HKU BULLETIN

TRAPPED IN AN INFODEMIC

Social media and information overload

Combating wildlife trafficking
Genomic analysis of pangolin scales
uncovers illegal trade routes

An antibiotic breakthrough
HKU's new drug offers hope against
drug-resistant strains

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LIVING IN AN INFODEMIC

Social media's alarming power to spread false or harmful information has raised concerns. HKU researchers delve into the nature of 'fake news', explore how social media impacts China's information landscape, look into legal challenges in regulating platforms, train fact-checkers, and uncover the effects of social media on the human brain.

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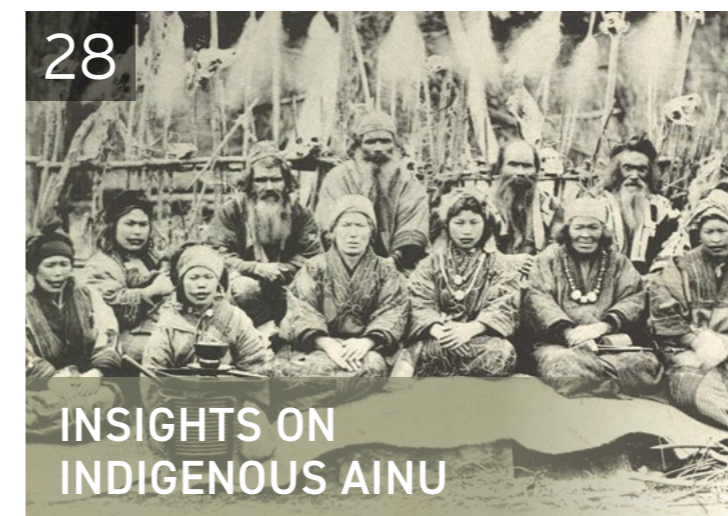
LIVING IN AN
INFODEMIC

Alarm bells are ringing about social media's ability to quickly convey and amplify false or harmful information, such as content intended to mislead voters or promote anti-vaccination and other dubious health advice. HKU researchers consider what makes news 'fake', how social media affects China's information landscape and the legal challenges to regulating platforms. They are also training fact-checkers and seeking to understand the effects of social media on the brain.

A NEW SPIN ON
Fake News

What constitutes 'fake news'? And how can we distinguish it from the real thing? Professor Rachel Sterken in Philosophy has been considering these questions in the context of new technologies and platforms such as social media, that pose challenges to the knowledge environment.

Which of these is 'fake news' – anti-vaxxers posting unfounded stories against COVID-19 vaccines on social media? Or the British newspaper, *The Mail on Sunday*, publishing a fake article about a climate change study?

For Professor Rachel Sterken, Chairperson of the Department of Philosophy, who has published on the problem of fake news and leads a major project on meaning and communication in the information age, the answer lies not so much in the content of a news story as the processes it went through before and after it was published.

"There has always been fake or deceptive news in the public sphere. But the way news is produced and consumed is changing as a result of social media and AI technology," she said.

"What gives a story its status as news are the standards and practices that a journalist applies in producing the story, such as verifying sources. These practices provide assurances that the information that circulates is important, relevant and true. If the procedures by which we produce, verify and distribute content are changed or eroded, then that could have serious implications for our epistemic environment."

Valid news outlets usually follow good news production practices, which means even if they produce incorrect stories, these stories are not fake, even if they are misleading, she said. "It's important to recognise that good journalists can make honest mistakes. That's not the same as fake news. The distinguishing feature of fake news is that there is no accountability and no proper procedures for verification."

Lines blurred between news producers and consumers

Societies have procedures for holding news organisations accountable. *The Mail on Sunday* faced formal complaints and issued apologies in 2017 for the inaccuracy of its report. Individuals who spread fake news, on the other hand, are not held accountable in the same way. Anti-vaccination supporters have continued to spread fake information without sanctions across social media.

"The ease with which social media can circulate news is also a challenge for journalistic institutions because they lose control over content distribution and curation," she said. Platforms decide how to allocate stories to users based on their algorithms. They also blur the lines between consumers and producers of news by allowing consumers to create news without verification or other processes. "There are lone actors out there that break stories, but they aren't journalists. They don't necessarily produce stories via journalistic practices."

Professor Sterken suggested better content moderation could improve the knowledge environment, but it is not a replacement for fact-checking. Moreover, social media companies do not share traditional media's goal of contributing positively to the epistemic environment. Rather, they mainly want to keep people on their platforms. They may also have no qualms about scaling back on content moderation, as seen with Twitter (now called X).

"If you start to conflate news organisations and social media or collapse them together, trouble arises," she said. "When news organisations distribute their content on social media, the way content is filtered down to the public and the way the public interacts and can respond to it is structurally very different from what it used to be."

Public debate becomes more difficult

This difference affects public debate. Traditionally, readers could write a letter to the editor and engage in a public dialogue. Now, there is no structure to the conversation and no way to track it because stories and topics get jumbled together. "The recommendation algorithm messes with the relevance of particular journalistic stories to particular audiences, by moving them from one group to the next based on viewership. This makes it difficult to have a cohesive, well-structured public conversation and debate surrounding issues that matter to particular groups."

Professor Sterken believes society needs to give deeper consideration to the design and governance of social media platforms, and our epistemic environments.

Even more changes are happening with the advent of artificial intelligence, which exacerbates the question of the quality and curation of information. AI can generate authentic-sounding speech and other content. Philosophers and others working in the area are thinking about how to distinguish authentic and synthetic speech online, whether the latter should be labelled, and whether content generated by AI and bots should be immediately removed given the source does not have free-speech protections.

"Things are happening at a rapid pace, making it hard for institutional structures and processes to constantly reassess and understand what is going on," she said. "We need to educate our students and the general public so they can understand and make sense of these issues as they arise. We also need to develop trustworthy sources again, find mechanisms to give status to information in ways that people find legitimate, and establish means by which we can productively talk to each other in the public sphere."

> "If the procedures by which we produce, verify and distribute content are changed or eroded, then that could have serious implications for our epistemic environment."
>
> Professor Rachel Sterken

THE
FACT-CHECKERS

Professor Masato Kajimoto and his journalism students fact-check news and rumours on social media. The job is only getting harder.

About 15 years ago, Professor Masato Kajimoto from HKU's Journalism and Media Studies Centre (JMSC) noticed a worrying trend. Reputable media outlets were publishing stories from social media without checking if they were true – stories such as the rumoured death of American actor Morgan Freeman (he was alive) and the projection of sunrises on giant outdoor screens in Beijing so people could see the sun despite bad air pollution (the image was an advertisement).

Media outlets soon cottoned on, but the problem of fake news and misinformation on social media was only just beginning. Professor Kajimoto began tracking it around the time of 2014's social movement in Hong Kong, when misinformation was circulated to promote certain narratives. In 2016, the whole world started to pay attention in the wake of Brexit in the UK, and the elections of Donald Trump in the US (who popularised the term 'fake news') and Rodrigo Duterte in the Philippines.

"There are certain groups in society that have very strong motivations to produce and disseminate misinformation. They are trying to mislead or deceive the public. It's definitely something that I think journalism can address," he said.

This is a tall task, given the vast quantities of content that are circulating. On Facebook alone, more than one billion stories are posted each day. Professor Kajimoto therefore is selective. He tracks multiple groups and topics at a time on Facebook, Twitter (now called X), Reddit, and other platforms. Misleading popular posts shared within private messaging apps such as WhatsApp and WeChat also often appear on these public platforms.

Spotting fake news

His research has identified groups and narratives targeted by fake or misleading posts, showing, for instance, how religion is a factor in Southeast Asia where posts target Muslims in Myanmar and Chinese Christians in Indonesia. In Hong Kong, misleading posts have been more political, with disinformation widely used against opposing political views in the period before the National Security Law was introduced in 2020.

Professor Kajimoto also heads the Annie Lab at HKU – which stands for the Asian Network of News & Information Educators – a project he started with other journalism educators in Asia in 2013. Annie Lab has been training students on fact-checking, such as how to verify if accounts are real or fake and if images or videos have been manipulated.

The students focus on a variety of claims circulating on social media. Examples of their work include showing that a post on X claiming China's blood products account for 80 per cent of the global market was false (it's normally under one per cent except for the pandemic

years) and that a photo claiming to show a Palestinian boy mopping up the blood of his family in the recent Gaza war was misleading (it was taken more than 10 years ago after the slaughter of a cow).

While fact-checking skills are valued in the job market and society in general, there is also a downside. "We often joke about fact-checkers having post-traumatic stress disorder because you see content after content that is clearly trying to mislead and deceive people, and lots of graphic images and conspiratorial narratives. What we can do is very limited – the volume is just getting worse. So in a way, it's a very bleak future."

> "We often joke about fact-checkers having post-traumatic stress disorder because you see content after content that is clearly trying to mislead and deceive people, and lots of graphic images and conspiratorial narratives."
>
> Professor Masato Kajimoto

GenAI complicates things more

Generative artificial intelligence (GenAI) makes things even bleaker because it is so difficult to verify sources, with worrying implications for public information. "There are lots of voice fakes now, especially in countries having contentious elections, and you cannot tell if this person really said that or if somebody used AI to generate their voice," he said.

But there are a few slivers of hope. Big tech companies are looking into digital tags to identify AI-generated images and many media outlets now fact-check political leaders. The idea of 'pre-bunking' (as opposed to debunking) is also taking hold to help citizens spot fake and misinformation. The JMSC itself has a dedicated course on GenAI.

Professor Kajimoto also thinks misinformation and fact-checking should be put in perspective. If people have decided on an issue, they are unlikely to change their minds. Think of the US election – no amount of debunking is likely to sway supporters of Donald Trump or Joe Biden to vote the other way. Even during the pandemic, no amount of scientific information changed the minds of anti-vaxxers, because they held deep fears of vaccination.

"When it comes to trust, oftentimes it comes from somebody that people know. So no matter how many times news organisations or medical doctors try to convince them, they may not listen. But if it comes from loved ones, then people might change their minds. Trust is more emotional than rational," he said.
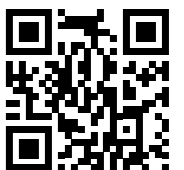
Learn more about the Annie Lab

SPEAKING TO
POWER

More than one billion people in China use social media. Professor Yanhui Wu studies the benefits and drawbacks to the country's information landscape.

Before social media took hold in the late 2000s, traditional newspapers were a key player in the media landscape, but they mainly reported on the movements and activities of government leaders or, if they were commercialised, on entertainment-oriented news. Investigative reports about pollution, corruption and other problems, which are costly to produce and may be subject to external pressure, were hard to find. For Professor Yanhui Wu of the Faculty of Business and Economics, a specialist in media economics who was an award-winning journalist before entering academia, this was not ideal for society.

"The rapid flow of diverse information is really important in a market economy like China's," he said, "but traditional newspapers have been weak in providing this information and monitoring local governments and businesses because they are owned by local governments, who do not fully internalise the benefit of freer information flow."

The arrival of social media, which reached 100 million Chinese people by 2010 and more than one billion today, was a game-changer. "Social media has generated a huge informational shock. It provides a way to facilitate communication both from the bottom of society and from the very top," he said, putting pressure on the middle to be accountable.

Some benefits with a caveat

A 2017 study by Professor Wu showed that from 2009 to 2013, millions of social media posts discussed protests, strikes, corruption and other social problems in China. That atmosphere may be different today, but he has also shown how social media continued to impact government action in relation to non-COVID-19 vaccine procurement.

Bearing in mind a vaccine scandal in Shanxi province in 2007, when the local government stopped media from reporting on its approval of expired vaccines for children, leading to more than 100 deaths and disabilities, he decided to investigate if social media could offer greater accountability. "Theoretically, information is no longer controlled by local government on social media," he said.

