resistance persist, as well as a failure by institutions to protect workers' rights and welfare.

Workers' perspective

These issues are not mentioned in the state museums, but they do have a forum in the worker-led Culture and Arts Museum of Migrant Labours that is tucked away in a temporary structure near Beijing's main airport. Its displays offer a rebuke to state-sponsored narratives.

For example, while state museums portray residence permit cards as gateways to the future for rural migrants, the Beijing museum presents them as a burden because of the huge effort required to obtain the necessary documentation to qualify for these cards.

The Beijing museum also shows how workers are exploited and oppressed, such as the strict restrictions placed on workers' time and socialising at Foxconn factories, and how employers refuse to provide adequate protection or even medical assistance for labour-related injuries.

"The government tends to portray labour as a way for migrants to achieve mobility, but the migrants have feelings of alienation and of being separated from their support network. They feel subjected to the exploitative mechanisms of a capitalistic economy," he said.

Dr Qian and another collaborator, Quan Gao of Newcastle University, UK, have begun looking at how workers cope with this alienation. In Shenzhen, they discovered many migrants attend Christian churches – of nine churches visited by the scholars, more than 80 per cent of the congregations were migrant workers.

"They join for two reasons. One is superficial – they find community there and a social support network. A deeper reason is that they borrow from Christian theologies to make sense of their current situation. They tend to think they are not exploited by capitalism and that their suffering is because they are labouring for God, so they want to better themselves to be better behaved, not quarrel too much and obey the rules," he said. "We expected these churches to be spaces of resistance, but in fact they turn out to be spaces of co-optation."



DR QIAN JUNXI

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Display of permits and certificates needed for working in the city.



Replica of a workshop, but now deprived of labour activities and relations.

SPYCAMS AND SNAPSHOTS CAPTURE WORKERS' LIVES

Professor Maggy Lee Shuk-yi has been investigating the experiences of Filipina domestic workers, from the surveillance they are subjected to before and after they leave their country to the objects that bring meaning to their lives.

Several million Filipinas work as overseas domestic workers and are an important source of remittances for their families back home. They also contribute to the economy in places like Hong Kong by facilitating dual-career households. But in the process, the migrant workers must navigate constraints and invasive scrutiny both in their home and destination countries, says Professor Maggy Lee Shuk-yi of the Department of Sociology, who has been researching the social impact of migration.

Professor Lee has completed several research projects on Filipina migrant domestic workers, including a recent British Academy-funded project on the surveillance of these workers in Hong Kong, conducted with Goldsmiths, University of London and the University of Hull.

"These workers are subject to a highly elaborate and formalised system of pre-departure monitoring that requires them to go to great lengths and bear significant financial costs to produce a wide range of documents and files before they are able to travel from the Philippines," she said. The documents range from authenticated birth and marriage certificates, medical certificates, passports and work visas to voter registration cards, National Bureau of Investigation clearance, local police clearance, local government clearance, baptismal certificates, school or college diplomas, attendance certificates from a pre-departure orientation seminar, overseas employer certificates, and more.

The monitoring continues, albeit in a different form, when they reach their destination. Hidden 'nanny cams' are particularly intrusive. Professor Lee cited one case where a domestic worker was dancing with her new employer's young daughter when she received a call from the employer, who was suspicious that the child was being shaken. When the child appeared before the camera laughing and smiling, the employer was assured. But the participant was left feeling uneasy.

"She knew there were cameras in the home but that was the first time the employer had acknowledged their presence. It made her think more carefully about how her actions appeared on camera," Professor Lee said.

Counterproductive

Workers regard this form of watching as counterproductive compared with face-to-face surveillance, she said. "While the use of cameras is often legitimised in terms of preventing harm and ensuring care, it may have precisely the opposite effects in so far as it undermines the trust necessary for care relationships and constrains rather than ensures or enables the attentiveness necessary for good care."

"This kind of monitoring allows employers to not just monitor at a distance, but to interrupt, direct and interfere with their employees' work in a continuous and unpredictable manner. The camera is both a focal point of conflict and negotiation, and a device for contesting relations of trust," she said.

Separately, Professor Lee has also been part of a research team trying to show that domestic migrant workers are not simply 'maids to order'. In collaboration with Goldsmiths University and various NGOs, she was

co-investigator on a project about Filipina domestic workers in London and Hong Kong that sought to get the workers themselves to contribute to the discussion about the social impact of migration.

Sixty subjects participated in the study in which they were interviewed and shared personal stories and photos that reflected their aspirations, investments and everyday concerns. The collected materials were exhibited in Manila, London and Hong Kong in 2018.

One participant who had been working in Hong Kong for 26 years shared laminated wallet photos of her children and husband. "In the photos hidden in people's pockets, children are always small and partners are always young," Professor Lee said. "This woman left to work long before the days of smartphones and Skype calls, and she missed the sound of her own children growing up. She said the objects reminded her of her bigger dreams for her children to study and have a better life."

Contrasting experiences

Others shared photos of meaningful objects such as a manicure set that helps a migrant earn extra money, carpentry tools sent

home to a self-employed husband, documents giving title to property in the Philippines, favourite foods from home, and religious mementos.

"Through these images and their narratives, we wanted to raise public awareness about the vital work these migrant workers perform and the relation between migration and development," she said.

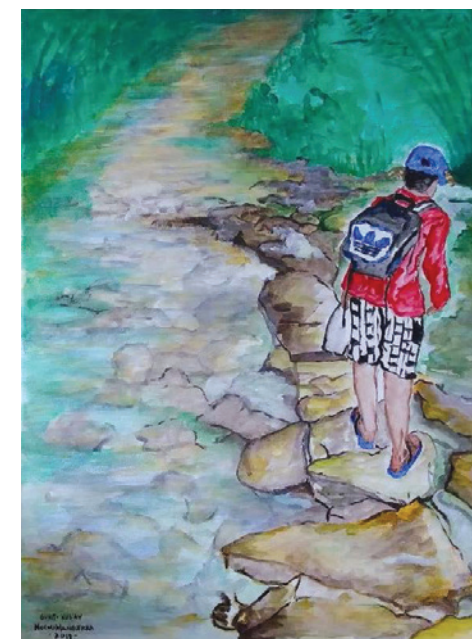
The two projects provide an interesting contrast to earlier work by Professor Lee on female transnational professionals who migrated to Hong Kong from the 1980s to the 2000s for career reasons, personal preference, or to accompany their husbands.

"Unlike migrant domestic workers, these female expatriates are not necessarily compelled to move for economic reasons and their mobility is subject to fewer formal restrictions and less pervasive scrutiny," she said.

"The two contrasting types of migrants have shown me that we need to rethink our narrow conceptions of migration and how private experiences are shaped by wider patterns and conditions of social life."



Sample postcards created by migrant workers during the focus group workshops.



Canvases painted by Filipina artists who are currently working as domestic workers in Hong Kong and are part of the Guhit Kulay, a Hong Kong-based domestic worker-led art collective.



PROFESSOR MAGGY LEE SHUK-YI

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EMPOWERING DOMESTIC WORKERS WITH KNOWLEDGE

HKU staff and students are spending their weekends at EmpowerU, an initiative to teach domestic workers about health, legal, financial, career and other matters and inform them of their rights.



The first cohort of students from the Domestic Worker Empowerment Project with HKU student ambassadors.

When Dr Michael Manio of the Li Ka Shing Faculty of Medicine's Emergency Medicine Unit arrived in Hong Kong from the Philippines in 2010 to pursue PhD studies here, he was surprised to stumble across large crowds of Filipinas gathering in public places. "I thought they were homeless. In the Philippines you don't see groups of women sitting out in the street like that," he said. As he discovered in discussions with the women, this was just their normal day off. Since they are required to live in with their employers, meeting on the street is often the only place they can have privacy with friends.

That situation spurred Dr Manio to make a difference. After completing his PhD in 2014, he proposed the Domestic Worker Empowerment Project (DWEP) – re-branded

in 2018 as EmpowerU – to equip the workers with knowledge so they can better care for themselves and their employers and improve their lives.

"The inspiration came from talking with the domestic workers. They told me they want to upgrade their skills and improve their work, but how can they do that if no one is teaching them? Here at the University, we have a pool of experts and we've tailor-made the curriculum for them," Dr Manio said.

Currently, about 1,000 domestic workers gather every weekend for courses taught on campus by HKU academics (about 15 staff from different Faculties are involved), with support from HKU student interns.

Expanded offerings

The domestic workers pay a small fee to help cover administrative expenses for a one-year certificate programme that covers health and wellness, the law and their rights, business and financial matters such as saving for the future, recycling and other environmental protection measures, and media studies to enhance skills in photography, story-telling and video editing.

Participants are also trained in cardiopulmonary resuscitation and fire safety by Hong Kong's Fire Services Department, and they learn computer skills. They can also take optional language courses in Cantonese and Japanese. Most importantly, they are connected to a broad network of NGOs, government bodies

and other support services that can help them if they encounter difficulties.

Dr Manio's partners in EmpowerU are David Bishop in the Faculty of Business and Economics and Lindsay Ernst in the Faculty of Law, who also both run Migrasia Global Solutions Ltd, a social enterprise incubator focussed on solutions for people who migrate. With their help, the EmpowerU programme has expanded over the past three years to nine courses, secured external donations such as computers and dress suits that the women can wear to class, and crowd-funded nearly HK\$40,000.

And the domestic workers are not the only ones learning. The founders also hope student interns will have their eyes opened, too. "We want to involve our students because they will become future employers. It's a chance for them to understand the lives of domestic workers and learn from them," Dr Manio said.

HKU students gain insights, too

Lilaine Kapangyarihan, a third-year Bachelor of Social Sciences student and a Filipina, was raised by domestic helpers and concurred.

"Before I came to university, I hadn't thought of their lives very much," she said. "I came to EmpowerU to understand the culture more and the situation that domestic helpers are in, and maybe try to help them."

Sheleoni Chung Ho-lam, a fourth-year Bachelor of Social Sciences student, was also raised by a domestic helper with whom she formed a special bond. She expressed sympathies for the difficulty helpers face in overcoming culture and communication in a foreign land, and she was impressed by the dynamism and enthusiasm of EmpowerU's participants. "I've never seen a classroom so vibrant. They never fear asking questions and the classes are more like a conversation between the students and lecturers," she said.

Mr Bishop of the Business Faculty sees great potential for EmpowerU. He would like to see it expand to help not only domestic workers in the region but also refugee asylum seekers and others in need, which could be done by recruiting other university partners and setting up online learning platforms. "My hope is that EmpowerU becomes the go-to learning platform for marginalised and disadvantaged populations across Asia," he said.

Dr Manio, meanwhile, continues to work on making the HKU EmpowerU a success. He turned down tenure-track positions at universities in Korea and the Middle East so he could stay in Hong Kong. "It's a nice community at EmpowerU, like a family," he said. "When I meet these domestic workers every weekend, I don't consider it work. There is passion and commitment and I feel I am doing something worthwhile here in Hong Kong."



DR MICHAEL MANIO

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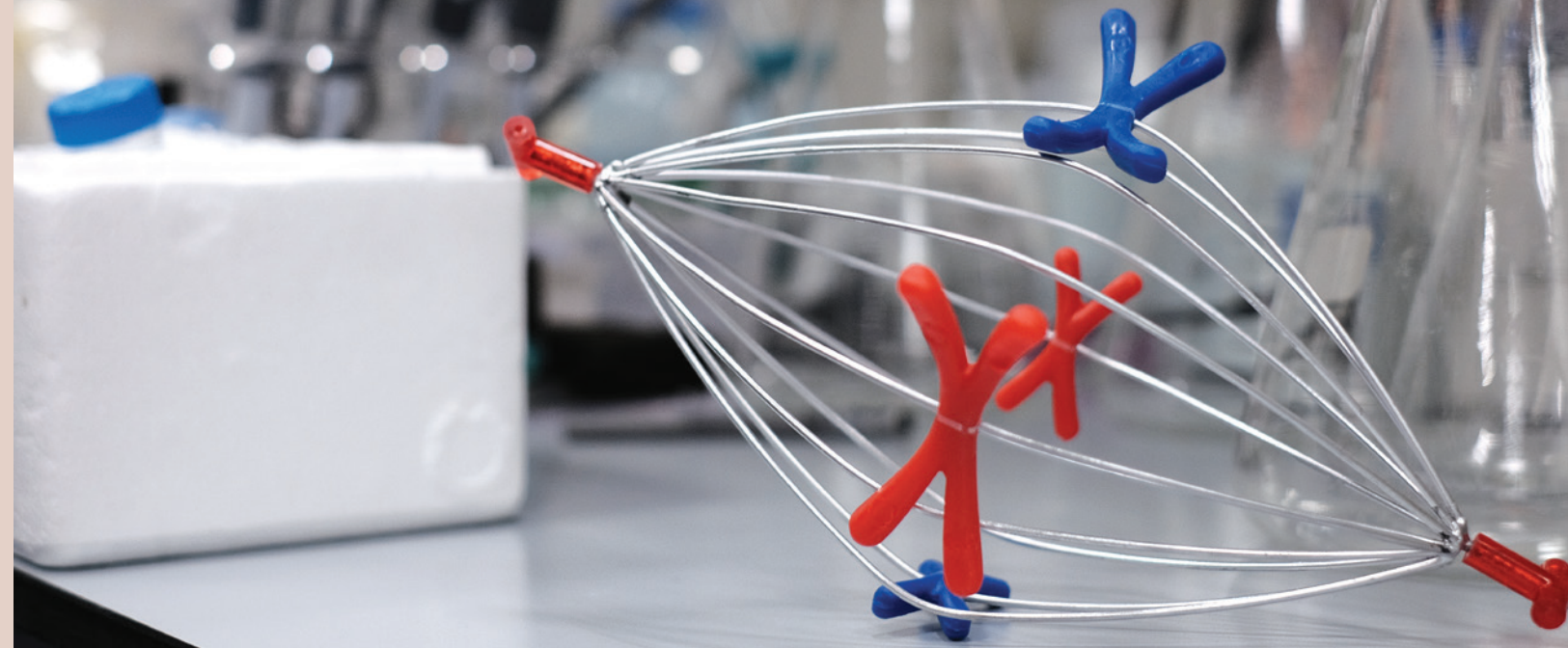
Students being trained in cardiopulmonary resuscitation and fire safety by Hong Kong's Fire Services Department.



The Domestic Worker Empowerment Project kicked off in 2014 with the participation of HKU students.

CHROMOSOME STABILITY IN THE BALANCE

Errors in chromosome separation can result in an abnormal number of chromosomes and lead to diseases such as cancer. Biologists have now discovered that non-coding ribonucleic acid (RNA) plays a vital role in maintaining chromosome stability.



During cell division, all chromosomes (represented by the blue and red 'X' shapes), which have been replicated to two identical sister chromatids and held together at the centromere, first align in the centre of the cell through attachments to spindle microtubules (represented by the iron rods). Subsequently, the identical sister chromatids are each pulled to one side of the cell, ensuring equal chromosome segregation.

The groundbreaking research, which revealed that centromeric DNA is used as a template to produce a non-protein coding centromeric RNA essential for chromosome stability, was done by Associate Professor Dr Karen Wing Yee Yuen, who heads HKU's Chromosome Biology Laboratory, and Post-doctoral Fellow Dr Yick Hin Ling, both from the School of Biological Sciences.

"During cell division, the cell must distribute its chromosomes equally and accurately to its daughter cells," said Dr Ling, first author of the work. "Errors occurring in chromosome segregation can result in cells with an abnormal number of chromosomes, called aneuploidy, which is a hallmark of cancers and may also cause spontaneous abortion or birth defects. Therefore, it is important to understand the regulation of cell division.

"Centromere is one of the major elements on a chromosome to regulate the movement of the chromosome during cell division. Our research suggests that mis-regulation of cenRNA [centromeric ribonucleic acid] expression causes centromere malfunction, which results in chromosome instability and aneuploidy."