Social media posts that raised concerns about vaccine safety were collected in various Chinese cities and the number of posts in each city was compared with local procurement processes. Local governments can procure either through open tender, which is transparent but slow, or private negotiation, which is faster but opens a gateway to corruption. Professor Wu found when there were more posts about vaccine safety, the city was more likely to procure through open tender and from reputable listed companies, which are under stricter regulations.

However, there was a caveat. "Social media does benefit accountability to some extent," he said, "but the effect works only when the local political leaders are responsive to top-down pressure. For instance, when they have a strong incentive to advance their career, they care more about what the central government will think about their competency and accountability. Otherwise, the effect is rather limited."

Regulating the algorithms

Professor Wu has also started looking at how the mass of information on social media could be managed to prevent societal harm, such as the circulation of fake news or the whipping up of anti-Japanese hysteria. One thing he is adamant about: the information itself is not the problem.

> "We need to strengthen the safeguards for society, but we should not blame the information itself. Regulating the circulation of information is probably more important than regulating the production of information."
>
> Professor Yanhui Wu

"The problem is that we have suddenly come to realise we live in a vulnerable society. This is happening in many countries. We need to fix our society to make it stronger, but this will take a long time. An intermediate step would be to channel information in a way that mitigates harmful impact and try to promote the better aspects of information generation on social media," he said.

He proposes regulating algorithms – not companies or platforms, which is the traditional approach taken in places like China – because this would minimise the circulation of harmful information at source. Such regulation requires heavy involvement by humans, as well as methodological innovation, and he is developing his model in collaboration with data scientists.

"Our approach is to choose the most important issue and develop an algorithm that can control this extremely well. The disadvantage is that it may not be able to control other issues of less social consequence, but they are not as important. Basically, you have this trade-off," he said.

An example of a trade-off is freedom of expression. People could still post their views, but the algorithm could prevent them from being circulated widely, especially if they were fake or dangerous posts (for instance, touting bleach as a cure for COVID-19 or encouraging people to swallow washing detergent capsules).

"We need to strengthen the safeguards for society, but we should not blame the information itself," he said. "Regulating the circulation of information is probably more important than regulating the production of information."

REINING IN
TECH PLATFORMS

Fake news and misinformation are easily published and circulated on platforms such as Google, Facebook and YouTube. There are moves to make these media responsible for the messages they convey.

In 2022, US courts ordered American talk show host and conspiracy theorist Alex Jones to pay more than US$1 billion in damages to the parents of several of the 20 children murdered at Sandy Hook Elementary School by a gunman in 2012. Jones had been claiming online since 2014 that the deaths were a 'hoax' and the parents 'crisis actors' and, until 2018, platforms such as Facebook and YouTube allowed his content to be

posted and shared. They removed him that year for a range of offensive content, but the question lingered: what obligation did those platforms have to keep such fake and harmful information out of the public arena?

To Dr Marcelo Thompson, Adjunct Associate Professor in the Faculty of Law, the answer is clear – platforms must do more to moderate their content. Unfortunately, while

many platforms are global and their content circulates worldwide, the laws that govern them are set locally, impeding convergence, he said.

On the one hand is the US, where policy adopted since the mid-1990s has left platforms unchecked regarding their moderation decisions. The initial intention was to encourage growth and investment in the tech industry without the worry of liability, and to support freedom of expression. But this in turn removed most incentives for platforms to take such a core aspect of their mission seriously.

"In the US is also the belief that moral choices online should be left to individuals, and the law shouldn't be demanding state intervention on moral grounds," he said. "However, individuals can only truly choose if platforms themselves are neutral, which is far from the case. Global convergence depends on acknowledging this reality."

Protection on moral grounds

In China and increasingly in Europe, protecting the public interest involves intervening on moral grounds. Europe does not explicitly acknowledge this parallel, but its Digital Services Act has introduced the idea of regulating against societal harm, such as through misinformation.

"Europe claims that it is not enforcing morality but rather European values. But the very idea of freedom of expression has a moral dimension, as that freedom can be restricted on public interest grounds as long as the restriction is necessary and based on law," he said.

"Large language models are pervaded by moral forms of reasoning through their algorithms. We need to acknowledge that everyone is doing the same thing, and then the discussion becomes, how far should we go?"

The pandemic is a case in point. China stepped in at the beginning to restrict information flows to prevent panic, while in the US there were no restrictions on misinformation circulating online, which drove anti-vaccination sentiment and the adoption of questionable treatments.

"In order to protect individuals, you need the state to step in to decide on the nature of decisions that are made by platforms that are increasingly displacing states as a locus of power," he said.

Admittedly, it can be complicated for states of all kinds to regulate tech platforms when they are beholden to them. "There is a paradox that the state is increasingly dependent on the knowledge of the very actors

> **"There is a paradox that the state is increasingly dependent on the knowledge of the very actors it seeks to regulate. Unchecked platform power is a challenge for the future."**
>
> Dr Marcelo Thompson

it seeks to regulate. Unchecked platform power is a challenge for the future of the law and the future of the state," he said.

Inching to the Chinese approach

A case in point is Hong Kong. Dr Thompson recently produced a report for the Chief Executive's Policy Unit on the responsibility of technological platforms here. The report suggests that, while national security concerns are of paramount importance, they need to be followed by a broader range of public interest considerations. More power may mean less when platforms could easily pull out in response to stricter government demands. However, a softer, public-interest-based approach, drawing on technological standards adopted through a wide public consultation, could at the same time increase available regulatory alternatives, garner greater public support, and ultimately further Hong Kong's international standing, he said.

Dr Thompson also thinks the city should look at the situation in Mainland China, where people have more data protection rights in relation to social media platforms than Hong Kong residents, at least when it comes to private actors. China's Personal Information Protection Law applies to the government, too, although in a 'looser' way, he said. But Europe also offers public interest exceptions in its data privacy laws.

"China saw this issue coming and they have been regulating from the outset. Europe has this illusion of being so different from China, but it is inching increasingly closer to the Chinese approach by addressing issues of societal harm and addressing what is essentially a moral dimension," he said. As the big players of Europe and China converge, the outlier remains the US.

STUCK ON
SCROLLING

Social media platforms bombard us with information in ways that can be addictive and possibly harmful to mental health. HKU scholars consider the consequences for young and old.

"Brain science could be critical to inform policymaking on social media use by minors and for developing new and specific treatment interventions."

Professor
Benjamin Becker

Facebook came in for a harsh grilling earlier this year when the CEO of parent company Meta, Mark Zuckerberg, was accused in a US Senate hearing of having 'blood on his hands'. The reason was the mental health effects linked to the platform's algorithms.

Social media algorithms are primed to keep us scrolling and exposed to more and more information. Multiple studies have found this to be associated with negative effects, such as depression and anxiety. But the question remains – what exactly is social media use doing to our brains?

Neuroscientist Professor Benjamin Becker of the Department of Psychology and State Key Laboratory of Brain and Cognitive Sciences began looking at this issue a couple of years ago when he noticed features of social media overuse resembled those of drug addiction. "Usually, our behaviour is driven by seeking reward but in addiction, this

becomes uncoupled from a positive experience and becomes automatic behaviour. In addition, when people try to stop or reduce their use, normally they fail. They have lost control over behaviour," he said.

Social media users can experience such symptoms but, unlike drug addiction, the mechanisms are unknown. Professor Becker and his German colleague, Professor Christian Montag from Ulm University, therefore have called on brain researchers around the world to look at what is happening in the brain when people engage with social media, especially adolescents.

"Most researchers use questionnaires to study social media, which do not tell us what kind of brain changes go along with that, particularly during adolescence when the brain undergoes dramatic changes in reward processing and social processing. Adolescents are already very sensitive to the influences of friends, peers and the environment.

Difficult to resist

The only way to find out is to conduct long-term fMRI studies tracking adolescent brain development and social media use over two or more years. These are expensive, but they would provide insight about which brain systems get engaged with social media, which get people hooked, how this interacts with brain development, and how it affects or interacts with mental health.

"We currently don't know these things. Brain science could be critical to inform policymaking on social media use by minors and for developing new and specific treatment interventions," such as education, regulation or restricting use, Professor Becker said. He and Professor Montag proposed in *Nature*

in April that such studies could be funded through a proportion of the fines imposed under the European Union's recent Digital Services Act.

Meanwhile, he has already done preliminary work showing young users of WeChat experience brain changes related to emotional control and their reward system, similar to other addictions. Another study in Chengdu showed people are more likely to be distracted by social media notifications than other notifications.

Professor Becker stressed that social media use is not overall a bad thing – many people use it without ill effects. But some people may be more vulnerable to addiction than others, particularly if they have higher reward sensitivity (as in drug addiction). Currently, it is unclear if reward-sensitive people are prone to heavy social media use, or if the use drives their reward sensitivity.

In any case, the issue urgently needs addressing in young people

because their brains are developing quickly and vulnerable to algorithms and content that keep them glued to the screen. Interestingly, the European Commission has launched proceedings against TikTok based in part on the negative effects on minors. "Social media can propel or enlarge problems because the information spreads very fast," he said.

Anxiety in older people, too

Older adults can also be vulnerable to anxiety from social media use, according to a study focussed on COVID-19 led by Professor Terry YS Lum, Henry G Leong Professor in Social Work and Social Administration.

Professor Lum and his collaborators collected information from 3,421 adults aged 60 and over about their use of social media to obtain COVID-19-related information. Heavier use of social media was associated

with more anxiety and lower social trust in information, particularly because users were more likely to encounter false information. However, social media use did not mediate their COVID-safe behaviours.

"COVID-19-related information on social media was over-abundant and sometimes questionable, resulting in an 'infodemic' during the pandemic. Our results align with previous studies that suggest social media usage in general can increase the risk of developing anxiety symptoms. Importantly, we were able to show that social trust in information may be challenged by unverified and contradictory information online," Professor Lum said.

"The negligible impact on participants' behaviours suggests social media may have caused more confusion in consolidating a consistent effort against the pandemic. Media literacy education is therefore recommended."

MEASURE OF THE
MUTATIONS

A cutting-edge screening platform enables rapid large-scale assessment and quantitative analysis of the severity and infective strength of SARS-CoV-2 mutations.
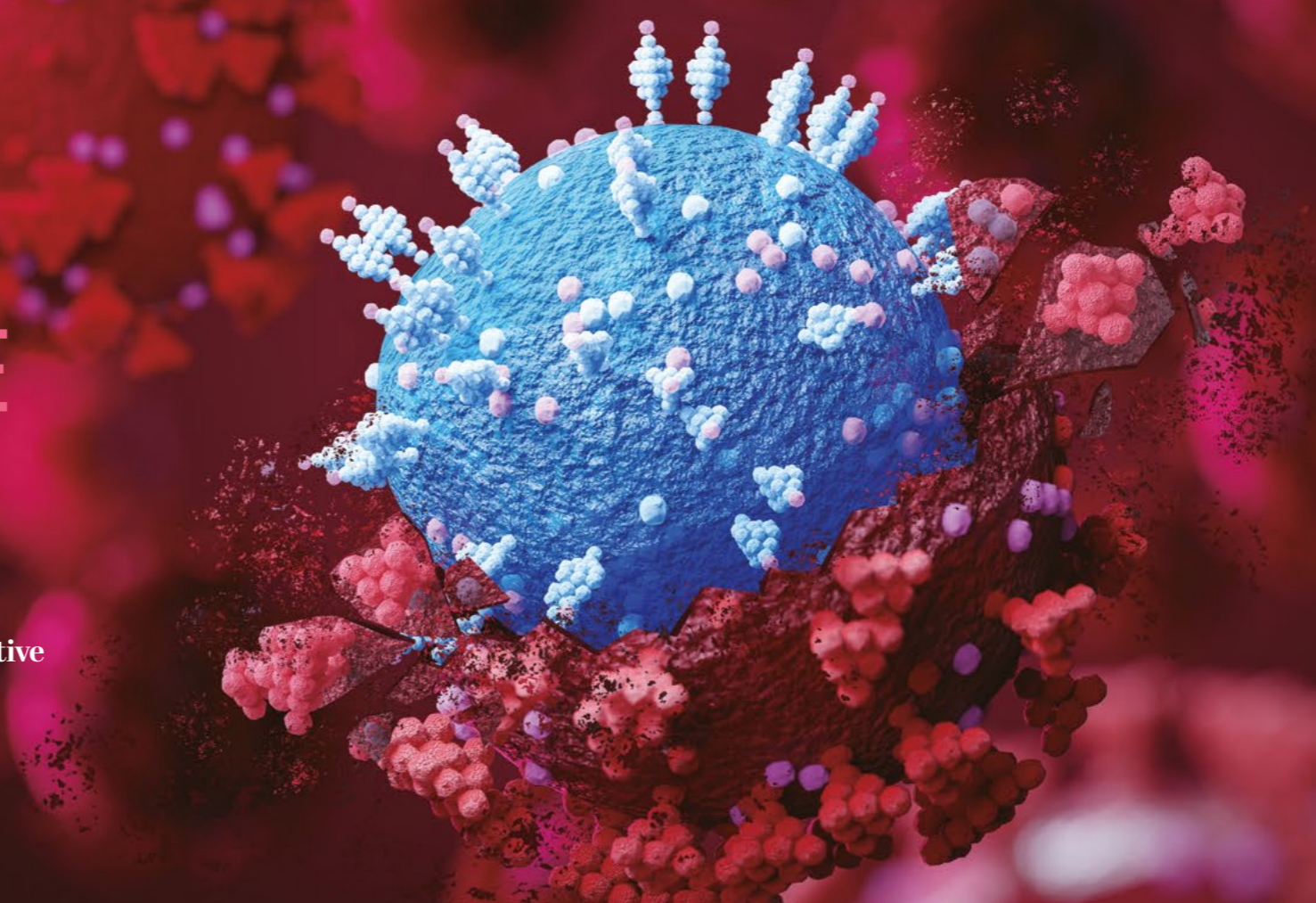
"The unique perspective lies in the power of the throughput – we can perform large-scale screening on the cell-cell fusion phenotype that no previous technology can achieve."

Professor Alan
Wong Siu-lun

The innovative platform was developed by a cross-disciplinary team comprising researchers from the Faculties of Medicine and Engineering, and uses novel screening methods and advanced genetic techniques to identify the specific genetic and cellular factors responsible for promoting syncytia formation – which contributes to virus spread and disease severity.

"The unique perspective lies in the power of the throughput – we can perform large-scale screening on the cell-cell fusion phenotype that no previous technology can achieve," said Professor Alan Wong Siu-lun, Associate Professor in the School of Biomedical Sciences, HKUMed, who led the research.

"For screening the many possible mutations (like the ones for SARS-CoV-2), we definitely need a method to enable us to achieve large-scale screening in a short time frame. Prior to this work, to the best

of our knowledge, no large-scale quantitative analysis that directly reveals how mutations of the spike protein affect the cell-cell fusion process has been reported."

The novel system they developed uses split green fluorescent protein which gives out signals when cells fuse together. This was combined with a microfluidics-based system and large-scale mutagenesis to create a new platform enabling rapid screening and analysis of spike protein variants and their fusion capabilities.

Previous studies have shown that certain variants, such as the Delta strain, form larger syncytia than the original strain of the virus, and the team discovered that a single K854H mutation can transform the Omicron variant into a strain that forms fusions from a low rate to a high rate. To enhance the efficiency, they then developed a new strategy using size-exclusion selection to sort fused and unfused cells on

a large scale, and this enabled speedy screening. The resulting system has an accuracy rate of over 80 per cent, and is also 39 times faster than traditional methods.

"For traditional imaging-based methods, with an imaging throughput of about 30 seconds per sample, screening a genome-wide CRISPR library of 37,722 sgRNAs is estimated to take about 13 days," said Professor Wong. "We have developed two new methods. With our first droplet microfluidics-based method, it is estimated that screening the same library would take a total of about seven days. With our second size-exclusion-based method, the screening would take around eight hours."

The collaboration between HKUMed and the Faculty of Engineering began around 2021. "SARS-CoV-2 kept evolving, and we were seeing that variants like Delta could increase the virus' cell-cell fusion ability and enhance disease severity,"

said Professor Wong. "We thought there is a real need to track the new and potential mutations and look at their degrees of infectivity, as well as their impact on disease severity. We thus thought about the different possibilities and came up with our new methods."

Previously, Professor Wong's lab had been working to develop new technology platforms for large-scale screening – such as protein mutagenesis and CRISPR-based genetic perturbation screening, *etc* – so they already had related expertise in identifying genetic and cellular factors responsible for different diseases like cancers. "However, we were not working with infectious diseases previously," he said, "and with COVID-19, we moved on to explore the collaboration to develop new methods for syncytia formation (cell-cell fusion)."

Post-mortem samples taken from individuals who died of COVID-19 have shown extensive lung tissue

damage with the presence of large multi-nucleated syncytial pneumocytes due to cell-cell fusion, and scientists consider syncytia to be a frequent feature of severe COVID-19. Syncytia are formed by two or more cells fusing. SARS-CoV-2 induces syncytium formation when the spike protein on the surface of an infected cell interacts with receptors on neighbouring cells. Syncytia contribute to pathology by facilitating viral dissemination.

Knowledge gap

"We realised that there was an important knowledge gap and people hadn't really been looking at syncytia formation in great detail nor at the technical difficulties involved in studying syncytia in large-scale and high throughput," said Professor Wong. "Our team were able to utilise innovative screening methods and advanced genetic techniques to identify the specific genetic and cellular factors responsible for facilitating syncytia formation."

The research marks a major step towards developing effective interventions and treatments to block the fusion and potentially restrict virus spread. In addition, at the same time, the team were also able to identify two FDA-approved drugs that may ease disease severity.

"With our new method, we were able to identify – from an unbiased viewpoint – the important drug targets that can be potentially treated by the FDA-approved drugs via repurposing," said Professor Wong.

The innovative methodology potentially has other uses too. "We hope this can be expanded to studying the mutational effects of various viruses that cause cell-cell fusion, as well as screening different types of cell-cell interactions – including tumour and immune cell interactions," he said. "We also will try to develop other additional types of enabling high-throughput large-scale screening systems."

TAKING THE
STRAIN

In the ongoing battle to fight new COVID strains with new vaccines, an HKU-led research team have discovered that basing the vaccine booster on the related but distinct virus, SARS-CoV-1, may produce more effective protection.

The discovery is the result of a collaboration between HKUMed and the Shenzhen Institute of Advanced Technology (SIAT), and originated from introducing the concept of 'antigenic distance' and 'antigen field' to select the optimal booster vaccine seed strain.

"The concept of 'antigenic distance' refers to the measurement of dissimilarity between different antigens, quantifying the variation in the strength of immune responses against these antigens," explained Professor Huang Jiandong, L & T Charitable Foundation Professor in Biomedical Sciences and Chair Professor of Synthetic Biology at HKUMed, who led the study. "Based on this concept, we introduced the 'antigen field' to improve our understanding and quantification of interactions between the human immune system and foreign antigens.

"The 'antigen field' can be compared to an 'electric field', representing the fundamental interactions occurring within the immune space. When a specific antigen is encountered through infection or vaccination, it generates an 'antigen field', which – once activated – can 'repel' subsequent antigens attempting to enter the same field or those in close proximity based on 'antigenic distance'."

Using the 'antigenic distance' model, the researchers measured immune escape between different mutant strains, and from these results predicted the potential protection range of various strains as booster vaccines. A booster vaccine based on the SARS-CoV-1 strain, the original virus that caused the 2002–2004 SARS outbreak, appeared to offer broader and longer-lasting protection against COVID-19 variants.

"Vaccines developed and used from 2021 to 2022 were primarily based on the ancestral strain isolated in 2019," said Professor Huang. "These vaccines aimed to elicit an immune response against the specific characteristics of the original strain. However, as new variants have emerged and spread, the effectiveness of vaccines based on the ancestral strain has been somewhat diminished."

The term 'ancestral strain' refers to the original strain of SARS-CoV-2 that was first identified in December

> "As the virus evolves, our methods of living with it will also adapt, which includes ongoing vaccination efforts and the development of effective specialised treatments."
>
> Professor Huang Jiandong

2019. Also known as the original or wild-type strain, this strain has since evolved into various forms, including the Alpha, Delta, and Omicron variants.

In addition to the problem of new strains, other factors – such as immune escape, waning immunity, and immune imprinting – also make selecting booster vaccines for SARS-CoV-2 challenging.

Professor Huang said: "Immune escape occurs when the virus evades the protection offered by existing vaccinations. This happens when new variants, like the Delta and Omicron, emerge with genetic characteristics differing from the ancestral strain targeted by current vaccines. Consequently, vaccine effectiveness is compromised, necessitating the development and use of updated booster vaccines."

Decline in protection

Waning immunity refers to the gradual decline in protection provided by natural infection or vaccination over time. While some vaccines, such as the smallpox vaccine, offer long-lasting immunity, the protection conferred by COVID-19 vaccines decreases after several months. This underscores the need for a long-lasting and broad-spectrum vaccine.

"The phenomenon of immune imprinting arises when the immune system depends on immunological memory from an initial viral or vaccine exposure, leading to a stronger immune response against the original virus or vaccine," said Professor Huang. "However, this may compromise the immune response to slightly different versions of the virus encountered later. In the case of COVID-19, immune imprinting could hinder the effectiveness of vaccine development against emerging variants.

"Our study's technique can overcome immune escape and immune imprinting challenges to some extent, while also addressing the issue of waning immunity."

The breakthrough is important because, according to the World Health Organization (WHO), COVID-19 is likely to remain a part of our lives for the foreseeable future. "After the acute phase of the pandemic, it is expected to become a seasonal endemic, similar to the influenza virus," said Professor Huang. "And, like the influenza virus, there is potential for new, more virulent variants to emerge, leading to future pandemics. Our team, along with international collaborators, will continue to monitor the emergence of new SARS-CoV-2 variants and work together with global experts to prepare for potential future pandemics.

"As the virus evolves, our methods of living with it will also adapt, which includes ongoing vaccination efforts and the development of effective specialised treatments."

The 'antigen field' concept also has potential implications for developing vaccines and immunotherapies against other infectious diseases and even cancers. "This concept offers a framework for describing the range of protection and effectiveness of vaccines over time," he said. "By optimising vaccine effectiveness and the duration of protection against current and future variants, the 'antigen field' concept can assist in designing ideal vaccines for other infectious diseases. Presently, we are applying the 'antigen field' theory to the development of an influenza vaccine and a vaccine against *Staphylococcus aureus*.

"Regarding possibilities for cancer treatments, while our theory primarily focusses on describing antibody-mediated immune responses, both the concepts of 'antigenic distance' and 'antigen field' can be extended to include T cell-mediated immune responses. Analogous to their application in infectious diseases, the 'antigen field' concept can be employed in developing cancer vaccines to prevent immune escape by cancer cells."

The research team led by Professor Huang Jiandong (centre, first row).

ADVANCING INTELLIGENCE

In developing highly complex digital computers, researchers are seeking to learn lessons from Mother Nature, including how the brain works and quantum physics systems.

Professor Li with a chip equipped with memristor devices.

Professor Can Li, Assistant Professor in the Department of Electrical and Electronic Engineering was awarded the Croucher Tak Wah Mak Innovation Award last year, for his work on advanced computer systems and emerging nano-electronic devices. His research involves tackling the limits of traditional digital computers by working to create advanced artificial intelligence hardware systems that are inspired by the human brain. The analogue systems that he is developing amalgamate how the human brain remembers and recognises information – namely the associative memory, and the randomness of decision-making – a necessary ingredient for advanced intelligence.