Their discovery has sparked much interest in scientific circles, partly because non-coding RNA produced from the centromere (cenRNA) has really captured scientists' attention over the last decade. As cenRNA is present in a very small amount, whether it has meaningful biological functions, or it is simply useless, has been a matter of frequent debate.

"Our study has two main discoveries," explained Dr Ling. "First, cenRNA controls

the cell division of budding yeast, one of the simplest forms of eukaryotes in the earth. In recent literature, we know that cenRNA also controls the cell division in animals like mice and humans. Therefore, our findings suggest that the action of cenRNA in cell division remains unchanged throughout evolution.

"Second, our work showed that the cenRNA level is tightly regulated. Too much or too little cenRNA affects the stability of the chromosome. It is clear that the cells produce only a minute amount of cenRNA for a reason. In future research, we are very interested in studying the mechanism behind this."

Implications for cancer research

Recent studies have shown a link between a high level of cenRNA and breast cancer. In mice, breast cancer can be induced by artificial overexpression of cenRNA in the cells of mammary glands.

"The mechanism is unclear, but we think that a high cenRNA level will disrupt the normal function of the centromere, causing aneuploidy and driving cancer formation," said Dr Ling. "Another study indicated that high cenRNA levels may also promote the formation of an extra centromere on the chromosome. When a chromosome contains

two centromeres, it will break during cell division, resulting in chromosome fusion, rearrangement and breakage again, common in tumour cells."

The research team now intends to see if cenRNA can be used as a biomarker in disease diagnosis and/or as a target for cancer therapy. Dr Ling said: "Our first step will be to gain a more thorough understanding of the action of cenRNA spatially and temporally, and how the cenRNA expression is mis-regulated, causing chromosome instability, aneuploidy, and eventually cancer."

Path to discovery

The Chromosome Biology Laboratory began focussing on the regulation of the centromere in 2011 under Dr Yuen's stewardship. When Dr Ling joined the laboratory in 2013, they began to investigate how cenRNA regulates the yeast centromere.

During her PhD, Dr Yuen identified hundreds of genes that would cause chromosome instability in yeast. These genes included human gene homologs with relevance to cancer. "We are excited to see multiple genes that cause cenRNA mis-regulation. We may be able to find a cenRNA-related mechanism that underlines cancer development," she said.

"In humans, there are 23 pairs of chromosomes, and yeast has 16. So in the project, we are actually dealing with 16 different species of cenRNAs. We tried to deplete one particular species of cenRNAs to see what happened to the chromosome from which the cenRNA originated. We found that the chromosome is perfectly fine. That was the moment that we both thought that cenRNA was useless."

Fortunately, however, they did not stop there: Dr Ling spent a year doing complicated yeast genetics to deplete all 16 species of cenRNAs. "We found that the chromosome is unstable only when we manipulate all the cenRNA species," he said. "We also found a sweet spot of cenRNA level for a chromosome to function normally. Both too much and too little cenRNA are detrimental."

Baker's yeast, or budding yeast shares 23 per cent of human genes, meaning that yeast is an excellent model organism for studying basic biological processes in which yeast and humans shared, such as cell division and DNA replication.

"Yeasts are fast and easy to grow, and we can manipulate their DNAs quite easily, which allows us to do experiments that are difficult to do in humans or mammals," said Dr Ling.

"We often get our first understanding of fundamental conserved human cell processes via experiments on yeast."

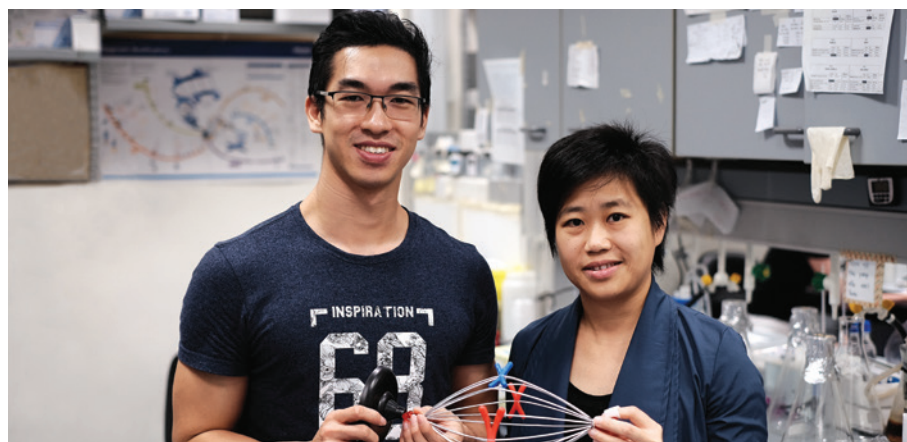
Dr Yuen added: "With simple model organisms like yeast, you can find out the most basic mechanism of how eukaryotic cells work, accurately and efficiently. We can learn a lot about ourselves from these single-cell organisms, with our creativity and imagination in experimental design.

"What comes next is that we'll visualise the localisation dynamics of such cenRNA in live cells within their two-hour cell cycle, and understand their functions using different 'guilt by association' approaches."



DR KAREN YUEN

"We are excited to see multiple genes that cause cenRNA [centromeric ribonucleic acid] mis-regulation. We may be able to find a cenRNA-related mechanism that underlines cancer development."



Dr Yick Hin Ling (left) and Dr Karen Yuen (right) from the School of Biological Sciences show that too many or too little cenRNA [centromeric ribonucleic acid] will result in cell division error.

THE ART OF BENDING THE LAW

Protest movements are often associated with civil disobedience. But some protesters pursue ‘uncivil obedience’ – adhering to the rules in such an exaggerated and literal way that it becomes subversive. Art historian Dr Monica Lee Steinberg has been exploring this phenomenon and other ways that artists interact with the law.

American conceptual artist Lowell Darling is practised in the art of bending (but not breaking) rules to the point of absurdity. Faced with onerous demands by US tax authorities to prove he was a ‘for-profit’ artist and not a hobbyist, in order to claim some US\$800 in expenses, Darling turned the challenge into a project. He established the fictional Fat City School of Finds Arts and handed out thousands of free MFA and PhD degrees; and he transformed the documentation of his art practice (business records, correspondence, project ideas) into a marketable portfolio – a copy of which is in the special collections division of the Getty Research Institute in Los Angeles.

Darling also challenged the political system by running for California governor in 1978 on the platform ‘The Inevitable Campaign Slogans and Promises’. His campaign featured a large stuffed hand on a stick (a ‘glad hand’) for shaking people’s hands and an admission that he was selling out to special interests, a proposal to replace taxes with good luck, and an announcement that he would appoint the incumbent candidate Jerry Brown as the governor.

Such acts of ‘uncivil obedience’ are the focus of ongoing research by Dr Monica Lee Steinberg, Assistant Professor of American Studies in the School of Modern Languages and Cultures. She has been trawling through archives to

uncover work by contemporary artists, like Darling, who engage in what she describes as “contentious compliance to expose the flaws of a system”. Unlike civil disobedience, uncivil obedience has received scant attention from fine arts scholars.

“Artists like Lowell Darling are taking the letter of the law and looking at how they can work within it while also protesting certain aspects they disagree with,” she said. “US tax law is dense and complicated, and it has always been a point of difficulty for artists to demonstrate they are working ‘for-profit’ and thus eligible to take a deduction for expenses related to their practice. Darling fulfilled, in an unexpected way, the requisite for-profit

factors considered by the Inland Revenue Service. He also deconstructed not only a political campaign but the ludicrous things that are very common to campaigning.”

Staying within the lines

Intellectual property rights are another area that has been the target of artistic uncivil obedience. One well-publicised case was the 2011 project *Face to Facebook*. Artists Alessandro Ludovico and Paolo Cirio used 250,000 public profiles on Facebook to create a fake dating website, which they uploaded then shut down quickly afterwards. They assiduously documented the ensuing repercussions, which included a letter from Facebook’s legal team that focussed not on privacy violations, but on the artists’ trademark infringement.

“What becomes clear in a very public way is that, in the United States, there is little privacy protection for users of social media sites. But Facebook can galvanise intellectual property protections if and when others use the word ‘Facebook’,” she said. “The artists were very careful to stay within the lines of certain laws

to highlight a discrepancy between privacy and intellectual property protections.”

Dr Steinberg’s interest in uncivil obedience traces back to an earlier project about contemporary artists who create works using fake names. Some, such as Lynn Hershman Leeson and Bruce Conner, even signed contracts using their fictional characters’ names.

“I kept thinking, are these contracts even valid? It led me toward the question of what happens at the intersection of art and law from a humanities perspective, which is an understudied area. That’s when I started looking at all these artists who were using law as a medium of expression and found an entire body of work,” she said.

In addition to the art of uncivil obedience, Dr Steinberg has also started studying ‘true crime’ representations in art. For example, Mark Lombardi created hand-drawn infographics and diagrams to creatively trace fraud and abuses of power, such as a work illustrating the business connections between former US President George W Bush and Osama bin Laden from 1979 to 1990.

As with uncivil obedience, Dr Steinberg’s interest in true crime in art leans towards artworks about taxes, particularly given the labyrinthine nature of US tax law. In fact, she is finding that such complexity abets artistic expression.

“The norms that underpin how we apply policies, mandates, and laws are not written down, so the more rules there are on the books, the more opportunities there are to explore those rules in an unexpected and hyperbolic way,” she said.



**DR MONICA
LEE
STEINBERG**

“The norms that underpin how we apply policies, mandates, and laws are not written down, so the more rules there are on the books, the more opportunities there are to explore those rules in an unexpected and hyperbolic way.”

Paolo Cirio and Alessandro Ludovico initiated the Face to Facebook project in which a custom-made software was used to steal one million public profiles from Facebook, filtering them with artificial intelligence for face-recognition software and posting the resulting 250,000 profiles on a dating website. (Courtesy of Paolo Cirio and Alessandro Ludovico)



Lowell Darling, Elect Darling Governor, 1978. Button pins, diameter: 1 3/4 in. (4.4 cm), Lowell Darling Papers, box 2, Santa Monica Art Studios, Santa Monica, California. Photograph by Sabine Pearlman. © Lowell Darling



Mixed media installation at Public Private exhibition 2013 at Kellen Gallery of The New School, New York. (Courtesy of Paolo Cirio and Alessandro Ludovico)

STREET-LEVEL STUDIES TAKE THE PULSE OF HONG KONG

The Li Ka Shing Faculty of Medicine's cohort studies, involving tens of thousands of subjects, help scientists understand health and well-being in people's daily lives. The work also recently flagged the harmful impact on mental health from social movements, such as the recent anti-extradition bill protests.



Public health studies are valuable for understanding population profiles and spotting emerging trends. But in order to be useful, there needs to be quality data – and lots of it. That takes both money and laborious collection work. Fortunately, HKU's School of Public Health has had admirable success in securing resources for this work that will have benefits for generations to come.

The School works on cohort studies that involve thousands of people and use scientific methods to collect and analyse the data. One of their most striking projects has been the Family Cohort Study, conducted as part of a HK\$250 million project on health, happiness and family harmony that was funded by the Hong Kong Jockey Club Charities Trust. Half the money was used to collect baseline data from 20,000 households for the cohort

study (the other half went to action programmes and participatory research with the community).

More than 100 researchers and staff paid two visits to the households between 2009 and 2013. Each member of the household was interviewed using an array of validated questionnaires and each interview took at least one hour. The researchers also brought validated measuring tools to take biometric data such as height and weight. "It was like doing a census," said Professor Gabriel Leung, Dean of Medicine and Helen and Francis Zimmern Professor in Population Health, who leads the Family Cohort Study with Dr Michael Ni, Clinical Assistant Professor of Public Health.

The Jockey Club funding ended in 2013, but since then the scholars have secured research

grants and other funds to continue to monitor this population through telephone surveys. While much of the data is still being teased apart and subject to peer review, they recently identified a trend that was alarming enough for them to go to the media with the results, given the public health implications.

Depression trend

Their surveys found that the recent anti-extradition bill protests in Hong Kong coincided with a sharp increase in mental health problems: 9.1 per cent of respondents reported symptoms of probable depression and 4.6 per cent of suicide ideation (in fact, several suicides have been linked to the movement).

This increase was significantly higher than the baseline established in 2011, when probable depression was 1.3 per cent among respondents and suicide ideation 1.1 per cent. During 2014's Occupy Central movement, the figures rose to 5.3 per cent and 3.6 per cent, respectively.

"When we saw the recent results, we felt a duty to alert society. We truly have a mental health epidemic when one in 10 people are affected," said Professor Leung. "And they

were affected regardless of whether they participated in the protests or were part of more aggressive groups, or perhaps took no side. The prevalence of probable depression was higher among both men and women and, most importantly, in all ages above 20 years old.

"The surprising thing is that older folks were the most affected, especially those who were less educated, less financially well-off, and men generally. Is this because they are not venting their feelings, or worrying about younger family members? Is it because they have witnessed possible consequences of such large social movements in their own lifetime? We don't know. All we can do as scientists is to assess, document and report in an open, transparent, robust and dispassionate manner."

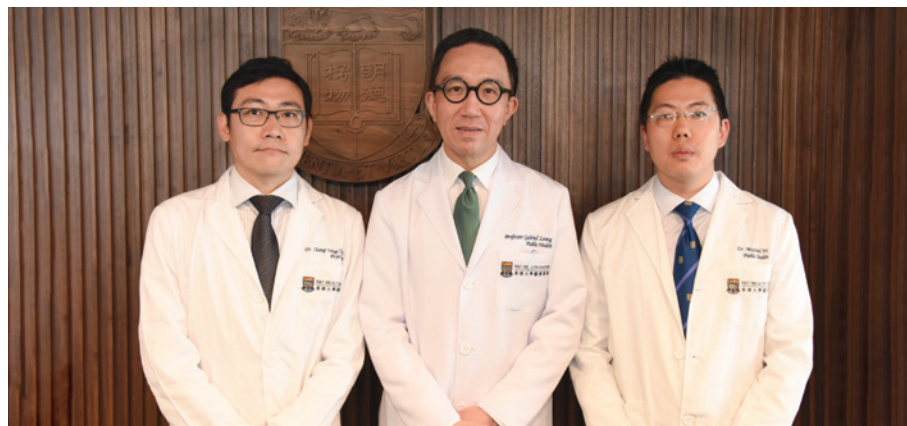
'In vivo, in situ, in daily life'

Professor Leung also noted that while family conflicts diminished after Occupy Central, symptoms of probable depression continued to increase, affecting 6.1 per cent of respondents in a follow-up survey in 2017. The team is continuing to conduct additional waves of surveys to track the ongoing effects of the recent social movement for their academic research.

Professor Leung said these findings illustrate the importance of cohort studies in identifying problems "in vivo, in situ, as people live their lives in their natural environment." He also leads the 'Children of 1997' Birth Cohort Study, tracking 9,000 children born in April and May of that year. He is involved at various levels in the Department of Health

Elderly Health Service Cohort tracking routine health data from 150,000 participants, the Guangzhou Biobank Cohort Study tracking 30,000 participants aged 55 and over, and the new Born in Guangzhou Cohort Study which aims to recruit 100,000 participants.

"Unlike laboratory experiments, the beauty and the headache at once of population research is you cannot control for extraneous factors nearly as well," he said. "My job is to record observations which you will not see in the laboratory unless you're looking for them, and to explain the inexplicable so bench scientists can work out the precise mechanisms. The results are real and directly applicable, and they have the greatest impact because they concern saving lives, millions at a time."



The Family Cohort Study research team – (from left) Dr Chang Wing-chung, Clinical Associate Professor of the Department of Psychiatry; Professor Gabriel Leung, Dean of Medicine and Chair Professor of Public Health Medicine; and Dr Michael Ni, Clinical Assistant Professor of the School of Public Health.