These tasks require hardware that can process analogue signals at the exact location where the information is stored, which has bottlenecked the performance of digital computers when handling a massive amount of data, for example, the neural network model for artificial intelligence. In achieving the task, Professor Li is exploring the potential of the memristor, an emerging nano-electronic device that can not only process information in the memory device, but also emulate the non-linear behaviour of biological synapses and neurons through full analogue processing.

"The crux of the matter is that AI capability is increasing faster than the hardware tech can cope," said Professor Li. "Before it doubled every two years, now the trend is for it to double every three to four months. This means the software is not sustainable because the hardware cannot support it. Hence, it is time to start inventing again!

"What is fundamental is that traditional computers work on Boolean logics – all zeros and ones – and they are very good at some things like mathematical calculation. AI is different in that it is a brain-inspired algorithm. So we need to design the computer in a new way. The data involved is endless, so bottlenecks occur, and brain-inspired 'neural networks' are inefficient on digital computers."

Brain-inspired

Professor Li's research asks what we can learn from the brain and from what Mother Nature can do, and finds parallels, such as: they compute in the analogue domain; they massively parallel compute on easy tasks; and there is some stochasticity.

Stochasticity is the quality of lacking a predictable order or plan – that is, things being random or haphazard. Human brains are high-density and work at high speed, but mistakes occur. Professor Li's argument is that random mistakes can lead to discovery – and if this stochasticity can be worked into analogue computers new things may unfold. "Sometimes stochasticity is the source of intelligence," he said, "and we want to harness this unpredictability as a feature to increase functionality."

In the past 10 years, he has been using a new device called a memristor – which has very high density and very high speed and can be scaled down to smaller than two nanometres – to help build a brain-inspired computing machine. His team have built a prototype computer – "3D like the human brain" – integrating a memristor.

"Humans also memorise things differently from computers," said Professor Li. "Humans learn from experience, but computers cannot do that – not even ChatGPT! A computer stores the pattern in the memory, so when we want to retrieve the pattern we need to know the address of where it's stored. Humans can use associative memory – 'maybe I have experienced something similar to that' – so we are trying to introduce associative memory paths into the computer.

"We are imitating that in artificial neural networks using the memristor crossbar array. A 3D crossbar has the potential to provide human-brain-level complexity."

Physical systems

The second focus of the research is what can be learnt from physical systems. "First, how the computing system can learn from the crystallisation process or annealing process. For example, how atoms in a solid-state system find their location that minimises the system's energy when the system cools down," said Professor Li. "Second, how can we learn from quantum computers and apply that knowledge to our classical analogue computers?

"We start with a very simple configuration and the system will find the minimum energy very quickly. And then we change the energy configuration slowly to a more and more complicated configuration," said Professor Li. "So this is something we learn from quantum computing because the most mature commercial application for the computer right now is to find the combinatorial optimisation problem."

In conclusion, Professor Li said that, while researchers know that quantum computing is superior, there are problems. One is the need for a cryogenic system to produce very low temperatures – "highly problematic because it consumes a lot of energy and is not portable".

"We have learnt some things from the quantum system that we can use for analogue computers in the classical domain, and therefore we are implementing a quantum element in the classical analogue computer," he said. "We are also exploring ways to use other natural processes to perform that. If you compare our solution with the quantum computers you can see that we are actually better, especially when you consider the energy needed for a cryogenic system in the comparison."

> "Sometimes stochasticity is the source of intelligence, and we want to harness this unpredictability as a feature to increase functionality."
>
> Professor Can Li

Origin
OF THE SPECIES

An innovative project which uses genomic analysis to determine where smuggled pangolin scales originated may bring a breakthrough in stopping the illegal trade of these endangered animals.

Photo of a white-bellied pangolin (Phataginus tricuspis)*. (Courtesy of Frank Kohn, United States Fish and Wildlife Service)*

The idea to use genomic analysis came from Professor Timothy Bonebrake of HKU's School of Biological Sciences, and Professor Thomas Smith of the University of California, Los Angeles (UCLA). While working together studying climate change responses of butterflies in Cameroon in 2013, they discovered a mutual intrigue with the connection between Asia and Africa regarding the pangolin trade, and this led to the idea of building an international database to determine where the scales had originated.

The first step – and it was a big one – was to create the reference database on pangolin, a task that would require much time and major collaboration with scholars, researchers and experts spanning four continents.

"We worked with a range of local collaborators in Africa who had access to samples of pangolins in their distribution. This is critical for reference," said Professor Bonebrake. "It took us many years to complete and was logistically very challenging – we needed many permits from lots of different countries.

"Tom Smith and I worked together early in the project to design the study and supervise the activities. Dr Jen Tinsman, also of UCLA, joined the project soon after

that and led the effort – she coordinated all activities and oversaw the execution of the research with Tom and myself. This was very much an integrated team effort."

At the Hong Kong end of the equation, they worked with partners including the Agriculture, Fisheries and Conservation Department and Kadoorie Farm and Botanic Garden, who had samples from seizures of illegally-traded pangolin scales. Two PhD students in the School of Biological Sciences at HKU, Taneisha Barrett and Tracey-Leigh Prigge, then worked in the lab to extract DNA from the scales and prepare for sequencing.

"The preservation of these samples – some of which date back to 2012 – was brilliant scientifically and I'm glad they did this," said Professor Bonebrake. "Once we have each of these [reference samples and seizure samples] and have sequenced the genomic information then we can find matches and see where samples seized in Hong Kong most likely originated."

Beyond pangolin

It is very much an ongoing project, and one that could be expanded beyond pangolin. "We're still trying to find samples to sequence," he said. "The more samples we have the finer the resolution of the trade that we can characterise. The team would love to do this for other species: we did a similar study for tokay geckos a couple of years ago, but we lack a strong reference database like the one we now have for white-bellied pangolin. Hopefully in the future this will change because there are many species traded for which we need more information on spatial and temporal dynamics."

Other researchers have expressed interest in applying the approach to different seizure samples and systems. "It has been a very positive response and

> "Our research characterises key transit pathways between the origin of pangolins and the location of seizures. Now we need to see if the pangolin populations in these source locations can be better protected and conserved."
>
> Professor Timothy Bonebrake

I'm optimistic that the work will encourage follow-up study of pangolins and other overexploited species."

The genomic analysis so far has revealed that there is little correspondence between the transit locations and the sources of pangolins themselves, suggesting high levels of movement of scales prior to shipping to Asia.

"I suspect this pattern is a consequence of a number of factors, including the avoidance of detection from law enforcement," said Professor Bonebrake. "It could also have something to do with logistics planning. Scales may be easiest to transport overseas in large quantities which then requires the amassing of scales in specific locations."

The researchers hope the work, which has been published in the journal *Science*, will ultimately open more doors to redirecting international resources to the protection of pangolins, and to authorities to tracking down traffickers. While it is too early to say if this will happen, they are already expanding their investigations.

"We need to understand more fully all of the actors involved in the trade of pangolins," said Professor Bonebrake. "Our research characterises key transit pathways between the origin of pangolins and the location of seizures. Now we need to see if the pangolin populations in these source locations can be better protected and conserved. We also need to understand more about patterns of demand for pangolin products – how does the demand for these products in traditional medicine drive the trade and is the level of demand changing over time?

"A new species of pangolin was recently 'discovered' from a seizure in Hong Kong. This is an Asian species but we don't even know where it lives. So, there is still a lot more we need to investigate regarding the trade of pangolins to ensure their effective conservation. And, unfortunately, global wildlife trade is affecting a huge diversity of species. My hope is that increased technological advancements and international cooperation, as implemented in this research, will give us options for reversing species declines."

PhD student Tracey-Leigh Prigge drilling powder from pangolin scales to be used for DNA extractions and/or stable isotope analysis.

A GUIDE TO TOURISM
IN HONG KONG

Hong Kong has positioned itself as a travel destination for nearly a century. But the tourists and attractions have changed with the times, reflecting bigger developments in the city and the world, as HKU historians are finding.

Hong Kong as a travel destination has been many things to many people over the decades. For Western visitors in the 1930s, it was a beach and recreation stop on a round-the-world voyage by sea. After the Second World War, its 'oriental-ness' and Chinese culture attracted jet-setters. In the 1970s and 1980s, it became a shopping mecca, especially with visitors from Asia who benefitted from the growing wealth in the region. This century, tourism has been dominated by Mainland Chinese visitors, whose interest has shifted from shopping for luxury goods to exploring cultural and historical sites and places of natural beauty.

Why has it had such a changeable image? Professor John Carroll and research assistant Jodie Cheng of the Department of History have each been investigating the tourism trends, both independently and collaboratively, and how these provide insights into larger societal and political developments.

"Promoting Hong Kong tourism has been an unpredictable and even contentious matter," Professor Carroll said. "In recent years, as the government has taken a more assertive role in promoting tourism, local residents have also become increasingly concerned about tourism. Meanwhile, visitors have sometimes found themselves entangled in the resulting protests."

The beginnings of tourism stretch back to the 19th century, when the city was promoted by private shipping firms, travel guide publishers and hotels. In the 1920s, the government itself started to see tourism as a potential revenue source, according to Ms Cheng, who specialises in pre-war tourism in Hong Kong. This led to the establishment of the Hong Kong Travel Association (HKTA) in 1935.

Bustling but sleepy

The narrative at the time was of Hong Kong as the 'Riviera of the Orient', featuring beaches, scenery and leisure, albeit with an embedded message. An iconic poster by the HKTA featured colonial buildings against the backdrop of Victoria Peak. "Historians of tourism

read that as colonial governments wanting to showcase the facilities they have built and the progress they have made in the colony," Ms Cheng said. "A picture focussed only on the natural features cannot show this."

The Second World War halted tourism, but afterwards things took a very different turn. Air travel meant people could make shorter visits, while the establishment of the People's Republic of China in 1949 and the closing of borders meant Hong Kong became one of the few places where people could experience Chinese culture and gaze at Mainland China. For the government and other actors, including airlines, hotels and travel agents, as well as the new Hong Kong Tourist Association formed in 1957 to pick up where the pre-war HKTA left off, this was a time of opportunity.

"From the 1950s up to 1997, a range of state and non-state actors tried to promote Hong Kong as a unique place that was culturally Chinese but a British colony and which blended East and West. And from the early 1970s it was portrayed as a bustling metropolis coexisting with the sleepy rural New Territories," said Professor Carroll, whose research has focussed on post-war tourism.

> "Tourism is almost necessarily a global phenomenon, but by studying Hong Kong, we want to decentralise the narrative from a Eurocentric one of how modern tourism has developed."
>
> Ms Jodie Cheng

Window on Hong Kong

Tourism also became a window through which Hong Kong people came to think about their city and themselves. "Especially within the contexts of the Cold War and the disintegration of the British Empire, tourism was about more than economics and the movement of people. It became a way for Hong Kong to position itself within Asia and across the globe," he said.

Interestingly, from the mid-1980s to 1997, tourism authorities struggled to define Hong Kong. The opening of Mainland China meant visitors did not need to come here to experience Chinese culture, so shopping took centre stage, especially for tourists from around the region.

After the handover, things took another turn as the government began to see tourism as a way to

brand the city to the world following uncertainty about its future. The Hong Kong Tourism Board was established in 2001 with full government funding and the Culture, Sports and Tourism Bureau was established in 2022.

The biggest change, though, was in the tourists themselves. Following the Mainland and Hong Kong Closer Economic Partnership Agreement signed in 2003 (in the wake of SARS), more Mainland tourists poured into Hong Kong.

This has had local impact, including sometimes negative reactions from local residents. But for Ms Cheng, it also reinforces the idea that mass tourism is not just a Western concept. In fact, tourism and travelling are deeply embedded in Chinese history and culture.