Professor Gabriel Leung leads the 'Children of 1997' Birth Cohort Study, tracking 9,000 children born in April and May of that year. A party for the participants was held in 2018 to celebrate their 21st birthday.



PROFESSOR GABRIEL LEUNG

When we saw the recent results, we felt a duty to alert society. We truly have a mental health epidemic when one in 10 people are affected.

Professor Leung's portrait by Pan Shiyi Photography

HONG KONG'S ROLE IN WILDLIFE TRAFFICKING EXPOSED

A new study reveals that Hong Kong has unwittingly become a strategic hub for the illegal wildlife trade and is contributing to the extinction of many threatened species. Its authors are calling on the government to introduce much stricter legislation – and fast.



Hong Kong's illegal wildlife trade is increasing in volume, underestimated in value and contributing significantly to the global extinction crisis. These are the conclusions of a recent study co-authored by Hong Kong Wildlife Trade Working Group (HKWTWG) and Ms Amanda Whitfort, Associate Professor in HKU's Faculty of Law.

Entitled *Trading in Extinction: The Dark Side of Hong Kong's Wildlife Trade*, the study condemns Hong Kong for playing a central role in such trafficking and reveals the extent of the problem, how this illicit industry works and how the government is failing in its duty to end organised trafficking and thereby endangering rare species further.

The crux of the problem, said Ms Whitfort, is that policing of the animal smuggling industry is under-resourced. "Wildlife trafficking is now regarded as the fourth most lucrative black market in the world, after drugs, people and arms, with the annual sums involved globally as high as US\$23 billion (HK\$179 billion)," she said.

Hong Kong's geographic location, free trade policy and logistical convenience as a gateway to China have meant it has become a hub for illegal wildlife trade, supplying growing demand for wildlife and wildlife products across Asia and particularly in China.

"Yet, under Hong Kong law, wildlife smuggling is not included in the Organized and Serious Crimes Ordinance [OSCO]," said Ms Whitfort, "which means the authorities do not have the power to prosecute effectively the syndicates and networks that take advantage of Hong Kong's position as a major trading port."

Sedated and blindfolded, this white rhino was transported from South Africa for release in Botswana's Okavango Delta, as part of an initiative to restore rhino populations to that country. (Courtesy of Neil Aldridge ©Photographers against wildlife crime™)

It is perhaps no surprise then that the study found the situation is worsening. Between 2013 and 2017, customs officers seized over HK\$560 million in trafficked wildlife, including over 20 metric tonnes of ivory, 43 metric tonnes of pangolin (scales and carcasses), 1,366 metric tonnes of illegal wood and 27 metric tonnes of other endangered species (mainly reptiles).

"Those quantities are conservatively estimated to equate to the deaths of over 3,000 elephants, 51 rhinos and 65,000 pangolins," said Ms Whitfort. "Depending which pangolin species are targeted, (the species vary greatly in maximum size), between 345 and 2,777 animals must be killed to produce one tonne of scales."

Pangolin has become the most trafficked mammal in the world, with around 300 being poached every day. All eight species of pangolin (four Asian and four African) were listed in Appendix 1 of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) in 2016.

Low risk, high profit

The low risk of detection and high profit have made the trafficking industry attractive to transnational criminal syndicates who oversee supply to growing markets in Asia. The study cites one case where a person was found guilty of smuggling three pieces of rhino horn into

Hong Kong in a chocolate box. The horn was worth more than HK\$500,000, yet the man was given a sentence of just four weeks in prison.

"This reflects the increasing profit to be made from wildlife smuggling," said Ms Whitfort. "A vicious circle has been created. As endangered species become rarer, their value on the black market rises, fuelling poaching and driving species closer to extinction. Gram for gram, rhino horn is now more valuable than platinum, and certainly easier to smuggle than drugs, which explains why organised crime is involved."

The contraband is smuggled into Hong Kong via multiple points, with some coming through Hong Kong International Airport – often brought in by 'mules' paid by the syndicates – or hidden inside parcels and air consignments. The majority though arrive by sea, smuggled aboard containers.

Trading in Extinction makes the case that if wildlife crime is to be addressed properly, Hong Kong, as a strategic hub, urgently needs to implement an enhanced enforcement strategy.

At present, the study says, Hong Kong courts provide little deterrent. Despite the high value of the trafficked goods, the ecological, social and financial impact of the crimes, the high cost of after care and the suffering of the animals, of 165 prosecutions reviewed

between 2013 and 2017, penalties ranged from fines of HK\$1,500 to HK\$180,000 and from 160 hours community service to eight months in custody – much lower than the maximum penalties permitted.

The government has made some moves in the right direction – announcing in 2016 that it would take legislative steps to ban Hong Kong's domestic ivory trade and in 2018 introducing heavier penalties for the smuggling and illegal trade of endangered species. However, as the study says, this is unlikely to be enough.

Ms Whitfort said: "The legislature must go further if Hong Kong is to effectively deter the transnational criminal networks from funding extinction. Wildlife crime is a high profit, organised crime activity. The Hong Kong Government has a responsibility to the international community to counter the city's role as a key transit point for illegal trade in endangered species by including wildlife crimes in our Organized and Serious Crimes Ordinance."

Photographers against wildlife crime™ are an international group of award winning photographers who have joined forces to use their powerful and iconic images to help bring an end to the illegal wildlife trade in our lifetime. The group collaborates with writers and journalists worldwide. For details, please visit: www.photographersagainstawildlifecrime.com



MS AMANDA WHITFORT

Gram for gram, rhino horn is now more valuable than platinum, and certainly easier to smuggle than drugs, which explains why organised crime is involved.



Two founding members of the Hong Kong Wildlife Trade Working Group – Professor Yvonne Sadovy (left) and Ms Amanda Whitfort (right).



EUROPE'S DIRTY MONEY PROBLEM

The European Union (EU) likes to present itself as a paragon when it comes to regulating banks and keeping corruption at bay. But recent high-profile cases suggest otherwise. Dr Roland Vogt has been investigating the EU's problems with money laundering, organised crime and terrorism.

In September 2018 the world's largest money laundering scandal was revealed and it was shockingly centred on regulated banks in Europe. Some US\$230 billion – yes, billion – was laundered from Russia, Azerbaijan and other dubious sources through Estonia, using Danish and Swedish banks. The problem only came to public attention through a media investigation.

Meanwhile, in an unrelated case, the European Central Bank (ECB) revoked the license of Malta's Pilatus Bank in November 2018. The bank's chairman is the son of an Iranian construction tycoon who had no prior banking experience and who served clients in Azerbaijan, Iran, Venezuela and the like. The ECB acted only after he was arrested on money-laundering charges in the US.

To Dr Roland Vogt of the School of Modern Languages and Cultures, these cases illustrate the hypocrisy of the European Union (EU). He had been researching how the EU pressured Asian jurisdictions to follow European regulatory standards on money laundering when the present cases came to light.

"There was an effort to tarnish Hong Kong and Singapore as dirty, and it was very successful. Over the last decade, those jurisdictions have done a lot to clean up their operations," he said. "But over the last two years, we've seen huge scandals in the EU itself."

Moreover, these scandals pose a security challenge because money laundering is closely linked to organised crime and terrorism. This inspired Dr Vogt to investigate further, drawing on documents from the

recent cases and interviews with politicians and others on the ground. He has identified several significant weaknesses in the European regime.

Europe's weak spots

One is 'state capture', which arises in smaller jurisdictions that have only a few banking experts who move back and forth between banks and regulators. For example, some of the top managers of Danske Bank, Denmark's largest bank, previously worked in the Estonian subsidiary and later took up positions with the Danish regulator. "Why would they investigate themselves? That is the problem of state capture," he said.

Similarly, in Malta there were cosy connections between Pilatus Bank and government officials. The Maltese prime minister and his chief of staff attended the wedding of the bank's chairman, and the chief of staff opened an account with the bank.

Another weakness is 'state capacity'. European member states generally struggle to deal with the money laundering and terrorist financing carried out by organised crime and terrorist networks, despite abundant resources.

In Germany, for instance, the responsible agencies are understaffed and under-resourced and have a backlog of 30,000 to 40,000 cases. German security forces have also been slow to recruit people who speak the languages of Russia, the Kurdish regions, Kosovo and the Middle East, from where organised crime has been imported.

"The German domestic security architecture was created basically to prevent the rise of right-wing, Nazi extremism. But now this is totally inadequate to deal with the challenges the country is facing," Dr Vogt said.

Other member states also suffer from a lack of centralised databases and security systems, apart from Italy, which has not experienced any major Islamist or right-wing terrorist attacks and has a long history of dealing with organised crime. The country takes a tough approach on terrorist threats, including deporting people deemed dangerous.

Economic impact

The impact of Europe's weaknesses goes beyond individual corruption cases. They also distort the economy, he said. In Estonia, Danske Bank and two Swedish banks withdrew from the country, where they previously had a market share of 45 per cent. Russian banks are now filling the gap, but they do not have the same compliance culture. In addition, the banks themselves were hit by the crisis, with Swedbank's stock price falling by more than 20 per cent.

"The European Union has anti-money laundering agreements to counter the financing of terrorism, but these are not effective. The scandals keep happening," he said.

What, then, can be done? Dr Vogt believes countries within and outside the EU must share more information and learn from each other. Italy is a good example, particularly its

use of deportation. Australia, Colombia and Singapore all have good records in fighting money laundering.

Experimentation is also important to test new methods or ideas. In Germany, the regulator has seconded people directly onto the trading floor of Deutsche Bank to advise on decisions related to risk assessment and observe how well the bank deals with that. This is preferable to a blanket requirement for risk assessment, in which banks check every transaction to avoid legal liability and the system becomes swamped.

Regulators should also look at non-financial intermediaries, such as tax auditors, accountants, real estate agents, casino operators, jewellers and art dealers, who have become targets for money laundering. Dr Vogt has started researching this area, too. "Research should not only deal with theoretical issues but also the complexities and challenges that exist right now," he said.



DR ROLAND VOGT

“ *The European Union has anti-money laundering agreements to counter the financing of terrorism, but these are not effective. The scandals keep happening.*

Dr Vogt's portrait by Santiago Engelhardt

OF MICE, MEN AND PIGS

HKU researchers have developed a new type of stem cell that has great potential for advancing research into embryonic development, regenerative medicine, biotechnology and agriculture.

Since embryonic stem cell research began in the 1970s, scientists have typically worked with ‘blastocysts’ – clusters of several dozen embryonic cells that have just started on the path to development. But there have been limitations with this approach, not least because it was only possible to derive embryonic stem cells from the blastocysts of rodents and humans, not other mammalian species, which restricted stem cell research and its applications. Stem cells from pigs, for instance, could be particularly useful for biomedical research because they share many genetic, anatomical and physiological features with humans.

The conventional wisdom held that it was difficult to derive embryonic stem cells from other animal species because of the

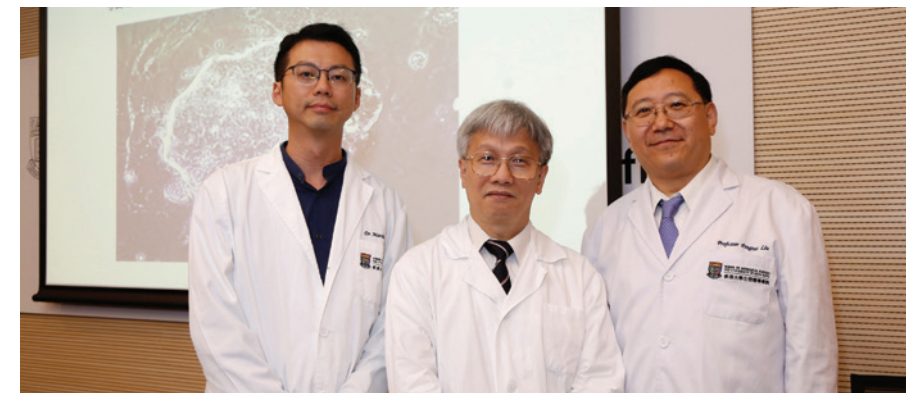
differences between species. But Professor Pengtao Liu of the Li Ka Shing Faculty of Medicine's School of Biomedical Sciences and Stem Cell and Regenerative Medicine Consortium was not convinced. About a decade ago, he set out to prove his case working with his research team at the Wellcome Sanger Institute (previously the Wellcome Trust Sanger Institute) in Cambridge.

“Our argument was that perhaps we needed to re-think this problem, and I had an idea. What if we tried to derive stem cells earlier in the development process, for example from mouse embryos of only four or eight cells? These early embryos are to some extent similar to blank pieces of paper – there is not much written on them so there is less diversity among species,” he said.

With that idea, he and his team developed technology that can capture and derive stem cells from the very early embryos of different species.

Several firsts

The first animal they worked with was the laboratory mouse. In 2017 they reported in *Nature* that they had captured early stem cells, which they called Expanded Potential Stem Cells (EPSCs). This was to distinguish them from the two existing blastocyst stem cell types called embryonic stem cells, which are derived from fertilised eggs, and induced pluripotent stem cells, which come from skin and other cells and are re-programmed to an embryonic-like state.



The research team in the School of Biomedical Sciences – (from left) Dr Martin Cheung, Professor William Yeung and Professor Pengtao Liu.

The significance of their finding was two-fold. First, as predicted, Professor Liu and his team were able to show that their technology worked for other mammals. In June 2019, they reported in *Nature Cell Biology* that they had derived EPSCs from humans and, for the first time, from pigs.

“Scientists have been trying for many years to derive pig embryonic stem cells without success because they used the standard blastocyst embryo approach. Our porcine EPSCs will allow us to do sophisticated genetic modification of the pig genome,” he said.

This has major implications for research in several fields. Scientists will now be able to edit pig genes, which is expected to lead to applications in regenerative medicine, organ transplantation, biotechnology, and animal health and food production.

Totipotent features go beyond previous stem cells

“Our stem cells can greatly accelerate the process because we can make multiple modifications in a short period of time that

was previously challenging. There are so many things that could be done in the coming years rather than decades,” he said.

The second important impact of their research is that their EPSCs have ‘totipotency’ features, meaning they have the potential to produce all embryonic and extra-embryonic cell lines, including those of the placenta, called trophoblasts, and the yolk sac. “This is different from standard embryonic stem cells which primarily produce only embryonic cell lineages,” he said. Being able to study trophoblasts means researchers may be able to get to the root of pregnancy complications such as miscarriages and preeclampsia, which affects about six to eight per cent of all pregnancies.

Professor Liu has worked in close collaboration with the Wellcome Sanger Institute and the Friedrich-Loeffler-Institut in Germany. Moving forward, he said that since Hong Kong lacks large animal facilities, they will also be collaborating with centres outside Hong Kong for further research on pigs and other large animals. The team is also trying to derive EPSCs from more mammalian species and will

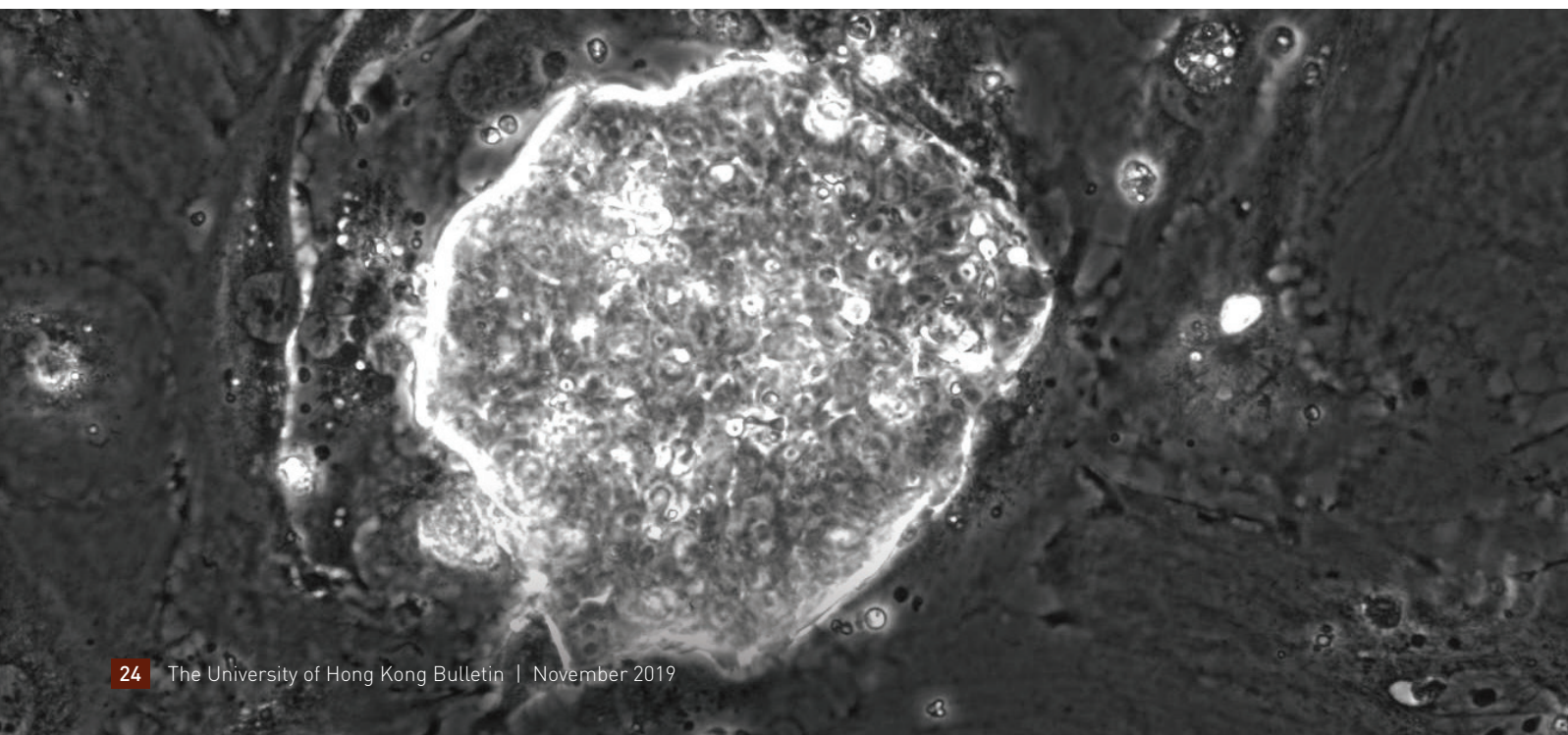
investigate the potential of the technology in species conservation.

“EPSCs have been called transformative because we can make many more modifications more quickly than before and do things that were previously impossible. We believe they have huge potential for future studies of fundamental human biology and translational medicine,” Professor Liu said.



PROFESSOR PENGTAO LIU *EPSCs [Expanded Potential Stem Cells] have been called transformative because we can make many more modifications more quickly than before and do things that were previously impossible.*

Porcine EPSC [Expanded Potential Stem Cell] colony established from German Landrace Day-5 blastocysts.



CHINA'S ARCTIC AMBITIONS

Opportunities arising from climate change, plus a growing sense of its own global importance, are spurring China to become more active in the Arctic.

China may have no territory near the Arctic but, as officials like to recount, it feels the region's pain when it comes to climate change. "There's this dynamic where Chinese officials are saying 'indigenous people in the Arctic are affected by the rising sea levels of climate change, but so is China'. It's a way for China to legitimise its activity there," said Dr Mia Bennett, Assistant Professor of Geography who has been researching geopolitics in the Arctic since 2009.

That activity has become more prolific over the past decade. On the one hand, China is investing in the region. For example, the state-controlled Silk Road Fund and China National Petroleum Company have stakes of 9.9 per cent and 20 per cent, respectively, in the Yamal Liquefied Natural Gas (LNG) project in Russia, the largest LNG project north of the Arctic Circle. The Silk Road Fund China

and another Mainland oil and gas enterprise, Sinopec, also each own 10 per cent of Russia's largest petrochemical producer, Sibur.

On the other hand, it is increasing its physical engagement there. In 2012, the icebreaker, Xue Long (Snow Dragon), became the first Chinese vessel to cross the Arctic Ocean to Europe. And growing numbers of Chinese tourists have been visiting the region. Although numbers are difficult to estimate, the impact can be seen in the acceptance of Alipay in Arctic countries such as Norway and Finland, and the employment of Chinese-speaking staff in hotels and cruise ships.

In January 2018, China formalised its interest in the region when it unveiled its Arctic Policy setting out its foreign policy approach there and its plans to build up the 'Polar Silk Road' as an extension of the Belt and Road Initiative.

Polar Silk Road

"The Polar Silk Road, in a literal sense, refers to the shipping corridor that links China with Europe via Russia's northern coast, which is increasingly accessible due to climate change," Dr Bennett said. But the Arctic Policy also shows China is thinking further ahead than other countries in considering the possibility of developing shipping across the North Pole if the warming of Arctic waters should make that possible.

"China and other Asian countries see the opportunities of climate change to be in some sense greater than the threats. Whereas the Arctic states [which include Canada, Denmark, Finland, Iceland, Norway, Russia, Sweden and the United States] see a less equal trade-off," she said.

China's activity has inevitably inspired suspicion in some of those states, but Dr Bennett said her research – which includes analyses of policy documents, field visits and interviews with officials, businessmen and others in the region, and remote sensing – suggests that for now, China is largely motivated by commercial and scientific interests, which include a scientific research station at Svalbard in Norway.

"Despite the more fear-mongering headlines in the Western media that the Chinese have large military designs on the Arctic, I don't see that happening in the near future," she said.

A greater say

Nonetheless, China and other Asian states are seeking a greater say in the Arctic commensurate with their status as rising global powers, and Arctic states are taking note. In 2013, China, India, Japan, Singapore and South Korea were given observer status at the Arctic Council, an intergovernmental body representing the eight Arctic states.

China, Japan and South Korea were also invited to sign a 2017 treaty banning fishing for the next 16 years in the central Arctic Ocean, which was also signed by the Arctic states and the European Union. This is a preventive measure until more is known about fishing stocks in the region.

"This agreement underscores the real influence Asian states are having in Arctic governance and Arctic commercial development in future," Dr Bennett said.

The response to these activities from the people and Arctic states has been telling. Dr Bennett reports that people in Norway, Russia and Greenland are generally welcoming of the Chinese presence. When China showed interest in investing in Greenland's airports, some Greenlanders even regarded it as a way to gain more independence from Denmark, which still oversees the country's military and foreign affairs. However, that deal was vetoed by Denmark and, allegedly, the US, which both remain wary of Chinese activity in the region. As a result, China is treading carefully as it makes inroads to the Arctic.

"The southern capitals are still sceptical that Chinese investment is being driven by some geostrategic or military element, so China is very careful how it frames its involvement in the Arctic. It is trying to tamp down that rhetoric," she said.



DR MIA BENNETT

“ China and other Asian countries see the opportunities of climate change to be in some sense greater than the threats. **”**

H E Wang Hong, Administrator of the State Oceanic Administration of China's Ministry of Natural Resources, addressing the Arctic Circle Forum held in Shanghai in May 2019.



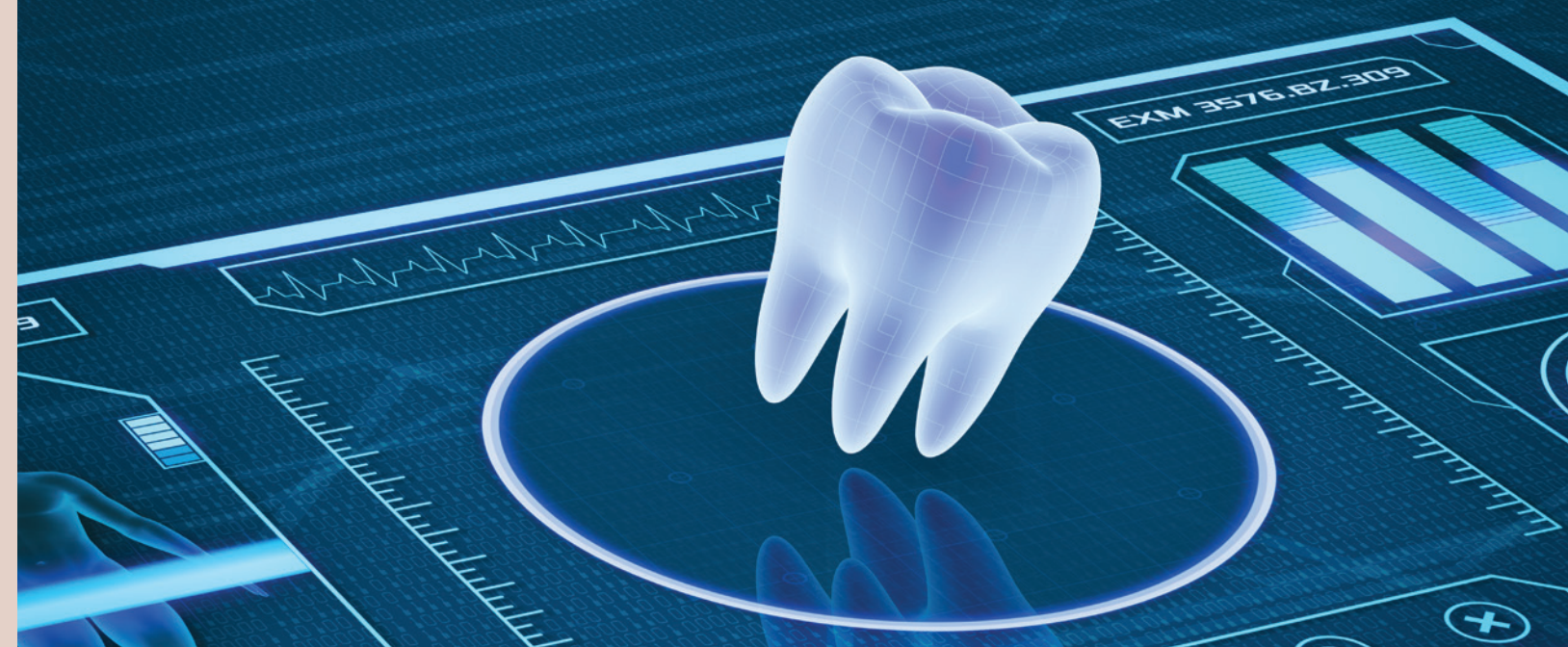
The gate to the World's Northernmost Chinatown, the theme chosen for the annual Barents Spektakel festival in Kirkenes, Norway in February 2019.



China's research icebreaker Xue Long, also known as Snow Dragon.

DIGITAL DENTISTRY

Eventually robots will replace dentists to do operative work such as drilling and filling teeth. While that day is still far off, the application of digital technology in dentistry is already advanced, aiding a wide variety of commonly performed dental procedures.



“Dentists will still be crucial for diagnosis and selecting the best treatments,” said Dr Walter Yu-hang Lam, Clinical Assistant Professor in Prosthodontics, “but the basics will be done efficiently and economically by robots.

“There have already been many digital developments in other areas. Dentists have started to use optical scanners (intra-oral scanner or IOS) to scan patients’ teeth and create 3D models for diagnosis and treatment of disease. They are also scanning and ‘digitising’ patient data for the design of dental restorations via computer, and many novel tooth-coloured dental materials – such as zirconia – are now fabricated by the CAD/CAM (computerised aided design and manufacturing) process, replacing ugly metal restorations.” These advances are not only improving the accuracy and efficacy of treatments for patients, they are also more durable and save dentists’ time – both of which bring monetary savings, enabling cheaper treatments for the public in the future.

Most of a dentist’s clinical time is spent replacing patients’ missing teeth or inserting fillings, and one of the prime requirements for replacing or filling teeth is harmony to the patient’s masticatory system.

“Traditionally, a mechanical device called an articulator is used to simulate patients’ jaw movement,” said Dr Lam. “However, articulators are expensive and because they are mechanical devices and cannot accommodate the wide range of variations in the human system – for example most patients’ faces are not symmetrical – so simulation precision is limited and usually the dentist has to do ‘chair-side adjustments’ in the patients’ mouth.”

His team has introduced a clinical technique for a virtual articulator mounting with a 3D facial camera (stereophotogrammetry) to enable a simulation function that is far more precise and can account for patient’s individual variations. Moreover, with the exception of the 3D camera, the equipment used is modified from things readily available in the dental clinic.

“Accurate articulator-mounted casts are essential for occlusion [chewing] analysis and for fabrication of dental restorations. In the past there have been problems with getting the head position of the patient [known as the natural head position or NHP] marked accurately,” said Dr Lam.

He explained that his new technique uses the 3D camera to define the horizontal plane

in the capture area using a reference board (calibration) whose position is defined by vertical/horizontal light beams coupled with a spirit level normally used for building surveying. The horizontal plane as designated by the reference board can be transferred to the subsequent 3D photo of patients in NHP.

Virtual patient models

The team has also made advances in the development of better virtual patient models (VPM), which are both functional and can aesthetically simulate real patients, for CAD/CAM design of tooth restoration.

Designs include combining 3D teeth to a 3D face to create a two-part ‘facebow’. Dr Lam said: “Teeth and face are captured by two imaging devices – an intraoral scanner and a 3D camera. We proposed a non-invasive method to combine these two images together using a two-part virtual facebow.

“Unlike other researchers who propose using a tailor-made intraoral device, we modified the readily available dental impression trays originally used for making teeth impressions in any dental clinic. We assembled two trays together using two Lego bricks to relate teeth to the face in the 3D camera.

“Our virtual facebow facilitates the radiation-free registration of the teeth to a face image for transfer to a virtual articulator. The facebow is easy to make with minimal materials and adjusts to fit different people. Most importantly, its error in tooth registration is less than one millimetre.”

Dr Lam and his team have worked extensively with Dr Wang Zheng from the Department of Mechanical Engineering to develop robots for dental treatment. In particular he is interested in how to enable virtual dental patients and dental robots to work together so as to reduce dentist’s input time, which will have the knock-on effect of making dental treatment more affordable to the community.

Together, they have developed a robotic system for assisting dental drilling procedures, specifically designed to work in the smaller workspace – the mouth – in which dentists work. The result is a soft-bracing actuator which has improved the system stiffness to 10 times higher than non-braced models.

Their aim in developing the system was to relieve the burden on dentists, improve the efficiency of dental procedures and reduce the possibility of human error during treatment.

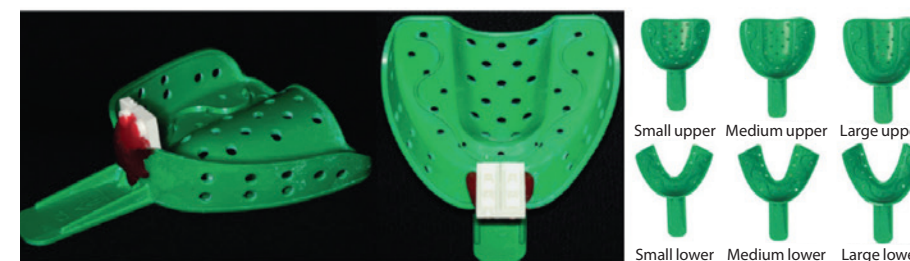
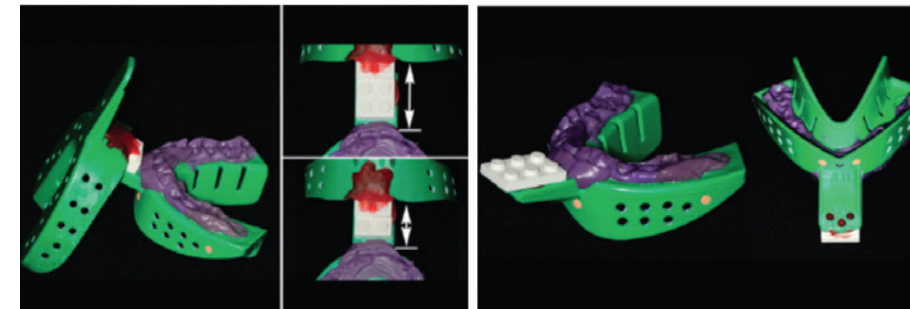
“We hope the robotic system we have proposed will accelerate automation in dental treatments,” said Dr Lam. “With several

iterations of the design and algorithm, we also hope clinical trials can be conducted in the near future. The development of virtual patient models and dental robots will facilitate dentists to provide treatment to patients who live in remote areas or have limited accessibility.”