"Tourism is almost necessarily a global phenomenon, but by studying Hong Kong, we want to decentralise the narrative from a Eurocentric one of how modern tourism has developed. Asian regions have their own unique travel culture as well. It's not just a matter of mass tourism spreading here from Europe," she said.

Fabulous Hong Kong, poster of Hong Kong Tourist Association, circa 1966, painted by Miroslav Šašek. (Courtesy of Hong Kong Baptist University Library Art Collections)

Hong Kong, the Riviera of the Orient, poster of Hong Kong Travel Association, circa 1936, painted by S D Panaiotaky. (Courtesy of Hong Kong Baptist University Library Art Collections)

NEW
HKU ANTIBIOTIC DRUG READY FOR TRIAL

An antibiotic drug developed at HKU that is effective against drug-resistant strains has been approved for clinical trials by Mainland China authorities.

Antibiotic resistance is a growing, global problem. In the US, about 70 per cent of bacteria in hospitals are resistant to at least one commonly used antibiotic, and 25 per cent resistant to more than one. In Europe, drug-resistant bacterial infections have led to 25,000 deaths annually. Moreover, 'superbugs' have emerged that are resistant to all classes of antibiotic drugs. In 2017, the World Health Organization published a priority list of 12 such pathogens that pose the greatest threat to human health and said new drugs were urgently needed to tackle them.

Rising to that challenge, Professor Li Xuechen and his team in the Department of Chemistry have been actively studying bacterial resistance and antibacterial drug development for more than a decade. Recently, they reached a milestone when a new antibiotic drug they developed, Kynomycin, was approved for testing in human subjects by the National Medical Products Administration (NMPA) of China.

The drug targets complex skin and soft tissue infections caused by bacteria, which are very common and often lead to emergency visits and hospitalisation.

"Treatment options have become increasingly limited because of the emergence of clinically resistant strains and the development of bacterial pathogens. We wanted to provide a new choice for clinical treatment," Professor Li said.

Tackling resistance

Kynomycin is a new type of cyclic lipopeptide antibiotic. Cyclic lipopeptides are a promising class of natural products with antibacterial properties and several are now in clinical use, such as daptomycin, which is used against Gram-positive bacteria such as *streptococcus* and *staphylococcus*. However, their structural complexity has made it difficult to modify them to address resistance.

Professor Li's group has overcome that obstacle in groundbreaking ways. In 2013, they pioneered a powerful tool for the chemical synthesis of peptides and cyclic peptides, called Serine/Threonine ligation (STL), then applied that to become the first in the world to achieve total synthesis of daptomycin. This has enabled them to look for next-generation daptomycin drugs using chemical synthesis.

Since then, they have synthesised more than 100 synthetic daptomycin analogues with the goal of developing new antibiotics to target resistant pathogens. The outcome from that work has been Kynomycin, which represents a new generation of antibiotics with extremely high antibacterial activity against both daptomycin-sensitive and -resistant strains. It also has low toxicity to mammals.

The discovery won the silver award at the 46th International Exhibition of Inventions of Geneva in 2018 and has undergone further development to the point that it is now ready for clinical applications. The drug has been licensed to a pharmaceutical company in the Mainland by HKU's Technology Transfer Office and it was approved for clinical trials by the NMPA last autumn.

"Our drug aims to improve the safety and efficacy of cyclic lipopeptide antibiotics and provides a new choice for clinical treatment. It now needs to undergo phase one, two and three clinical trials and be evaluated and approved by the NMPA," Professor Li said.

> "Treatment options have become increasingly limited because of the emergence of clinically resistant strains and the development of bacterial pathogens. We wanted to provide a new choice for clinical treatment."
>
> Professor Li Xuechen

New candidates on the horizon

Meanwhile, he and his team are working on other antibiotic candidates through their interdisciplinary approach that draws on synthetic chemistry, medicinal chemistry and biology.

For instance, they have prepared more than 100 analogues of teixobactin, the first new antibiotic with drug potential to be isolated from bacteria in decades. Teixobactin was discovered by other researchers in 2015 and has a unique chemical structure and mechanism of action. Using the STL technology, Professor Li's team became the first in the world to achieve a total synthesis of teixobactin, which was featured in *Nature Communications* in 2016. The resulting analogues have provided a foundation for systematically researching the structure-activity relationship in teixobactin and they are progressing towards developing a clinical application of their findings.

They also expanded the STL platform to achieve the first total synthesis of Malacidin A, a cyclic peptide antibiotic discovered in 2018 that is excellent against a broad spectrum of Gram-positive bacteria, including superbugs that are increasing in prevalence in Hong Kong and elsewhere, such as methicillin-resistant *Staphylococcus aureus* (MRSA) and vancomycin-resistant *Enterococcus* (VRE).

The team are now one of the world-leading research groups in the field of antibacterial cyclic peptides. Last year, Professor Li was awarded a Contribution Award in Carbohydrate Chemistry by the Chinese Chemical Society, an Innovation Award by the Peptide Alliance of China, and a Senior Research Fellowship by the Research Grants Council of Hong Kong.

> "With the technology and experience that we have accumulated, we will continue to work towards establishing a platform for developing and translating new peptide-based drugs," he said.
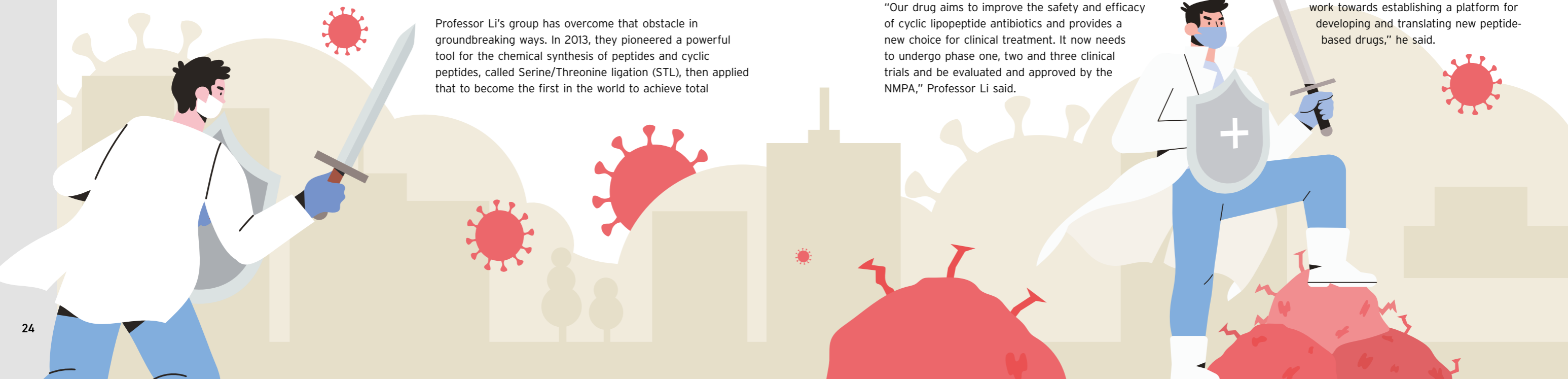
THE SECRET'S OUT

HKU researchers have shown how the hormone secretin helps regulate appetite and bone loss, opening a new pathway to control obesity and osteoporosis.

Secretin was the first hormone to be discovered, back in 1902. For decades, its actions were thought to be limited to gastro-intestinal functions. But this century, thanks in part to the work of Professor Billy Chow Kwok-chong, Chair of Endocrinology in the School of Biological Sciences, it was also shown that secretin is expressed in the brain. That finding was recently developed further with the discovery at HKU that secretin not only affects functions related to the gut, but also to the bones.

Professor Chow and Professor Kelvin Yeung Wai-kwok of the Department of Orthopaedics and Traumatology teamed up to show that secretin in the ventromedial hypothalamus (VMH) of the brain plays a vital role in controlling both energy balance and bone density, in a study published in *Nature Communications*.

Using both whole body and VMH-specific knockout mice that had secretin and secretin receptors removed, they found that a lack of secretin increased appetite, leading to obesity, and triggered bone loss, leading to osteoporosis. Conversely, if secretin was added back in, the appetite was controlled and bone mass increased. The findings applied to both male and female mice.

"Our study opens new doors to treating metabolic and bone diseases. The ability to control appetite and bone density through the brain has significant implications for tackling obesity and osteoporosis," Professor Chow said.

Connecting across disciplines

An interesting feature of the study is the collaboration between two seemingly distinct research streams. Professor Chow has been looking at secretin and energy balance for the past decade and previously made important findings on how secretin controls salt and water balance in the body. He also developed the knockout mice about 10 years ago and showed that secretin injections could inhibit food intake, but he had not identified the mechanism involved.

Meanwhile, Professor Yeung has been investigating the role of VMH in controlling bone regeneration. He had found that if there is a bone fracture, signals are sent to the brain via the central nervous system, which then sends signals back ordering that new bone be formed.

The two came together via a postdoctoral student of Professor Yeung's, who had become aware of Professor Chow's work and wondered whether they should collaborate. The two professors had known each other for years and, together with their postdocs, met over drinks and sealed the deal.

"Basically, with this study, we have identified the magic," Professor Yeung said. "Once the signal from the secretin is received, it can modulate both the bone loss and obesity."

On the energy intake side, Professor Chow looked at how food intake, obesity and fat metabolism were affected when secretin and the secretin receptor were removed. Appetite increased, there was evidence of obesity, and the overall fat content in the body increased, while at the same time browning of the fat cells, which increases the basic metabolic rate, decreased. The lack of secretin also reduced both glucose tolerance and insulin sensitivity, which has implications for diabetes. He further tested a diabetes-induced obesity animal model and found that when secretin was removed, all the bad pathologies aggregated.

"It's a breakthrough because it allows us to understand that secretin plays an overlapping role in all these different physiological mechanisms," he said.

Looking for treatment

Professor Yeung said the correlation between appetite and bone loss also helped explain a clinical observation that obese people can experience osteoporosis, because it showed that the lack of secretin triggered hunger or lack of satiety while at the same time inducing bone loss. Before, the mechanism for this combination was unknown.

"The implication is that we could simply treat people with obesity and osteoporosis at the same time by controlling secretin," he said.