Up next, Dr Lam will work with researchers at the University of Leeds, led by Professor Andrew Keeling, to use mobile phones to digitalise dental patients (VPM) and identify oral diseases via photography. “You could say that the ultimate aim is to achieve a ‘patient selfie,’” he explained. “Then the AI can tell if the patient has an oral disease.”



DR WALTER YU-HANG LAM *The development of virtual patient models and dental robots will facilitate dentists to provide treatment to patients who live in remote areas or have limited accessibility.*



Assemble of virtual facebow for individual patients.

TERMITES' ROLE IN SORTING OUT DROUGHTS

Termites have had bad press! Often regarded as pests, they have recently been found to be mini champions who help lessen the effects of droughts in tropical rainforests. In a world that is getting warmer and drier, this role could be vital.

The findings are the result of collaborative research, co-headed by Dr Louise Ashton of HKU's School of Biological Sciences, and research teams led by Dr Kate Parr from the University of Liverpool and Dr Paul Eggleton from the Natural History Museum in London. The results were reported as the cover story of *Science* magazine.

"Our termite study was part of a large, multidisciplinary project, involving multiple institutions called the Biodiversity and Land-Use Impacts (BALI) project," said Dr Ashton, who worked on the project with another post-doctorate Dr Hannah Griffiths. "The study involved understanding the role of both termites and ants in ecosystem processes."

For the research, the team carried out a large-scale manipulation in the rainforests of Borneo where they suppressed the activity of termites. By comparing the termite-suppression plots with control plots, they could quantify the role of termites in processes such as decomposition, maintaining soil moisture and soil nutrients and see if there were any knock-on effects in other parts of the ecosystem, such as in plant survival.

El Niño conditions

By what she describes as 'serendipitous chance', a large El Niño drought occurred at the same time the experiment began in 2015. They were lucky to have a good team and enough funding to continue the experiment for a two-year period, throughout the

drought and also in non-drought conditions. Thus they were able not only to investigate the roles of termites in tropical rainforests, but also how drought influences termite activity and the knock-on effects on the ecosystem.

"We found that during the drought, termite numbers doubled, and in the presence of termites, there was higher soil moisture, soil nutrient heterogeneity and decomposition," said Dr Ashton. "Most surprisingly, seedlings on plots with termites were better able to survive the drought period. These results show that termites can buffer some of the effects of a drought."

The results were possible because they carried out a large-scale field manipulation of biodiversity. Working in the tropical rainforests of the Maliau Basin Conservation Area of Malaysian Borneo, they were able to set up four 80 x 80-metre termite-suppression plots and four control plots. They collaborated too with a team of Malaysian research assistants to carry out regular field expeditions, which were around three months long. Over the course of the whole project they spent around nine months in the field.

"This type and scale of project is quite rare, because it is difficult to alter the diversity in rainforests, which are very stochastic systems," said Dr Ashton. "Additionally, insects, particularly termites, are understudied, especially in terms of their ecosystem processes and in the tropics."



Dr Hannah Griffiths and research assistants Mirah, Ele and Kidus collecting leaf litter from the rainforest floor. The sampling is to look at invertebrates that live in the leaf litter.



The research team developed novel suppression techniques using toilet paper rolls. Over 4,000 toilet paper rolls were used in the study.

An HKU collaborative study reveals termites actually help mitigate against the effects of drought in tropical rainforests.

Until this study, what was known about termites was that they are abundant in tropical ecosystems and one of only a few living creatures capable of breaking down the cellulose found in plant material. They create temporary protective structures, known as 'sheeting', above the ground, which enable them to move through the forest even during drought conditions. They also play an important role in soil processes such as decomposition and soil moisture, but their exact roles have never been fully quantified in real-world experiments – partly because it is difficult to suppress termite activity.

To find out more, the research team developed innovative suppression techniques using toilet paper rolls. "Termites really like eating toilet paper because it is easy to digest," said Dr Ashton. "We treated the toilet paper rolls with some termite insecticide, which enabled us to suppress the termites on our plots. By comparing these plots with control plots with termites present, we were able to determine the roles of termites in ecosystems."

The implications of the research are hugely important because droughts are predicted to become more frequent and more severe in the tropics in coming years and this study shows how crucial biodiversity is for mitigating their devastating effects.

Beyond Borneo

Now, the team is looking beyond Borneo to see if results are the same elsewhere. "Some

of the team are already carrying out similar large-scale manipulation experiments in South African savannahs," said Dr Ashton. "It will be very interesting to see if termites are also important in other ecosystems."

They are also further diversifying the focus of study. "As most tropical landscapes are now mosaics of different land uses, I'm also hoping to be able to work on understanding the role of insects in disturbed forests and agricultural systems," she added.

"Our results indicate that termites are important for maintaining healthy rainforests during periods of stress. As ecosystems are under increasing multiple pressures such as land-use change and climate change, understanding and maintaining biodiversity is becoming increasingly important."

The research in Borneo was Dr Ashton's second post-doctoral study, the first being in the Australian tropical rainforest in 2013 and 2014. Tropical field ecology is one of her main areas of interest and her PhD involved using insects as tools to understand ecological patterns and climate change. She concluded by expressing her gratitude to all involved on the BALI project: "This study was a really large team effort and was only possible through collaboration."



DR LOUISE ASHTON

“Insects, particularly termites, are understudied, especially in terms of their ecosystem processes and in the tropics.”



Researchers in the forest – (from left) Dr Louise Ashton, Dr Hannah Griffiths, Dr Kate Parr and Dr Amy Zanne.

CATHOLICS IN CHINA: A SURVIVAL STORY

Despite violent attacks on their faith, Catholics in China continue to transmit their belief down the generations. Historian Dr Li Ji has been tracking their story.

The history books tell us the facts about the arrival and activities of Western missionaries in China. But what did this mean to the ordinary peasants and missionaries at the time? For Dr Li Ji of the Hong Kong Institute for the Humanities and Social Sciences and the School of Modern Languages and Cultures, these ‘no-name people’ are her *raison d’être*. She has spent the past 15 years digging through archives, tracking obscure names and contacts, and letting serendipity take its course.

Her work started in 2004 with a trip to the Society of Foreign Missions of Paris to search its archives. Unlike the Jesuits, who focussed on the elites, the Society recruited missionaries from peasant families in Europe and sent them to live for decades among their counterparts in China. One such family

was the Du family of Manchuria, whose three daughters learned to read and write from the church and wrote a series of letters in 1871 to their priest. Dr Li used the letters in her first book, *God’s Little Daughters: Catholic Women in Nineteenth-Century Manchuria*, published in 2015, to show how Catholicism was disseminated by the priests and interpreted by believers to articulate an awareness of self.

But her fascination with the letters did not stop there. The Du sisters came from Santaizi, which is part of Liaoning province, and Dr Li visited the town where she chanced to meet the descendants of the sisters. Her current research is based around those encounters.

“To my surprise, the whole family is still Roman Catholic. In their home, you can still find icons

and pictures of the Virgin Mary. I became very curious to understand how this religious culture survived until today,” she said.

Offering stability

A key factor has been their self-identity as Catholics, which began before they even came to Santaizi. The ancestors of the Du family and others in the area only arrived in the 18th and 19th centuries, having fled conflict and hardship in such places as Shandong, where they had originally converted to Catholicism. In Santaizi, they held onto their faith – not only for benefits such as education, but stability in an increasingly unstable country. Dr Li’s research showed this was a common pattern among Catholic communities in northeast China.

The Catholic village of Santaizi as depicted by Caubrière in his letter to parents on October 10, 1902.



“The missionaries not only built churches and introduced rituals, they instilled ideas of local governance. Because in these border areas where they worked, there were sometimes no local officials or magistrates to take care of the people,” she said.

Dr Li also uncovered evidence of the close relationship between missionaries and Santaizi residents through the writings of French missionary, Alfred Marie Caubrière. He recorded daily conversations, such as elders discussing childcare and quarrels between husbands and wives, using a French romanisation of the local dialect, presumably to help others learn the local language. “These topics showed that he had an intimate relationship with the villagers,” she said.

Caubrière also wrote 233 letters to his family in France from 1900 to 1927 recounting village life, such as the story that the Virgin Mary protected villagers during the Boxer Uprising in the early 1900s and a drawing of a girl whose father had just died and who wanted to know what France was like. “Although these are trivial daily life details, they can tell scholars about big issues, like how Western culture or religion changed ordinary Chinese people’s vision of the world,” she said.

Family tradition

However, the Catholic legacy became more complicated when the Communist Party took over and began to rebuild the state. A daughter of the Du family who had joined a convent fled Manchuria to Taiwan with other church members in 1948. A son who joined the priesthood was killed during the Cultural Revolution. The church, which earlier was destroyed by the Boxers and rebuilt, was destroyed again during the Cultural Revolution.

During the more tolerant 1980s, the state allowed the church to be rebuilt again, albeit in a plain style. Still, people remain guarded about revealing their faith because it can cost them job promotions or Communist Party membership. Dr Li found this was not enough to stamp out that faith, though. “Not everyone in the Du family knows the Catholic doctrine, but most think of it as their family tradition. They want to hold onto it because it was important to their ancestors and it is part of their identity.”

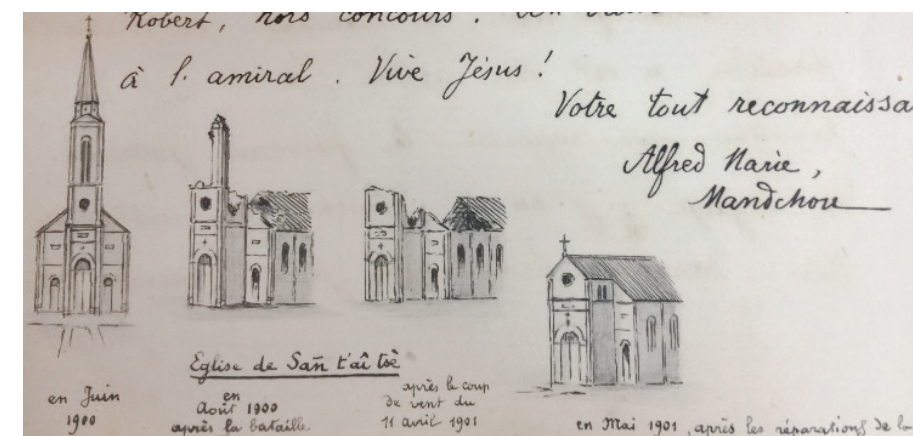
Because of that, Catholics are still seen as a threat to state governance, even though they are largely rural, less educated and small in number. “A problem from the state

perspective is, how have they survived all these anti-Christian campaigns and movements? They are not fighters, but they have held tightly to their identity. This is not only explained by faith but by their collective memory – of churches being destroyed, of their people being attacked,” she said. “It has strengthened their identity and feeling of belonging.”

Her second book, for which she is now completing her manuscript, will tell their story.



Dr Li’s first book God’s Little Daughters: Catholic Women in Nineteenth-Century Manchuria was published in 2015.



The village church before and after the Boxers’ attack in 1900.



DR LI JI

“A problem from the state perspective is, how have they survived all these anti-Christian campaigns and movements? They are not fighters, but they have held tightly to their identity.”

SWIMMING IN THE DEEP END

Communicating without words, slowing down, and challenging assumptions were all in a typical summer's day for students joining the GloCal programme.



A swimming pool might be a luxury add-on in some places, but in the village of Trung Dung in Vietnam, it was seen as a lifesaver. Several children had drowned in a dirty pond that was situated between the primary and secondary schools. A proper swimming pool with fencing could prevent such tragedies, while keeping the amenity for the community.

This was the proposal put to a cross-disciplinary team of teachers, who have jointly organised student learning excursions to Trung Dung for several years with World Vision. In previous years, students built toilets and libraries. This time, a team of 16 students would help build a village-funded pool and provide other support, including child safety assessment, in what proved to be a deep learning experience.

For instance, Sunny Wong Kei-chun, a third-year civil engineering student, helped with the swimming pool construction, where he discovered local builders had different ideas on worker safety and workmanship than he had been taught. "I came to understand that there is no conclusion on which is the best way to work. The most important thing is to learn from each other and find something in common so we can solve any disputes and get the work done," he said.

Students from other disciplines mainly did risk assessments of child safety around water, in the home, on bicycles and the like, and taught English to the village children. Since there were only three interpreters on hand, the students often relied on Google Translate and body language to communicate. "I used to think language is the key for communication but in Vietnam, I found that building a relationship with others does not solely rely on the language we speak. It is the experience and time we spend with each other that matters," said third-year social work and social administration student, Ariel Ho Cheuk-ki.

A team of HKU teachers and students helped build a village-funded pool in Trung Dung, Vietnam.

Demystifying

Such takeaways are a goal of the programme, which was organised by Faculty of Social Sciences lecturer Elsa Lam under her Faculty's GloCal initiative with Dr Ryan Wong Cheuk-pong in the Department of Civil Engineering and Dr Fiona Law in the Department of Comparative Literature.

"We want to demystify developing countries so our students can form their own understanding of places that are economically, culturally and socially different from Hong Kong and become aware of their own assumptions," said Ms Lam.

A similar outcome was achieved in remote Durgapur town in Nepal, 14 hours by road from Kathmandu, which hosted three HKU students this summer. They were tasked with interviewing the villagers on migrant work and microfinance and producing a report for the local think tank, Centre for Social Change.

As with Vietnam, the process was as important as the product. One of the first demands on the students was to relax their ideas about time. Meetings and departures often started two hours or more late. "We would sit for hours waiting in 35-degree Celsius weather without aircon or fan," third-year politics and

public administration student Quah Wei Vei said. "Eventually, we started learning from the locals and adopted a looser concept of time, such as arriving later than the agreed time."

Lacking opportunity

Over their four weeks in Durgapur, the students found their perspectives on migrant workers changing. They were struck by the sacrifices families made to secure a better future by splitting up and sending a family member abroad. "Their love for Nepal was also surprising since most migrant workers worked in more economically-developed countries, but still preferred to stay in Nepal if possible," said Tom Janghyeok Lim, a second-year politics and public administration student.

The cosmopolitanism of the Nepalese also impressed third-year Hong Kong studies student Phoebe Lai Wing-sze. "I had assumed people in Nepal would be less well-educated or not have as wide a global view as us, but many people are well-educated. What they lack is opportunity," she said.

The experience challenged students' views on migrant workers in their home countries, too. Wei Vei is from Malaysia, where many Nepalis work and are stereotyped as low-skilled. "I realised I had a false perception of migrant

workers. Some of the returnees we met were highly qualified and built successful careers," she said.

On a more practical level, the students learned to negotiate difficult logistics on their own, including the return trip to Kathmandu after landslides blocked the road. Since Ms Lam was in Hong Kong, they had to make their own decisions and arrangements.

"The interesting thing about the GloCal programme is that the student-teacher relationship changes," Ms Lam said. "They face issues or problems that I don't have answers to, so we have to work together and with the local partner to find the solution."



MS ELSA LAM

“They face issues or problems that I don't have answers to, so we have to work together and with the local partner to find the solution.”



HKU students teaching English to the village children in Vietnam.



HKU students had interviews with villagers in Nepal on migrant work and microfinance and produced a report for a local think tank.

GOING FOR ROBOTIC GOLD

Steve Jobs famously advised: “Stay hungry. Stay foolish” – a fitting thought for an innovative project aimed at encouraging students to have fun and learn by developing self-driving robots and entering them in the AI Olympics!



Duckietown is a replication of an autonomous driving environment for Duckiebot vehicles.

Going by the unforgettable name of Duckietown, the project is an interdisciplinary learning exercise in robotics research, giving students experience prototyping self-driving robots and applying Artificial Intelligence (AI) to the physical education platform developed by Massachusetts Institute of Technology (MIT) for experiential learning. And while the Duckiebot vehicles may have been AI-driven, the overall project was very much student-driven.

A group of engineering students first learned about it while participating in a hackathon organised by Law, Innovation, Technology and Entrepreneurship (LITE) Lab@HKU. One of LITE's founders, Mr Brian Tang from the Faculty of Law, told them about Duckietown, and they took the idea to Dr Loretta YK Choi, Faculty of

Engineering for advisory and technical support, and to help them raise knowledge exchange funding.

Dr Choi said: “Our protocol for this was that students would take the lead and enjoy as much flexibility as possible while working towards the project goals, so that they could explore, make mistakes, assume responsibility, self-adjust and practise autonomous learning to grow better and stronger, both personally and intellectually.”

The eventual team was made up of students with knowledge and skills from computer science, mechanical engineering and electronics engineering. Later students from HKU's Artificial Intelligence Reading Group also joined.

Their task was to prepare robots for competitions, in which they would perform autonomous real-life tasks, such as lane-following, on a physical platform. In the run-up, the teams underwent intensive training, fostering peer collaborations, solidifying their knowledge and demonstrating sustainable learning outcomes.

From the fun point of view, the project highlight was the chance to compete in the grand finals of the international AI Driving Olympics (AI-DO), in May 2019, co-run with the International Conference on Robotics and Automation (ICRA).

“While there they were also able to meet peer contestants with common interests from other academic institutions, such as MIT, ETH Zürich, Université de Montréal and National Chiao Tung University, and to exchange ideas and knowledge with them,” said Dr Choi.

The heart of the AI-DO was Duckietown, a physical miniature replica of a driving environment, where each Duckiebot [vehicle] has a single camera attached to it. Students experimented with different AI algorithms on a simulator and devised their own in the context of an impactful auto-driving problem. It enabled them to actually see how their solutions work in a playful, physical environment.

At the ‘Olympics’, they also learned the true meaning of Steve Jobs’ words: “When we arrived at the AI-DO contest in Montreal, the AI model the team had developed was still not working very well,” said Dr Choi. “Team members tried very hard to improve the model the day before the live challenge for which the submitted AI programs were deployed to the physical Duckiebot for action in Duckietown.

Accidentally off-road

“We were a bit nervous when it came to our turn to run our algorithm on the Duckiebots, but it turned not too bad, and in fact it was hilarious when our Duckiebot drifted away and went out of bounds when negotiating a turn in the road!”

While their Duckiebot did not win, it was second runner-up, a creditable performance for a first try, and the experience as a whole gave the students invaluable experience in being team players solving problems on the spot.

“The project also reinforced and consolidated the skills and knowledge that students learned from their respective disciplines,” said Dr Choi. “They researched areas of machine learning and auto-driving and got to experiment with advanced technology.”

Team member Kelvin Ng, a student from the Bachelor of Engineering in Mechanical Engineering, said: “In Montreal, not only did we gain practical experience in hands-on techniques for the driverless car project, we also had a better taste of applying imitation learning to typical control engineering challenges in the mechanical engineering discipline.”

Fellow team member Angel Woo, a second-year student from the Bachelor of Engineering in Computer Science programme, said: “I was once a ‘software’ person who was uninterested in hardware... however, this project helped me learn the fun part about hardware, and experience how software and hardware can be integrated in reality.”

While this first venture into AI-DO was very successful, Dr Choi hopes that in 2020 they may be able to expand the scope even further.

“At the start, we had envisioned that while determining the algorithmic parameters for autonomous driving, students would also need to deal with some behavioural control especially in a complex, multi-vehicle environment,” she said. “But it turned out that vehicle control by AI is by itself difficult to master within the time span (students had less than half a year to work from scratch), so in the end the team was not able to explore these other aspects.”

However, this has not deterred Dr Choi, nor the students – more are already signing up in 2020. Indeed, such is the enthusiasm that they are also exploring whether it is possible for them to host their own contest within HKU so more students can participate.

“It has been an incredibly rewarding experience to work with our undergraduate engineering students who were passionate and self-motivated in delving into the evolving AI technologies and applications,” said Dr Choi, adding that a large part of the appeal of Duckietown was the constant reminder that learning can and should be fun, and a little foolish.



DR LORETTA YK CHOI

“The project also reinforced and consolidated the skills and knowledge that students learned from their respective disciplines. They researched areas of machine learning and auto-driving and got to experiment with advanced technology.”



The HKU team was the second runners-up in the AI Driving Olympics at the International Conference on Robotics and Automation held in May 2019.

SOFTENING THE BLOW

A Hong Kong University start-up called Lifespans, which offers innovative treatment for fracture repair in elderly patients, is winning prizes and a lot of industry interest.

"We wanted to become the most respected orthopaedic implant company worldwide for the elderly, by offering the safest, most effective and most innovative treatment options for fracture repair in patients with soft, fragile bone tissue," said co-founder Dr Sloan Kulper, explaining the thinking behind the launch of Lifespans.

A key member of the research team from the Department of Orthopaedics and Traumatology which developed the bone implant technology, Dr Kulper added that typical implants widely used now, such as bone screws and nails, are too rigid. "They tend to break through elderly bone after surgery, resulting in failure rates as high as 25 per cent," he said. "This requires patients to return to hospital for additional surgeries which are costly, high-risk and painful."

The team's approach to solving this has been to develop new implant technologies that reduce damage. The critical time is the six- to nine-month healing period during which a patient puts his/her body weight on a fracture that is being held together by these implants.

"At this time, the patient is also walking, and potentially taking hundreds of thousands of steps," said Dr Kulper, "meaning the implant must firmly fix the bone fragments in place without allowing movement (migration) which can lead to misalignment during the healing process, or even cases where the implant breaks through the bone completely (called cut-out). By reducing the damage caused to bone tissue when a patient puts their body weight on an implant, failure rates caused by migration and cut-out can be reduced.

"During our research we observed that existing implant designs, which consist entirely of very stiff metallic and polymeric materials, are simply too rigid and inflexible for the relatively soft and fragile bones of elderly people. In response, we developed the world's first soft, elastic implant tip technology, which we call the Lifespan Soft Tip (LST). By augmenting typical implants with the LST, we have observed up to 25 per cent reductions in migration rates during pre-clinical testing."

This relatively low-cost technology uses a biocompatible polymeric material that acts a cushion between the rigid implant and the bone material. The technology was developed as part of Dr Kulper's thesis with Dr Christian Fang, Dr Erica Ueda Boles, Professor Frankie Leung and Professor William Lu as the primary team members.

Their second implant technology was developed in collaboration with Dr Xiaoreng Feng, an orthopaedic surgeon and PhD candidate in the Department of Orthopaedics and Traumatology. His thesis research with Lifespans co-founders included a groundbreaking study into the optimisation of orthopaedic screw thread design to match the biomechanical properties of bone.

Backed up by publications in leading journals in the discipline, including the *Journal of Orthopaedic Research*, these insights led to patent-pending inventions that underpin the Lifespan Soft Thread technology which continues to develop in collaboration with other members of the Lifespans engineering team.

"We also have a bone simulation software that we developed with the Faculty of Engineering's Professors KY Sze and Alfonso Ngan, and which was studied in-depth during a project led by Dr TM Wong, Dr Christian Fang, Dr Grace Zhang from the Medical Faculty and Tongji University's Dr Xiaodan Ren," said Dr Kulper. "This is a first-of-a-kind software platform for virtual testing of implants in computerised soft bone tissue. We recently published results in the top journal of our discipline."

The technology has won them numerous prizes at various scientific events, including top place at the Hello Tomorrow technology competition in Singapore, as well as the IMAGINE IF! start-up competition during its Hong Kong finals in 2019.

Dr Kulper said: "All the competitions and events we have participated in have introduced us to excellent networking partners. In particular, we have been very excited to join Johnson & Johnson's first incubation programme in Asia – JLABS @ Shanghai – where we have an opportunity to network and collaborate with an excellent community of industry veterans and fellow start-ups in the medical space."

Overseas approval

Lifespans is currently hard at work completing the regulatory approvals for their first devices – the Lifespans Soft Hip and Soft Shoulder implants – in the US, ASEAN [Association of Southeast Asian Nations], Australia and Canada. Likewise, they are beginning clinical data collection which will be used to gain market entry to the EU, China and Japan.

This is being fuelled by a combination of public and private funds, following successful

Seed and Pre-A fundraising rounds in the US and Hong Kong with leadership from Chief Financial Officer Adrian Chan. In March 2020, Lifespans' Chief Marketing Officer Richard Holloway has arranged for a public debut of the company's innovative technologies at the American Academy of Orthopaedic Surgeons (AAOS).

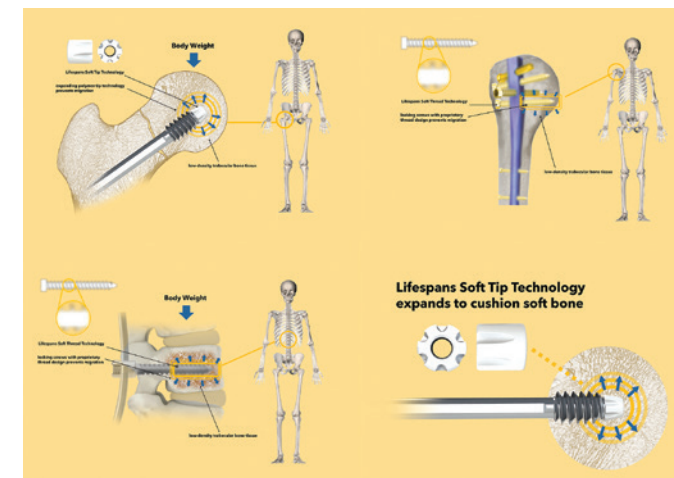
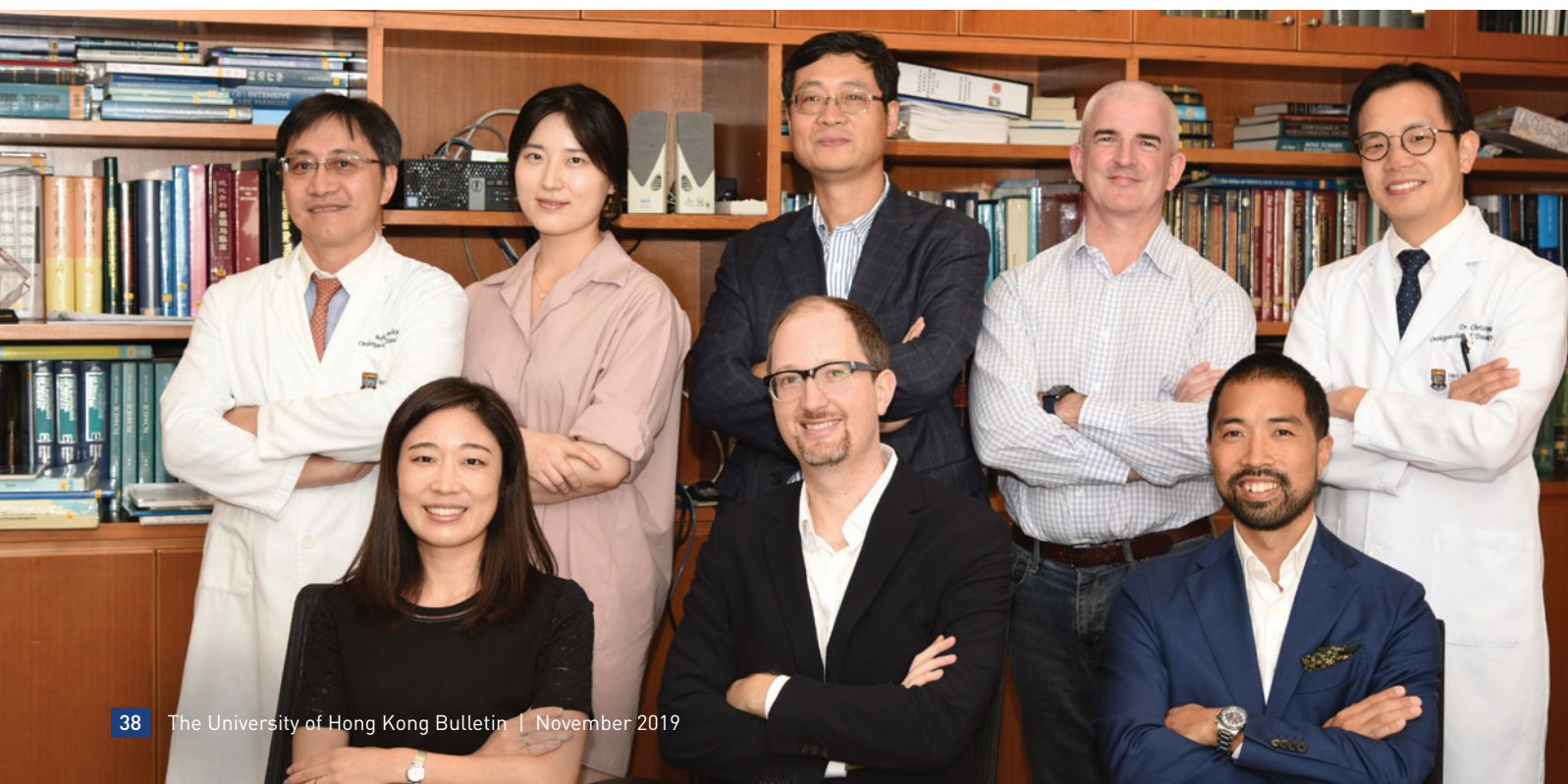
Dr Kulper commented: "We can't wait for the opportunity to share our work with our peers and the global orthopaedics industry at AAOS in 2020, it will be a huge milestone for all of the stakeholders in our company."



DR SLOAN KULPER

"We developed the world's first soft, elastic implant tip technology, which we call the Lifespan Soft Tip... we have observed up to 25 per cent reductions in migration rates during pre-clinical testing."

The Lifespans team – (back row from left) Professor Frankie Leung, Dr Grace Zhang, Professor William Lu, Mr Richard Holloway, Dr Christian Fang; (front row from left) Dr Erica Ueda Boles, Dr Sloan Kulper, Mr Adrian Chan; Dr Xiaoreng Feng (in absentia).



Lifespans develops three implants for repairing fractures in the elderly: Lifespans Soft Hip, Soft Shoulder, and Soft Spine.



Lifespans wins top prize at the inaugural Hello Tomorrow Singapore Regional Summit.

TURNING STEM INTO STEAM THROUGH MUSIC

A project to cross music with engineering by having youngsters design and build musical instruments is helping insert the 'A is for Arts' into STEM education.

The primary objective of the 'STEAM' competition, organised by the Faculty of Engineering and the Arts & Technology Education Centre (ATEC) and supported by the Knowledge Exchange Fund, was to enhance interest in and knowledge of how to engineer musical instruments to encourage creativity and expression in youngsters.