How to turn that finding into actual treatment, though, is another challenge. The two labs are collaborating on this, but it will take time. Professor Yeung said he would also welcome pharmaceutical companies or others using the findings to develop new treatments or d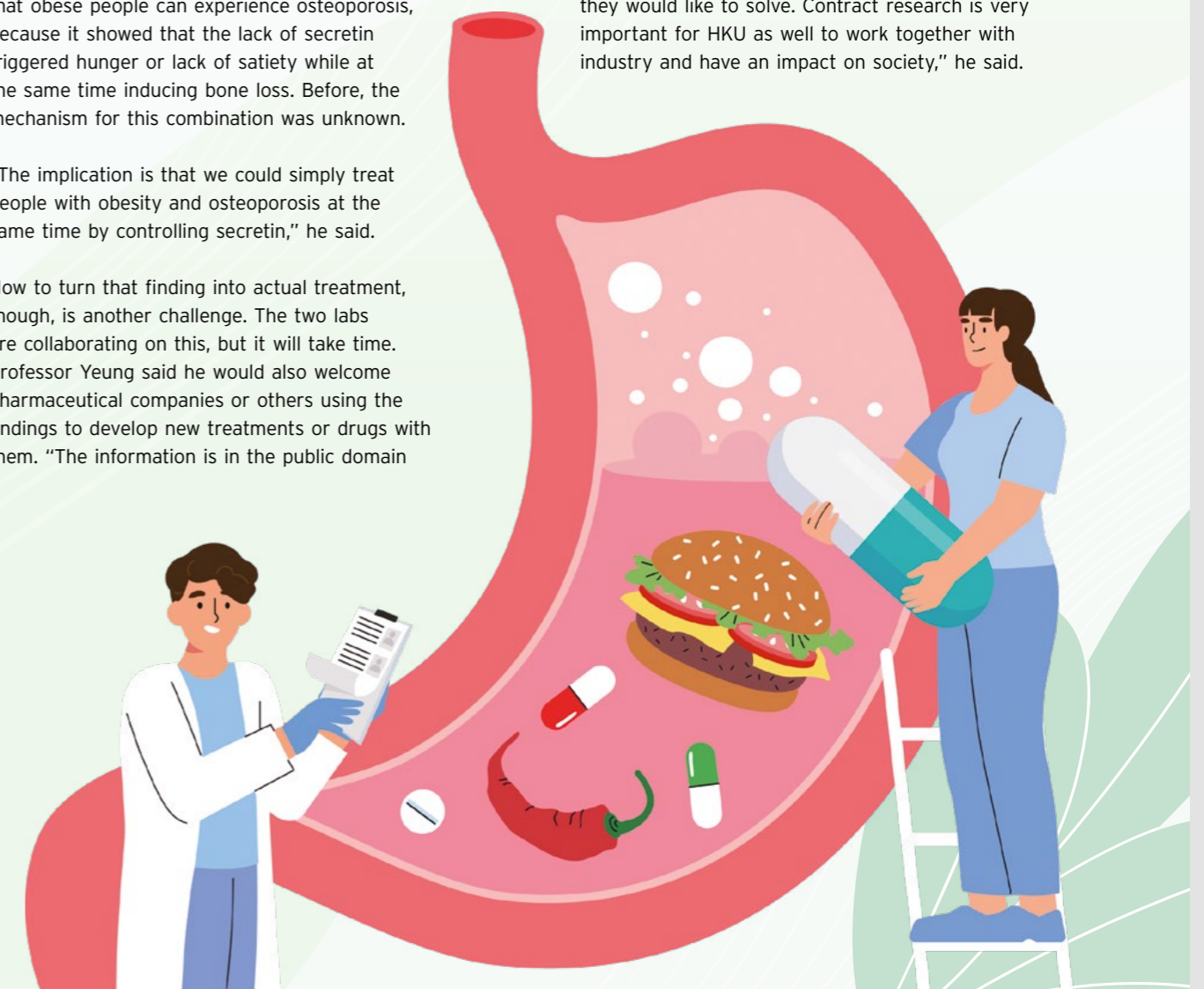rugs with them. "The information is in the public domain and everyone can read it. I think this is something a university needs to do to serve the public," he said.

Professor Chow, meanwhile, is developing several treatments based on the current study and on an earlier discovery of a small molecule that can work with secretin to stimulate the secretin receptor. He also values working with industry through contract research.

"Contract research is very important to me because I get to know the industry people and what kind of experiments they're doing and what kind of problems they would like to solve. Contract research is very important for HKU as well to work together with industry and have an impact on society," he said.

> **"It's a breakthrough because it allows us to understand that secretin plays an overlapping role in all these different physiological mechanisms."**
>
> Professor Billy Chow Kwok-chong

A group of Ainu people from Hokkaido from the end of the 19th century.

INSIGHTS ON INDIGENOUS AINU

Tracing the origins of modern debate on indigeneity and inclusion, research opportunities in Japan have shed light on connections between the Japanese proletarian movement and the Ainu people in the early to mid-20th century.

Professor Edwin Michielsen, who joined HKU's School of Modern Languages and Cultures as an Assistant Professor specialising in modern Japanese literature in July 2022, was given opportunities last year when he received two fellowships to further his research project 'Indigenous Solidarity: Proletarian Writers and Ainu in Interwar Japan'. This project is part of his larger book manuscript, which examines strategies for international solidarity in literary works and cultural activities by Japanese working class writers during the 1920s and 1930s.

The Ainu are an Indigenous people, originally from present-day Hokkaido, who over the centuries have been by turns colonised, marginalised, and forced to abandon their own culture and assimilate into Japanese society. In 2019, the National Diet of Japan passed an act recognising the Ainu as an Indigenous people of Japan and implementing measures to create a more inclusive environment while focussing on bolstering local economies and heightening awareness of Ainu culture. "While critics say it has not gone far enough, this recognition is part of broader, ongoing efforts for Ainu rights in Japan and global initiatives that acknowledge the violence inflicted on Indigenous communities and their cultures worldwide," said Professor Michielsen.

During 15 years of research into the literary and cultural history of Japan's working-class movement, Professor Michielsen had previously never encountered any references to Ainu in proletarian literature. It wasn't until another

professor inquired about potential connections between such writers and the Ainu during Professor Michielsen's doctoral defence that he became intrigued by the question.

Impoverished and marginalised

"Proletarian activists in 1920s Japan rapidly evolved into a mass movement advocating the enhancement of working and living conditions for the impoverished and marginalised," he said. "Drawing from various left-wing philosophies, the movement initially focussed primarily on Japanese workers and peasants, but eventually broadened its scope to encompass the rights of women, ethnic minorities, and other marginalised populations such as the burakumin, though it remained on the outskirts of proletarian arts and politics. However, the Ainu were not even within the purview of proletarian writers at the time."

Hoping to find connections, he applied for and was awarded fellowships from two institutions: the Japan Society for the Promotion of Science, which allowed him to be a guest researcher at the Asahikawa Campus of Hokkaido University of Education between May and August, and the Japan Foundation, which supported his research at Josai University in Saitama from the beginning of September to the end of October.

At Hokkaido University of Education, he was hosted by Professor Hirokazu Murata, and at Josai University by Professor Kazumi Kamimura. "These fellowships offer an excellent opportunity for scholars to collaborate with Japanese scholars across all research fields and to access the rich, well-preserved archives and research facilities available across Japan," said Professor Michielsen.

> "The shared perspective among all four authors is their portrayal of the Ainu as dispossessed and economically deprived individuals, drawing parallels with Japanese proletarians and paving the way for their integration into progressive political movements."
>
> Professor Edwin Michielsen

Tomoya Tsuruta's memorial stone.

Given his familiarity with proletarian archives, he wasn't very optimistic about finding many sources. However, with the support of his host professors and the diligent archive staff, Professor Michielsen unearthed additional materials, including a previously unknown 1937 Chinese translation of one of the stories he had been examining, which was entirely unfamiliar to Japanese scholars. He ultimately focussed his research on four proletarian writers: Yuriko Miyamoto, Ujaku Akita, Tomoya Tsuruta, and Hideo Oguma.

"After examining literary stories, plays, poems, and news articles, I concluded that Miyamoto and Akita struggled with how to portray the Ainu," said Professor Michielsen, "often depicting them similarly to stereotypes prevalent at the time and invoking the concept of the 'vanishing race', which referred to the supposedly irreversible process of the Ainu and their culture disappearing.

"Conversely, Tsuruta and Oguma explored ways to narrate the contradictory and conflicting interests of Japanese settlers and the Ainu, while also creating storylines that critiqued Japanese imperialism and potential collaboration between Japanese proletarians and the Ainu.

"Tsuruta even received the prestigious Akutagawa Prize, which recognises promising debut writers in Japanese literature. Nonetheless, the shared perspective among all four authors is their portrayal of the Ainu as dispossessed and economically deprived individuals, drawing parallels with Japanese proletarians and paving the way for their integration into progressive political movements."

After concluding the initial research and examination of archival materials, Professor Michielsen has presented his research findings at several international refereed conferences, as well as in a Japanese peer-reviewed article. Moving forward, he intends to delve deeper into the Ainu-related discussions in critical essays authored by proletarian writers like Oguma, and incorporate all findings into his current book project.

THE SUICIDE WATCH

Professor Paul Yip Siu-fai has been tracking Hong Kong's suicide rate for more than two decades and developing programmes to help reduce it. The recent period has been one of the worst for young and old alike.

Last autumn, when classes resumed following the COVID-19 pandemic, there was a feeling of relief that life could go back to normal for children and youths. Yet almost the opposite happened. From August to October 2023, there were 16 reported cases of suicide attempts and deaths involving schoolchildren under the age of 18, and six involving tertiary students. Suicide has been the leading cause of death among Hong Kong youth for decades, but this was different.

"We have never had anything like this before," said Professor Paul Yip Siu-fai, Director of the Hong Kong Jockey Club Centre for Suicide Research and Prevention (CSRP) which was founded in 2002. "COVID-19 turned the world upside down and it affected mental health as well. The resumption of classes triggered these problems."

Life for a significant number of people was undoubtedly difficult during pandemic shutdowns. Surveys of young people aged 11–35 by Professor Yip's Centre found that while 20 per cent of teenagers felt better because they did not have to get up early for school and could spend more time with their families, 30 per cent felt worse (half felt the same). These were students largely from low-income families who lived in small homes, had limited Wi-Fi access for connecting to classes and entertainment, and had parents whose jobs, such as cleaners and security guards, required them to leave their children alone at home for long hours.

When classes resumed, these students not only struggled to catch up, but they also often did not have an in-built support system of close relationships with classmates and teachers that normally would have developed on campus. Some crumbled under the pressure, particularly if they had underlying mental health problems.

No quick fixes

"The government is very concerned about it and so are we. We appeal to schools to please give them time and space to rebuild their relationships. It's not a quick fix but we need an environment that provides opportunity and time for us to repair this damage," Professor Yip said.

While the child suicide rate fell in early 2024, he expects there to be lingering challenges for young people. "This is the long COVID-19 for mental health. Young people missed these three years, and you can't ask them to go back to being 12 or 13 or 14 again, it's gone. It's like a scar on their mental development," he said.

Older people have also suffered a delayed response to the effects of the past few turbulent years. Early this year, the suicide rate for those aged over 60 jumped more than 10 per cent, having started to rise in 2023. Professor Yip believes several factors contributed – the pandemic led some to fear going out so they shut themselves in, the increase in scams reduced their trust in the community, and many had watched their children and grandchildren emigrate (more than 200,000 people have left since 2020).

"We see quite a bit of loneliness and anxiety and feeling of abandonment among older adults," he said.

In response to these tragedies, the CSRP has been working with partners to develop programmes specifically for youths and the elderly.

Training in self-help

With funding from the Hong Kong Jockey Club Charities Trust, they operate Open Up, a text-based emotional support service, with local NGOs. They are also going into schools to help both teachers and students. "We should not medicalise the problem, we should help people develop self-help first. We train

Student leaders introducing mental health topics to their classmates at an outreach programme.
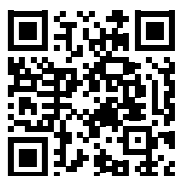
students to look after themselves and their classmates, and we encourage teachers to do the same."

The CSRP is also about to launch a zero-bullying campaign that promotes empathy towards victims, perpetrators and bystanders alike. The aim is to encourage young people to change their attitudes so they stop or report bullying and encourage teachers and school management to respond not only with punishment. "I'm not saying the perpetrator should not be penalised, but we should understand why they want to bully other people. They might have problems themselves. I hope we can provide a more holistic understanding of the situation and give them the instruments to promote a more harmonious study environment," he said.

An outreach programme for the elderly was also recently developed with funding from the Jockey Club, in which district-based NGOs knock on doors to reach out to isolated elderly.

Professor Yip himself continues to advocate publicly against sweeping the problem of suicide under the carpet. He speaks regularly in the media and has convinced media outlets to report suicides more sensitively, for example by not mentioning methods to prevent copycat suicides.

"Suicide is so depressing and sad. We need to keep track and not let people forget, and we need to try to learn something from it to prevent future incidents. That is our goal," he said.

> "Young people missed these three years, and you can't ask them to go back to being 12 or 13 or 14 again, it's gone. It's like a scar on their mental development."
>
> Professor Paul Yip Siu-fai

Learn more about Open Up

DRAMA QUEENS

Speech and language pathologists in the Faculty of Education have collaborated with professional actors and the Hong Kong Academy for Performing Arts' School of Drama to create simulated clinical situations that help students develop and refine their communication and noticing skills for better patient-centred care.