Entitled 'The Science and Engineering of Sound and Music', the competition was organised by Dr Ivy Wong Ka-yan and Dr Beta Yip Chi-lap and attracted more than 400 participants from primary, secondary and international schools across Hong Kong.

Teams were required to design and build a device capable of producing sound and being used as a musical instrument, culminating in

a live performance and competition to decide the most innovative and attractive.

Dr Wong said: "We wanted to engage youngsters by cultivating their interest and curiosity through hands-on and minds-on activities to solve problems in their daily lives. Auditory and verbal communications through sound, rhythm and music are basic in human lives. With the increased availability of low-cost, easily programmable hardware, open-source software and easy modelling and creation of 3D objects, students can build their own musical instruments when given suitable guidance."

"It was multidisciplinary," added Dr Yip. "The aim was to teach them science about sound and music, engineering principles, 3D

modelling and programming techniques for creating their musical instruments."

The Engineering Faculty team, led by Professor Francis CM Lau, has been working on collaborative knowledge exchange projects since 2006, giving them much experience in promoting STEM education to primary and secondary school students. Other projects coordinated by Dr Wong and Dr Yip include a number of competitions for school teams to design and implement effective methods or devices for meteorological instrumentation, such as measuring visibility, ultraviolet radiation and sea level and detecting the existence of lightning and earthquake, which were jointly run with the Hong Kong Observatory and the Hong Kong Meteorological Society.

The Musical Instrument Design Competition was jointly organised by HKU's Faculty of Engineering and the Arts & Technology Education Centre (ATEC).



The champion of the secondary school category goes to Team Mackerel from the Po Leung Kuk Choi Kai Yau School.



A guest playing the handcrafted plucked-string instrument that was inspired by Chinese musical instrument Yangqin.

For the musical instruments competition they coordinated a series of workshops and talks running over four months to give participants knowledge and ideas on how to go about their task.

"We taught the students programming, circuit design, 3D printing and laser cutting to show them what can be done using simple tools," said Dr Yip. "We also invited professional musicians to share their experience on topics such as 'What is music?', challenging students to expand their thinking and learn it's not necessarily all about *do-re-me*. This gave them more scope when developing their own musical instruments."

Asked what made them come up with the seemingly unlikely pairing of engineering and musical instruments, Dr Wong said: "Art and technology have always been closely related in that craftsmen must be at the top of their game when making musical instruments.

"The project coordinator and the team applied computational technology in arts, in particular music, for applications such as automatic music accompaniment, selection of melody lines, indexing of musical features, and the

creation of mobile keyboard instruments. It was all part of putting the 'A' into STEM."

Musical hit or miss?

And were the instruments actually musical? Dr Yip replied in the affirmative, saying that some of them could play a tune, and more: "During the concert, it was evident that the students spent a lot of time and effort preparing their performances and did their best to demonstrate their work to its best advantage."

While some teams had built familiar-looking instruments such as variations on pianos or drums, others had worked hard to incorporate innovative elements such as stepper motors, spinning wheels, marbles, wine glasses and wooden boxes to generate an original sound. Some even composed their own music and performed it on stage.

This was the team's first collaboration with the Arts & Technology Education Centre, a government education centre for STEM and arts education and they hoped to provide knowledge exchange not only for the participating teams through the proposed

competition, but also for teachers who will train future students afterwards.

For the future, Dr Wong would like to see more funding opportunities to enable them to organise more knowledge exchange projects, which she feels have value not only in themselves but can generate useful outcomes too. "The associated lectures, workshops and demonstration materials of the knowledge exchange projects could become effective teaching and learning resources and be useful for lifelong learning activities for schools and the general public," she said.



DR BETA YIP CHI-LAP

We also invited professional musicians to share their experience on topics such as 'What is music?', challenging students to expand their thinking and learn it's not necessarily all about do-re-me.

PLAYING THE LONG GAME

A world where children have forgotten how to play sounds like the plot of a Grimm's fairytale. Unfortunately, this is what is happening in today's digital world and it has sparked a major project to teach kids to play – and socialise – again.

The wicked witch in this particularly grim fairytale is the modern world – where parents are too busy to play with their children and where the only interaction occurring during play is between the child and his/her digital device, be it iPhone, iPad, or computer.

This joyless situation has sparked a project, developed by HKU's Faculty of Education and called Jockey Club 'Play n Gain', which aims to put the fun back into being a child by encouraging kindergarten children to learn social skills – and experience enjoyment – by learning to play.

"The move away from playing is not helped by the Hong Kong attitude to learning which is 'study, study, study'," said Dr Sylvia Liu, Principal Lecturer in the Faculty of Education and Director for Play n Gain. "But this is not just in Hong Kong, it is a global phenomenon – playing is not a factor in many children's lives, and later in life they have difficulty with social interactions. In the last 10 years, with the advent of smartphone and iPad, the situation has worsened. People sitting at a table

together will communicate with each other via WhatsApp rather than talk."

The official launch of the Play n Gain project in May 2019 marked the culmination of 15 years of work in this area for Dr Liu. Central to the work is her research-based social competence programme 'Social Star Mirror Model'. This serves as the conceptual framework for improving children's social and emotional skills through the systematic playing of interactive group games.

She started conducting research on play-based learning for students in Hong Kong when she realised her university students lacked social skills in face-to-face encounters. "Fresh graduates who were joining the workforce didn't know how to interact. I looked into it and realised how socially isolated their lives had become. Even when given group assignments, they wouldn't actually work together. Instead they'd assign to each other different parts of the project and accomplish those parts alone."

Dr Liu wondered when this social 'famine' started in a young person's life, and shifted her attention to secondary school students, then to primary. "I studied children in primary one to six, teaching them how to play. I quickly realised that if they didn't start playing during primary one to three, it got much harder to learn."

Sustainable gains

She then went back even further to kindergarten, and this is where the Play n Gain project is focussed now. "Kindergarten is where there is more involvement across the board. Not only children and teachers, but parents are involved too, which is important as the gains are not only for the kids, they are for everyone – the ultimate aim is sustainability."

Play n Gain works by supporting participating kindergartens to be 'Seed Schools', training parents and teachers to become ambassadors and keep play education going across schools and community.

The project also recruits university students as game assistants. Not only are they future parents but they will help support game activities at schools and in the community. Further, the project works with different organisations to promote game education to the wider community.

Dr Liu said: "We are working together to extend social-emotional learning from kindergartens to the community. Play n Gain develops human resources for game training to achieve sustainability in the long run. Parents and teachers can apply their play skills in daily life and in the community, to create play opportunities, environment and playmates for children. Play is a language – and when play is everywhere, it becomes part of our daily lives. Children play happily, safely with respect, as well as enjoying social-emotional gains."

Play n Gain has been funded by the Jockey Club Charities Trust. The HKU project began in 2018, with workshops held for teachers and parents in six kindergartens. It has since been extended to cover 14 local kindergartens, with a total of more than 2,200 children, and aims to develop a pool of around 8,000 parents, teachers and significant others to be change agents.

Asked what kinds of games are played, Dr Liu cites 'Scissors, Paper, Rock' – which is perfect as it is universal. "You use your hands and once the rules are established it's easy to play," said Dr Liu. "We then extend it to using your whole body – hold arms and legs out wide for paper, cross arms and legs for scissors, kneel down in a ball for rock."

Good winners, good losers

Next, they play with the rules, changing them so children have to think about what will now win. It gets them involved and engages them, and it helps ensure they learn to be good winners and good losers – no gloating, no sulking – and these skills become applicable in life.

"It's proven that playing games helps you learn essential social-emotional skills. There are three stages: start, maintenance, friendship; communication, conflict, emotion; and environment and executive functions, which

in turn involve working memory, inhibitory control and cognitive flexibility."

Asked what is most important to her about Play n Gain, Dr Liu said: "The parents learn to play and apply it to daily life, the teachers learn to play and apply it to daily teaching, the children learn to play and it prepares them for life."



DR SYLVIA LIU

We are working together to extend social-emotional learning from kindergartens to the community. Play n Gain develops human resources for game training to achieve sustainability in the long run.



The Launching Ceremony of the Jockey Club 'Play n Gain' project.



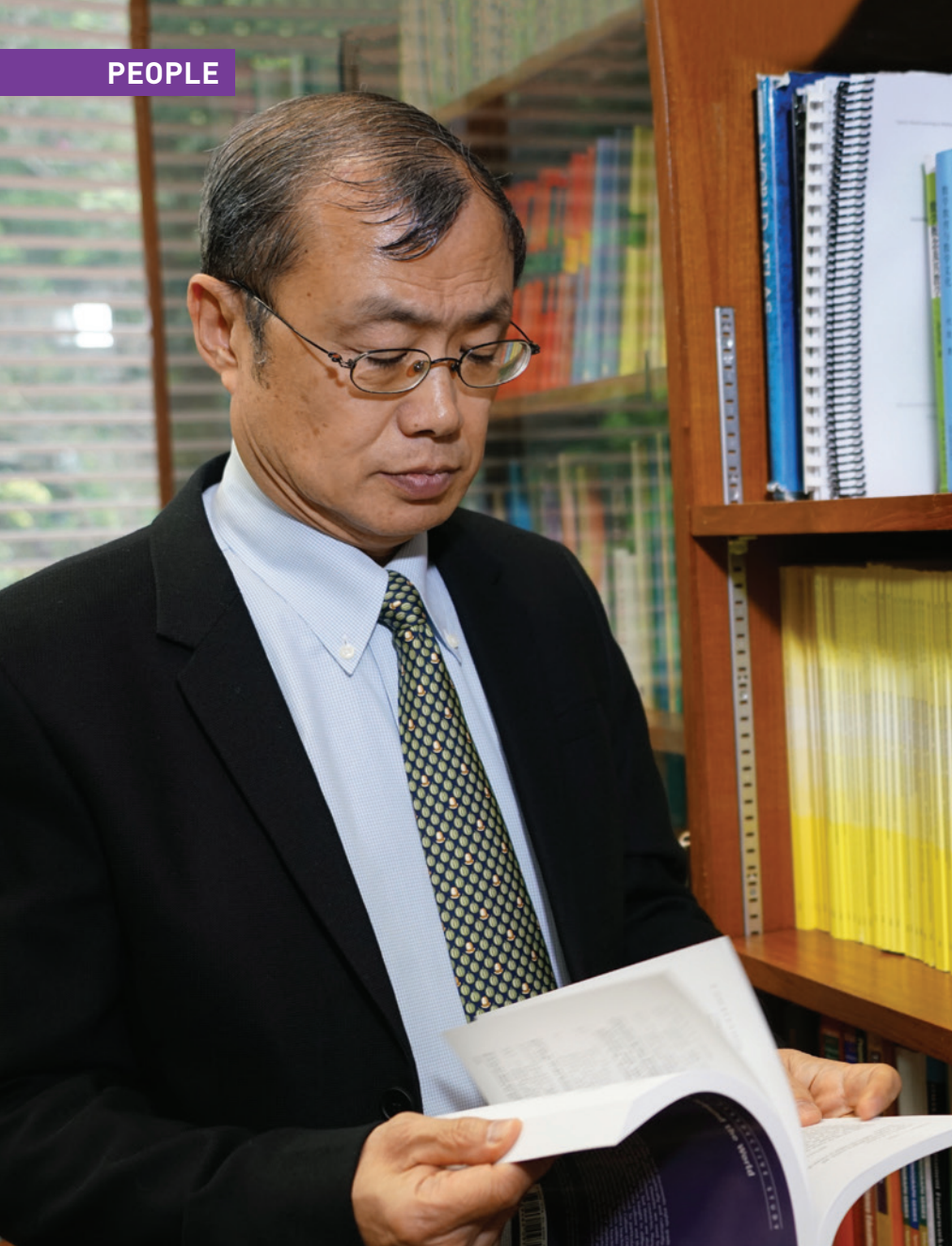
The mushroom game with key learning elements, including creativity, self-regulation, getting along with other children and safe movement.



Dr Sylvia Liu (second from left), Project Director of the Jockey Club 'Play n Gain' project introducing some 'good games', which should be fun, safe and respectful to others when playing.



The magic ball game with key learning elements, including rotation, sharing, courtesy, imagination and creativity.



NEW GRADUATE SCHOOL DEAN BRINGS A SENSE OF BELONGING

Professor Frederick Leung Koon-shing hopes to expand the employment horizons of research postgraduate students, while also making them feel supported and at home at HKU.

A home base has figured highly in the career of Professor Frederick Leung Koon-shing, Chair Professor and Kintoy Professor in Mathematics Education. He grew up in Hong Kong, did his undergraduate and master's degrees at HKU, and stepped into a Teaching Consultant job at the University where he has worked since 1982 (he did his PhD part-time at the University of London while continuing to lecture at HKU). His research has a connection to home, too. He is internationally renowned for his studies on cultural differences in mathematics education, which were inspired by his observations of how the British curriculum was taught to Chinese children in local schools.

Now, he is taking his homegrown inclinations into his new position as Dean of the Graduate School. Among his aims is to carve out a hub that research postgraduate (RPG) students can call their own.

"I'm not competing with what is provided by the Faculties," he said, noting some but not all had individual working spaces and social spaces for their RPG students. "What I want to do is provide students with a second home where they can mingle with other students, relax, have rooms where they can work if they want or hold workshops. Somewhere where they feel they belong. By making the experience better for them, I hope this will inculcate a sense of belonging to the University, too."

Getting the message right

Professor Leung's commitment to HKU runs deep. Apart from his 37 years as a scholar – during which he was awarded the highest international honour in mathematics education, the Hans Freudenthal Medal –



Professor Leung (left) at the Faculty Partnership Symposium 2018.

he has been Dean of Education, Master of St John's College, and Director of Education and Development for Research Integrity, among other posts. He agreed to take up the deanship of the Graduate School because for the first time, it has been made a full-time post. "It shows how serious the University is about promoting RPG education," he said.

He sees his job as three-fold. One is to help HKU attract top-flight research students. HKU is well-known in Hong Kong and Mainland China, but more promotional effort is needed elsewhere in the region and in Europe and North America. "Part of recruitment is how we promote ourselves," he said, a job that has been made a little easier with the recent announcement of new HKU Presidential PhD Scholarships for outstanding candidates, worth HK\$404,000 the first year and HK\$384,000 in subsequent years, which will be in addition to the Research Grants Council's Hong Kong PhD Fellowship.

"We must stress that we are an English-speaking university – you do not need to know Chinese to study a PhD at HKU – and that we provide these generous scholarships to offset the high cost of living in Hong Kong. And we need to focus on the attractions for research. The University is very strong in STEM, but we are also a very good location for humanities and social sciences students because of our expertise in and proximity to China," he said.



Professor Leung (centre) was named the first Changjiang Scholar in Mathematics Education by the Chinese Ministry of Education in 2014.

Variety and options

Professor Leung's second area of focus is ensuring students have a high-quality education experience over and beyond what they receive from their Faculty and supervisor. His proposal for a hub space is part of this. He also hopes to offer more variety within the Graduate School's compulsory courses in thesis writing, research methods and research ethics to cater to the different needs of students.

His third area of work – and one he is especially keen to improve – is students' future prospects. While academia seems a natural career path for RPG students, there are many other options abounding, particularly in the Greater Bay Area. "Many companies are thirsty for people with doctorates. We need to introduce students more to the opportunities that lie before them upon graduation," he said. The Graduate School will be cultivating ties with industry and also encouraging students to develop their research into start-ups. Professor Barbara P Chan was recently appointed Associate Dean (Innovation & Internship) to advance that area.

"I don't want students to think academia is the only path they can take. After they have been exposed to all these options and they are still determined to be a researcher, that's fine. But I don't want them to make that choice out of ignorance," he said.



Professor Leung (left) has been elected an Honorary Member of the International Association for the Evaluation of Educational Achievement, the first Asian recipient of this honour.