> "We believe that SMART@HKU SLP has high potential to generalise to other programmes that communicate with outside clients, such as business, teacher education and dentistry."
>
> Professor Estella Ma Pui-man

(Left) An actress portraying a 100-year-old elderly person hospitalised due to pneumonia. Student clinicians conduct a swallowing assessment to make recommendations on diet.

(Right) Student clinicians conducting assessments with an actor portraying a 75-year-old with moderate cognitive communication disorders and dysphagia.

During the COVID-19 pandemic, programmes requiring students to interact with patients were seriously hampered. Zoom consultations helped a little, but they could not effectively replicate being in a clinic with a patient who could be unpredictable or uncommunicative. So how could students be prepared for clinical sessions?

Professor Estella Ma Pui-man of the Human Communication, Learning, and Development Unit in the Faculty of Education drew inspiration from her own enjoyment of drama and reached out to professional actors and the School of Drama of the Hong Kong Academy for Performing Arts (HKAPA) to take on roles as simulated patients. They were given scripts outlining their characters and clinical symptoms, and the expected learning outcomes for speech-language pathology students. They were also shown videos of actual patients. Then they came to the school to meet with students.

During the simulated clinic, the actor-patients were examined and treated by students, then gave students feedback from the patient's perspective. Questionnaires administered before and after the simulated sessions found students' levels of self-perceived clinical skills and confidence increased by more than 70 per cent.

The success of the experiment led to two pilot runs funded by Teaching Development Grants and, this year, the formal incorporation of the programme into the Bachelor of Science in Speech-Language Pathology curriculum under the title 'SiMulation with ActoR Teachers@ HKU Speech-Language Pathology' (SMART@HKU SLP).

"We have very good evidence that simulation-based learning promotes better bridging for students between theory and clinical practice, both from students and our clinical educators who say it is very useful," Professor Ma said.

Dropping the blank face

"Previously, students entered the real-world clinic directly from the classroom, apprenticing with working professionals. Now, from Years 2 to 4, they can practise their soft and hard skills with simulated patients before and during their clinical training.

Scenarios are wide-ranging, such as a parent or domestic helper with a child who has autism spectrum disorder with a speech disorder, an elderly patient with dementia who is restrained in a hospital chair and unmotivated for treatment, or a stroke victim whose faculties are intact but cannot speak or swallow properly.

In Year 3, students learn how to collect background information, for instance from simulated caregivers about their child's developmental milestones, and how to identify the risk factors for speech and language problems. In Year 4, students interact with simulated patients with differing cognitive abilities, and work on diagnosing speech, language and swallowing problems. There is also a simulated ward, with medical charts and other paraphernalia, that provides a stepping stone to Year 5, when students move into hospitals.

A key element of the programme is the debriefing sessions, when the actors give feedback to students on how they felt about the patient experience and what improvements could be made. If there is time left in the 50-minute session, students can even redo the simulation to address any concerns.

"The actors say things like, 'You didn't greet me when you came into the room, that made me nervous.' Or, if the student showed a blank face, they say, 'That made me very nervous because I was afraid something bad happened to me.'" said Ms Ada WS Chu, Assistant Lecturer, who leads Year 4.

More diverse experiences

Students are also put on the spot by the actors, said Assistant Lecturer Ms Cheung Ka-yan, who leads Year 5. "I was in a simulated clinic where the actor asked student clinicians for suggestions and strategies because their child would never complete the exercises at home. Questions and feedback like this guide our students to rethink the whole rehabilitation process and how skills can be generalised to real-life situations."

The programme's adoption into the curriculum has required a lot of preparation and adjustment to class schedules. "The important thing is it's not a replacement for the clinic, we're actually giving students more diverse clinical experience to enhance their learning," said Assistant Lecturer Ms Carmela CY Tin, who leads Year 3.

Professor Ma said the simulated clinic offers students a safe environment to take risks without the fear of making mistakes. Such autonomy is not possible in real clinical situations. From the mistakes, students can reflect on why their original approach does not work and why an alternative approach works better. The programme also benefits the actors and HKAPA drama students, who are challenged to take on different kinds of roles and improvise in response to the HKU students.

"Cross-disciplinary collaboration is important to the programme because we learn a lot from each other," she said. "We believe that SMART@HKU SLP has high potential to generalise to other programmes that communicate with outside clients, such as business, teacher education and dentistry."

ISLAND IMMERSION

A field studies workshop to a remote Greek island to observe, study and document their surroundings gave Architecture students an anthropological perspective and taught them how to connect with culture and place.

The two-week trip to the island of Nisyros, just off the coast of Anatolia, took place last summer with 14 Bachelor's and Master's students, and was led by Professor Emma Letizia Jones, who teaches design and the history and theory of architecture at HKU.

Significant historically, Nisyros has been a node of maritime empires for millennia and played a significant strategic role from the Myceneans to the Venetians. Today, it is best known for the picturesque villages which surround its active volcano, which in turn gave rise to the Islet of Gyali, a landscape almost entirely made of fine pumice, a stone that is lighter than water. So light, it could almost float away,

Gyali is in fact vanishing as it is being mined for its stone by an international concrete conglomerate.

"Shipload by shipload, it is disappearing over the sea," said Professor Jones. "But the irony is that its very disappearance is Nisyros' economic lifeline, allowing the small volcanic island to survive, and to imagine a future for itself beyond mass tourism."

Professor Jones was introduced to Nisyros by colleague Dr Lydia Xynogala, a Greek architect who has been studying the island for several years. Dr Xynogala also acted as a guest critic for HKU students, introducing them to some of the more local aspects of the island.

> "In architectural education, we need to teach students to become observers of places and sites to understand the best and most sensitive way to design for them."
>
> Professor Emma Letizia Jones

The Stefanos Crater of the Nisyros Volcano.

'Thick description'

Describing the field trip as 'an interdisciplinary teaching experiment', Professor Jones said: "We are interested in combining architecture and ethnography, and particularly interested in the anthropological methods of Clifford Geertz and his methodology of 'thick description'. I wanted the architecture students to immerse themselves in the island, to practise observation – watching, listening, and paying attention to their surroundings in order to carefully document them.

"I often feel that architects have lost connection to place, and in architectural education, we need to teach students to become observers of places and sites to understand the best and most sensitive way to design for them. I think architectural studies are too computerised, so introducing some anthropological methods into the teaching was very important for me, to give the students some education on how to read culture and place."

Different elements of the workshop syllabus covered ethnographic methods of knowledge gathering with architectural surveying and observation; 'paying sustained attention' to the immediate environment for which the students were guided through exercises in observation; and then describing what was observed, through conversation, film, and drawing and collecting found objects. As part of the programme, students were also asked to produce short films about the islands.

Professor Jones felt the students got a huge amount out of the field trip on many different levels. "They enjoyed it immensely – the idea of taking the pressure off having to 'design' something, but rather to step back and observe, gather, and enjoy their surroundings. Film can be a nice way to break out of the stress of architectural school and the constant production of design projects. I hope they will use some of our methods in future investigations of potential sites for their design projects."

Reading the landscape

In addition to being a calming change for the students, the purpose of having them make films was to "show the audience how to read the landscape as an outsider and as a detective, how to become an interested observer without an agenda."

The resulting short films were showcased in an exhibition at Hong Kong's PMQ cultural hub. "The reaction was very positive," said Professor Jones. "I saw members of the public watching and enjoying the films, which was very satisfying, as we saw it was not just for architectural specialists."

Asked what was most surprising about the experience, Professor Jones said: "The students and what they observed of the island. They really entered into the spirit of the place and made some fascinating discoveries through film. They also dropped their guard and completely relaxed. By the end of the two weeks it was almost as if they were locals!

"A combination of walking, collecting, talking, filming, eating, drinking and playing bouzouki, as well as bathing in the thermal spring water of Nisyros really helped them step out of the high-stress Hong Kong environment, at least for a short time! I wanted to show them that architectural education is about living, sometimes slow living, and this can be very beneficial for creativity."
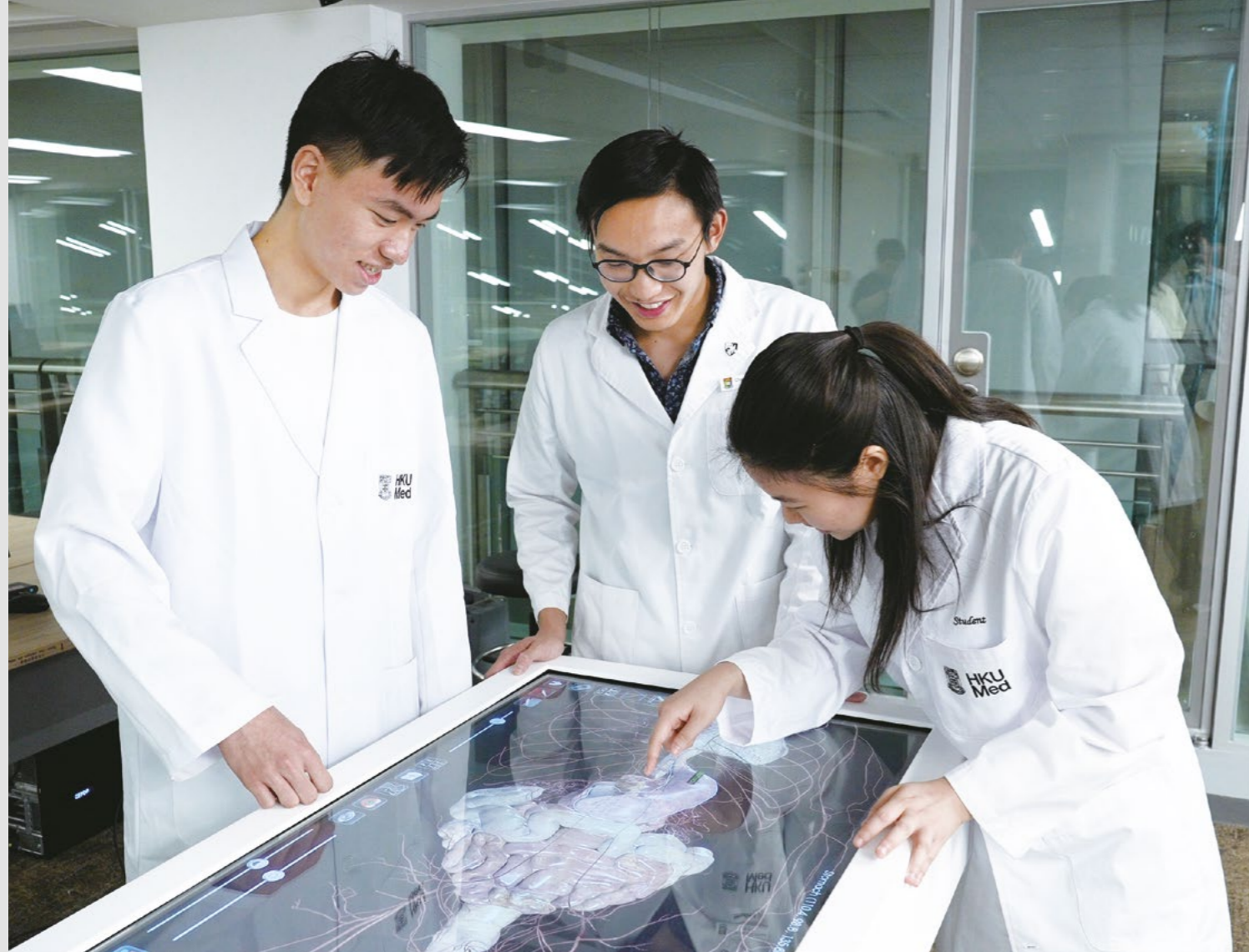
Advanced tools in education technology are integrated into near-peer teaching.