**PROFESSOR
FREDERICK
LEUNG
KOON-SHING**

“By making the experience better for them, I hope this will inculcate a sense of belonging to the University, too.”

A SLIVER OF HOPE FOR HONG KONG

The promise of the ‘one country, two systems’ model for Hong Kong has descended into increasing conflict and intransigence, as recent clashes illustrate. But that does not mean there are no options for moving forward, suggests a forthcoming book from the Faculty of Law.



In the 1980s, when Hong Kong's future was being negotiated by China and Britain, Deng Xiaoping coined the phrase ‘one country, two systems’ to describe the solution of allowing Hong Kong's legal and economic system to remain unchanged for 50 years. This governing model is unprecedented because it seeks to preserve a liberal enclave within a socialist state. It informed both the Sino-British Joint Declaration, an international treaty that expires in 2047, and Hong Kong's mini-constitution, the Basic Law, which mentions the 50-year timeframe but does not set an expiry date as such.

The neatness of the solution is now being sorely tested. To Cora Chan, Associate

Professor of the Faculty of Law, who has been studying how to sustain ‘one country, two systems’, the problem comes down to the fact that everyone has a different idea of what the model means.

Deng believed it encapsulated economic separation, with Hong Kong as an international financial centre helping China open its economy. Many Hong Kong people see it in political terms as referencing Hong Kong's distinct identity and autonomy from China. President Xi Jinping sees it in the context of China's sovereignty, security and development interests.

The result, says Ms Chan, is that there are “centripetal forces bringing Hong Kong and China's systems closer to unity, such as the co-location case [in which China controversially is applying Mainland laws at the terminus for a high-speed railway link in Hong Kong], and centrifugal forces pulling us apart, such as the voice for secession that was first heard after the 2014 Occupy Central movement.”

She has co-edited a forthcoming book that explores these tensions, called *China's National Security: Endangering Hong Kong's Rule of Law?*

“We are midway in the 50-year experiment and it is time to think about how we want the long-term China-Hong Kong relationship to look like,” Ms Chan said. “The theme of the book is whether it is possible to maintain China's conception of national security without endangering Hong Kong's rule of law.

The book does not assume it will definitely endanger Hong Kong's rule of law, but rather explores whether it will and if it is possible to preserve both.”

Hidden message

The book tackles the question from three angles. One looks starkly at the incompatibilities between Hong Kong and China. “These chapters suggest a clash is inevitable,” Ms Chan said.

The second considers sources of resilience in Hong Kong against encroachments on the rule of law that come in the guise of national security. These sources include the judiciary and legal profession, administrative law, legislature and civil society.

“The [overt] message is that the ability of these sources to function as sources of resilience seems to be waning. However, I think there is a hidden message. Hong Kong is well endowed with a strong constitutional framework that grants us a lot of legal powers and a high degree of autonomy that exceeds many federal regions in the world,” she said.

“We have a deep-rooted rule of law tradition, a professional judiciary, a well-trained legal profession, and a vibrant civil society. We can't take these for granted. There is much that the institutions of Hong Kong could still do if they are willing to make wise, timely and creative uses of their autonomous powers.” There is already an example of this in a 1999

right of abode case, in which the Court of Final Appeal said Hong Kong courts could strike down decisions of the National People's Congress Standing Committee that violated the Basic Law. The point was made obiter dictum, meaning it was separate from the core reasoning of the judgement. Partly as a result, it did not attract an overturning by the Standing Committee.

‘Perennial tension’

The third section considers concrete proposals for reinforcing Hong Kong's resilience, such as ensuring a role for international human rights and common law principles if and

when Article 23 legislation is introduced, strengthening the judiciary, considering how courts can deal with the demands of secrecy in national security cases, and introducing new institutions to monitor human rights.

Ms Chan has also separately explored the idea of maintaining the ‘perennial tension’ in ‘one country, two systems’ – of the two systems agreeing to disagree on certain legal questions, which are likely to be few in number. This has happened in the European Union (EU), where some member states do not fully accept that EU law overrides their constitutions.

“This pluralist concept would flout the traditional conception of a legal system, which is assumed to be unified with a final arbiter. However, the cost that comes with the lack of unity might be worth it. It might enable us to sustain both China's sovereignty and Hong Kong's rule of law in the long term,” she said.

Whatever the outcome of the ‘one country, two systems’ experiment, the rest of the world will be watching. “China's strategies in Hong Kong are indicative of its strategies around the world. Hong Kong is a testing ground for how resilient liberal values are against the authoritarian visions offered by an economic superpower,” Ms Chan said.



The tensions in the ‘one country, two systems’ concept have been manifested socially and constitutionally. The co-location controversy is an example of such manifestation.



MS CORA CHAN

“There is much that the institutions of Hong Kong could still do if they are willing to make wise, timely and creative uses of their autonomous powers.”

China's National Security: Endangering Hong Kong's Rule of Law?

Editors: Cora Chan and Fiona de Londras

Publisher: Hart Publishing

Year of Publication: 2020

CULTS OF FEAR

Frank Dikötter's new book documents how dictators of the 20th century used the cult of personality to solidify their power.



When Mao Zedong died in 1976, there were outpourings of grief on the streets. But behind closed doors, the reaction was quite different. "There are plenty of oral interviews and memoirs of people who cried in public, then went back home and opened their very best bottle of wine," said Professor Frank Dikötter.

The discordance between those reactions finds an explanation in his new book, *How to Be a Dictator: The Cult of Personality in the Twentieth Century*, which follows on from his three acclaimed volumes on China under Communist Party rule.

The new book was inspired by Mao's cult of personality during the Cultural Revolution and the parallels Professor Dikötter sees with other notorious 20th-century dictators, including the first cult-builder, Benito Mussolini of Italy, Adolf Hitler, Joseph Stalin, Kim Il-sung of North Korea, François (Papa Doc) Duvalier of Haiti, Nicolae Ceaușescu of Romania, and Mengistu Haile Mariam of Ethiopia.

Although each emerged under different circumstances, they share some similar features. "Dictators paradoxically are rather

weak. If they decide to grab power, others can do the same thing. How do you prevent someone else from organising a coup against you? How do you avoid the stab in the back?

"The cult of personality allows the dictator to tower far above allies and rivals alike, as all are made to collaborate through common subordination. When they praise their leader in front of all the others, they become liars, and when everybody lies it becomes difficult to find out what others think about their leader. The cult of personality is not so much about admiration but about fear," he said.

Claims of 'popular support'

Dictators cultivate that fear by purging both friends and foes. Mao had most leading members of the Chinese Communist Party denounced at one point or another, including Lin Biao who ironically helped implement his personality cult during the Cultural Revolution. Stalin purged or executed more than one million people from 1934 to 1939, accompanied by a propaganda machine that made him the focal point of the revolution.

"By 1939, every aspect of propaganda was about Stalin. It would not have been uncommon for factory workers to compose a letter to Stalin during a meeting in the Stalin House of Culture of the Stalin Factory on Stalin Square in the city of Stalinsk," he said. "A good dictator wants people to acclaim him even as he purges them."

The illusion of popular support was one key reason why modern dictators needed a cult of personality. In the past, kings and emperors

drew their power from a divine mandate. "With the French Revolution in 1789, sovereign power, for the first time, was vested in the people, not in God. This gradually unfolded into an age of democracy over the following two centuries," Professor Dikötter said.

The dictator subverts that democracy by seizing power, rather than being elected. Yet he still needs to convince insiders and outsiders that the people support him. "This is why Adolf Hitler liked plebiscites. There are many from 1933 onwards. At the same time, brown shirts knock on your door, give you a poster of Hitler, tell you where to hang it, and check back to see if you have displayed it. If not, you spend some time in prison. They also tell you how to vote. So Hitler gets a 99.4 per cent approval rate from the population."

Devastating consequences

Fascists and communists had a lot in common but differed when it came to justifying the cult of personality.

"Mussolini and Hitler had little to offer but themselves. They portrayed themselves as messiahs chosen by destiny to lead their people to greatness. But communist dictatorships were supposed to be the dictatorship of the proletariat, not the dictatorship of an individual. Stalin got around this by making sure the cult was presented as a spontaneous expression of the people, who demanded to see him and glorify him," Professor Dikötter said.

Since dictators end up being surrounded by liars and sycophants, they tend not to trust anyone ultimately. "The biggest threat

to dictators could very well come from the dictators themselves. They lose touch with reality, teetering between hubris and paranoia, and make all major decisions on their own," often with devastating consequences.

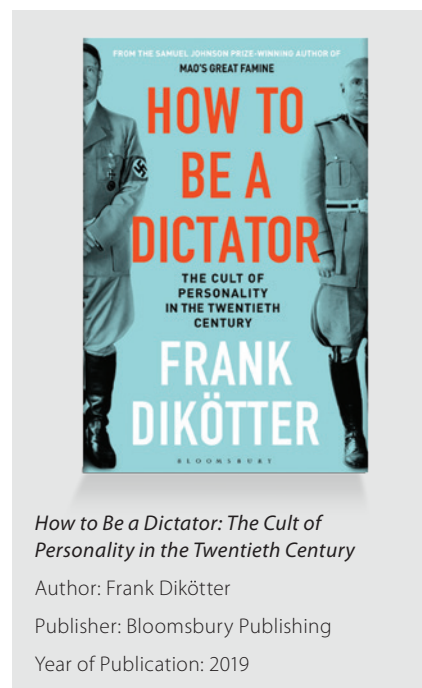
Mao pressed ahead with the Great Leap Forward that led to the deaths of tens of millions of people; Hitler insisted on invading Russia; Stalin signed a pact with Germany and refused to believe his generals when informed German troops were about to invade in 1941. "The sheer vanity of these dictators is extraordinary," he said.

While it may be tempting to compare present-day ego-driven leaders to the monstrous dictators of the 20th century, Professor Dikötter cautions strongly against that. "There's a danger of trivialising what happened to hundreds of millions of people across the globe who were compelled to cheer their leaders, even as they were herded down the road to serfdom. That is not to deny there haven't been setbacks over the last 10 years or so, but the book should give us a much-needed sense of perspective," he said.



PROFESSOR
FRANK
DIKÖTTER

“A good dictator wants people to acclaim him even as he purges them.”



How to Be a Dictator: The Cult of Personality in the Twentieth Century

Author: Frank Dikötter

Publisher: Bloomsbury Publishing

Year of Publication: 2019

MIND YOUR LANGUAGE

A unique aspect of Hong Kong law courts has been the frequent use of English as the trial language in a predominantly Cantonese-speaking society. An HKU scholar examines the challenges this creates.

The origins of the book – *Common Law in an Uncommon Courtroom: Judicial Interpreting in Hong Kong* – go back 25 years to 1994, when Dr Eva Ng joined Hong Kong Judiciary as a Court Interpreter II. She left that job 14 months later, but the uniqueness of the situation stayed with her.

Dr Ng, now Assistant Professor of the Translation programme in HKU's School of Chinese, said: "The trials I worked at during the first half of my time as a court interpreter were conducted in English, even if the participants in court including the presiding judge and counsel for both parties were Cantonese-speaking locals – a very awkward scenario for the interpreter to work in. An equally odd

situation later developed when magistrates started to hear cases in Cantonese but retain the interpreter in court as a language consultant while they silently translated everything said in Cantonese into English because of the requirement back then for the court proceedings to be kept in English."

Wanting to explore this unique courtroom setting more, she began empirical studies in 2008 when the High Court Registrar granted her access for academic purposes to audio recordings from criminal trials heard in English. From that, and with the support of three internal teaching grants, she developed a new course in Legal Interpreting begun in 2009–2010 and also started her PhD research, completed in 2013, which form the basis of this book.

The work covers many aspects of the issue, including problems that can arise from judges' intervention in the court proceedings, Chinese witnesses testifying in English, and English-language trials heard by Chinese jurors. It also looks at the limitations associated with the use of *chuchotage* – simultaneous translation (SI) in a whisper – in the Hong Kong courtroom, where interpreting in an English-language trial is arguably provided to cater for the need of the linguistic majority.

Linguistic power

"My initial aim as I started my thesis was to demonstrate how the presence of bilingual court participants (including, but not limited to, judges and lawyers) might impact on the

linguistic power of the court interpreter and the interactional dynamics in court," said Dr Ng. "In particular, how bilingual counsel may strategically exploit their bilingual skills to monitor the output of the interpreter and to propose alternative interpretations of ambiguous terms or expressions to suit their own purpose."

She also focusses on Chinese witnesses testifying in English and Chinese jurors' comprehension in English trials. "On the one hand, Chinese witnesses testifying in English without a good command of the language are necessarily disadvantaged linguistically as they manifest great difficulty in understanding counsel's questions and in expressing themselves adequately in English," Dr Ng said.

"On the other hand, the English-medium witness examination process might also impact on the comprehension of the Chinese jurors, who are forced to rely entirely on the English testimony and counsel's questions asked in English for their comprehension of the evidence."

She explained the situation further: In the usual case when witnesses testify in Cantonese, consecutive interpretation will be provided, and jurors who have a problem understanding counsel's questions in English can benefit from the Cantonese interpretation provided in open court.

"However, in the case of a witness testifying in English, or of counsel or the judge addressing the jury, *chuchotage* will only be provided for

Dr Eva Ng's book looks into the legal interpretation in Hong Kong.
(Courtesy of Hong Kong Court of Final Appeal)

the defendant in the dock, often located at the far end of the courtroom opposite to the judge's bench, to ensure his/her access to the trial in its entirety. It is not accessible to the jury."

This is what she finds most worrying. "Because jurors as 'judges of facts' are expected to return a true verdict based on what they have heard in court, so their comprehension of all the evidence given in court and the judges' instructions and counsel's speeches is vital to their deliberations of the verdict."

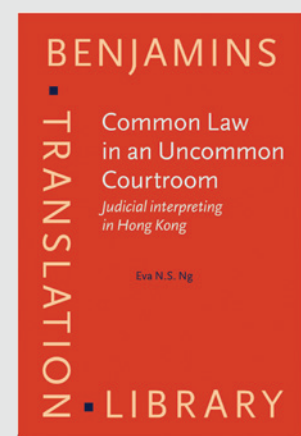
For this reason, Dr Ng is currently carrying out an experimental study funded by the Research

Grants Council to further investigate Chinese jurors' understanding of jury instructions and counsels' speeches as well as evidence given in English, by using recordings extracted from the court data to test potential jurors' comprehension.

The book does not only look at possible problems Hong Kong's unique form of bilingual courtroom may pose – it also offers some solutions. Dr Ng would like to see the courts made fully bilingual in the case of English trials, and thinks the Judiciary may consider using the electronic mode of SI, as used in the International Criminal Court in the Hague.

"This way, Chinese jurors who have a problem understanding speeches or utterances made in English will benefit from the interpretation provided for the defendant via their headphones, currently in a whisper. The use of consecutive interpretation for witnesses testifying in Cantonese should be retained to ensure a high level of accuracy."

Dr Ng concluded: "Court interpreting mitigates linguistic inequalities in the judicial process, and quality in interpreting is vital to the delivery of justice. It must therefore be made a shared responsibility of all the parties involved in the communication process, as well as policymakers, to ensure equal access to justice for all."



Common Law in an Uncommon Courtroom: Judicial Interpreting in Hong Kong

Author: Dr Eva N S Ng

Publisher: John Benjamins Publishing Company

Year of Publication: 2018



Dr Ng (first from right) arranged a mock trial for students of her Legal Interpreting course, with the participation of lawyers and students from the Department of Professional Legal Education.





DR EVA NG “Court interpreting mitigates linguistic inequalities in the judicial process, and quality in interpreting is vital to the delivery of justice. It must therefore be made a shared responsibility of all the parties involved in the communication process, as well as policymakers, to ensure equal access to justice for all.”

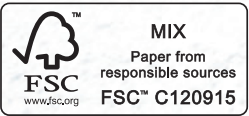
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