TEAM PLAYERS

Students in the medical faculty are participating in content creation and peer teaching to help support their junior classmates, bridge the digital divide and, most importantly, prepare for their future roles as leaders and mentors in the professional world. Their efforts have won several awards.

In the healthcare professions, there is a strong tradition of passing on the baton. Students and interns learn a great deal from the knowledge and experiences of working doctors, nurses and other professionals. The expectation is that they will become such mentors themselves in the future.

In the Li Ka Shing Faculty of Medicine, that culture of nurturing the next generation has long been encouraged. Recently, these efforts were consolidated under one umbrella with the aim of giving students the reins in teaching and curriculum development.

Students in Medical and Health Sciences Education (SIMHSE) was launched earlier this year, expanding on similar initiatives led by various teachers since 2020 for medical students only. It now embraces students in nursing, Chinese medicine, pharmacology, biomedical sciences, global health and bioinformatics, too.

Professor Gary Lau Kui-kai is the Director of Education Technology and now also of SIMHSE. The two fields blend well given the advent of artificial intelligence and other new technologies, which require students and teachers

to learn simultaneously how to make the most of them. So far, more than 25 innovative learning activities and resources have been developed with students as co-designers, benefitting more than 2,000 learners per year.

"It used to be that the teacher would recruit students for a project they had in mind. But quite frequently now, it's the other way around. Students feel they have this expertise they want to share, or they really want to do more to help with various teaching and learning activities," he said.

Near-peer teachers

For example, medical students created a tool that uploads lecture notes, reference materials and other content to the app Anki and creates flashcards to help with studying. Other students have been recruited to co-develop course content to improve AI literacy for staff and students, contributing videos and chatbots.

Near-peer teaching has also been initiated by students, with those in senior years helping their junior counterparts. This was formalised in 2021 when students Vernice Chan (MBBS graduate), Evelyn Chan (MBBS graduate), Teenie Wong (now in MBBS Year 6) and Helen Xiao (MBBS Year 5) organised Zoom-based tutorials for pre-clinical students, led by senior students, during pandemic restrictions.

The team planned the content, recruited participants, coordinated schedules, worked with the Faculty to arrange training for student teachers, collected feedback and adapted the programme accordingly. The tutorial groups are kept to a small size to foster interaction and have benefitted more than 150 students each year. This year the initiative was also extended to the clinical teaching years, with senior students leading tutorials on history-taking and physical examinations.

"Near-peer teaching offers alternative approaches to understanding content because peer teachers use their own notes, such as mind maps, tables and mnemonics. The peer teachers also benefit by deepening their understanding and revising the content," Teenie and Helen said.

> "It used to be that the teacher would recruit students for a project they had in mind. But quite frequently now, it's the other way around."
>
> Professor Gary Lau Kui-kai

Students in an Active Learning Workshop facilitated by peer teachers.

Teenie and Helen were nominated as student members of HKU's core steering group on Students as Partners, and they were among the five medical students awarded the Poon Li Wai Hing Award for Student in Medical Education in 2023.

External recognition

Student involvement in teaching has also been honoured locally and internationally. A project on students as co-designers, led by Dr Mei Li Khong and MBBS students, Winson Chan Hei-man, Justin Ng Ka-yu, Fok Jing-chen, Clement Ho Ka-chun, Lee Ka-ching and Odelle Wong Kar-yiu, received a global Bronze Award at the QS Reimagine Education 2023 event in Abu Dhabi that attracted more than 1,200 submissions. This team, supervised by Dr Khong, also won first prize at the 4th Symposium on Redesigning Student Learning Experience in Higher Education held for universities in Hong Kong.

Going forward, Professor Lau said that apart from extending SIMHSE to all students in the Faculty, they hoped to involve other disciplines such as engineering, where the overlay of technology with medicine makes a good fit in this era of big data and AI.

He noted that apart from the benefits to students, it was also rewarding for the Faculty to see students take a deep interest in teaching. Some medical students have pursued intercalated degrees in medical education during their Enrichment Year in the third year, and others have expressed a desire to become teachers.

"We are really proud of what our students are achieving and how they are taking the initiative to develop and co-develop materials and engage in nurturing the new generation. The students benefit a lot, too, because it prepares them for their professional roles as educators in the clinical setting," he said.

> **"The pharma industry knows we are experienced in conducting trials and have very good quality control. So they are confident in having their products tested here."**
>
> Professor
> Leung Wai-keung

TRIED AND TESTED

The University of Hong Kong Clinical Trials Centre (HKU-CTC) is a regional leader. About one-quarter of drugs approved by the US Food and Drug Administration (FDA) are tested there and Mainland firms are increasingly using its services. It is now preparing for higher growth in the face of new opportunities and stiffer competition.

Big pharma have been coming to the HKU-CTC for years to test new drugs, either to meet FDA requirements (multi-centre clinical trials must be conducted on patients from different parts of the world to gain approval) or to test new treatments for diseases that are prevalent in Hong Kong, such as hepatitis B. That is both a testament to the high quality of HKU-CTC's work, and a challenge moving forward.

HKU-CTC has grown from a small unit established in 1998 to support HKUMed academics in conducting clinical trials, to an establishment employing well over 100 people with expertise in areas such as law, finance and the administrative hurdles of regulatory processes. It has overseen more than 2,000 phase one, two and three clinical trials, mostly on industry-sourced products.

That success has attracted attention from others in the region, such as Vietnam and Thailand, that are establishing their own clinical trial centres at lower costs. While the competition is heating up, the Chief Director of HKU-CTC, Professor Leung Wai-keung, Li Shu Fan Medical Foundation Professor in Gastroenterology, believes HKU-CTC – and Hong Kong – retain advantages.

"The pharma industry knows we are experienced in conducting trials and have very good quality control," he said. "Hong Kong also is known to have a good regulatory and legal system. So they are confident in having their products tested here."

Those factors are important not only to remain competitive but also because Hong Kong aims to be an even bigger player in clinical trials. The Chief Executive announced last autumn that Hong Kong would establish the Greater Bay Area International Clinical Trial Institute in the Hetao Shenzhen-Hong Kong Science and Technology Innovation Cooperation Zone. HKU-CTC will likely be closely involved given its expertise and track record.

Access to better treatments

HKU-CTC has managed a range of trials, such as tests for new or repurposed drugs targeting specific molecules or antibodies, diagnostic procedures, medical equipment and accessories, vaccines, even applications such as tai chi or acupuncture. The most common trials involve cancer – these get the most funding – and gastroenterology, cardiology and haematology are also popular.

Recently, they oversaw successful trials of an intranasal COVID-19 vaccine developed at HKU by Professor Chen Honglin of the Department of Microbiology. But usually, the trials are initiated by industry.

"Clinical trials are very expensive so it's not easy to run an investigator-initiated phase one trial. You need to pay the volunteers, pay for the test, pay for the examinations – it is not cheap. Even a few tests could cost HK$1 million. So usually, it is very promising drugs that will be put into trial," Professor Leung said.

Patients benefit no matter who initiates the trials because they get access to potentially better treatments than they are now receiving. HKU-CTC recruits volunteers, usually patients with specific types and stages of disease. Trials are mostly done at HKU's teaching hospital Queen Mary Hospital, but negotiations are underway to conduct trials at other Hospital Authority hospitals with their wider patient base, and at the private Gleneagles Hospital.

Opportunities in the Greater Bay Area

"In future we would like to see active participation and recruitment onsite because it's not easy for patients to have to travel to Queen Mary Hospital for treatment. If more regional hospitals participate in clinical trials, patients there can potentially receive better treatment. There needs to be a culture change, but I think better patient care and research go hand in hand," he said.

Professor Leung also stressed that people need not fear clinical trials. Some have expressed that they think they will be treated as 'guinea pigs' and worry about safety, but there are large amounts invested in drug development to protect patients, particularly in multi-centre global trials, and all trials must first be approved by an ethics committee and by the Department of Health. "Everything is transparent and highly regulated," he said.

The government's plans to build up Hong Kong's clinical trials capabilities come as HKU-CTC has already been looking afield to strengthen its regional presence. It conducts training workshops, particularly in the Greater Bay Area (GBA), to help develop talent in an industry that is understaffed. It has also established a spinoff company in the GBA to do site management and contract research there.

"The GBA has many patients and many hospitals, but they're not very familiar with clinical research. We see a huge demand in future for expertise," he said. "We really need to expand beyond Hong Kong to continue to be successful, not only because of space and talent, but because we need a bigger patient load."

A SUPER WAY TO BUILD

Professor Llewellyn Tang Chun-ming's SuperApp-AutoCDE can manage information flow in buildings, from material sourcing through to operations and even carbon emission management for corporates seeking to demonstrate their green commitment. It has already attracted strong interest from investors and operators in the Greater Bay Area, Asia-Pacific, the Middle East and Southeast Asia.

When new buildings are under construction, there are often ongoing revisions to plans. Maybe a different material is needed than originally envisioned, or measurements or workflows need adjusting. This leads to multiple versions of plans being shared via email or text. For project proponents and managers, it can be a headache keeping track of the changes.

Professor Llewellyn Tang of the Department of Real Estate and Construction is acutely aware of the problem. He was a project manager before entering academia, where he chose to specialise in information management. One of his major outputs has been the AutoCDE – a common data environment with ISO 19650 certification – which is the core engine of his initiative, SuperApp, to help create more sustainable cities and streamline data management.

SuperApp-AutoCDE digitises and standardises data in a variety of formats, such as 2D drawing models, laser scans, documents, PDFs, photos and Internet-of-Things data, and turns that data into three-dimensional environments incorporating Building Information Modelling and a Geographic Information System to form a Digital Twin. The Digital Twin can analyse carbon emissions across entire built assets and give insights based on a client's targets, in a format that is much easier to understand than 2D drawings, charts and reports.

"What the client wants in the end is to save time, costs and energy use during both project management and asset management. Particularly for listed companies, they now all need to generate environmental-social-governance reports," Professor Tang said. "We can help the client plan and reduce carbon emissions and turn them into carbon credits."

Tailored to the client

SuperApp-AutoCDE can do this at any stage of a building or city development – for example, at the planning stage it can indicate designs or methods that would save on carbon emissions, while at the construction stage, it can give a head's up if appliances being ordered are not the right size (this is not uncommon) and save the carbon emissions generated by having to ship in replacements. At the operation stage, the platform can help evaluate and compare asset performance for continual improvement.

"The client can use our platform to track the whole process before they even start building. When the building comes into operation, we can monitor energy use as well," he said.

The app can be tailored so that each client can create numerous logins and adjust users' access to information according to their position in the project, such as project manager or site manager. It also has international applicability, having been developed to various ISO standards for information digitisation in the construction industry, smart cities, and carbon emissions quantification.

Professor Tang is the first to say that many of SuperApp's functions could be done manually, but that would take months to complete, as opposed to the real-time feedback from SuperApp, and would be prone to human error embedded in leading machine learning algorithms.

More clients and more uses

Since its launch in 2019, SuperApp has been adopted by more than 100 clients in Hong Kong, Asia-Pacific and Mainland China, and has started to make inroads in Malaysia, Indonesia, Saudi Arabia, and the United Arab Emirates. Recently, it secured Series A funding of HK$25 million and a valuation of HK$424 million, indicating investors have faith in its ability to grow and generate revenue.

Professor Tang said they are working on expanding the market base for SuperApp, as well as its use in applications beyond carbon emissions and built asset development. Recently, they were asked to apply the technology to update firefighting features in old buildings, which is a common pain point in many urban cities where these buildings often have inadequate or no such equipment.

They are also applying it to develop a 3D visualisation of a high school environment in Hong Kong that specialises in students with special educational needs. The aim is to use advanced visualisation technology as an experiential learning tool to familiarise students with the environment in and around their school and the things they would encounter on their way to school. The service is being provided free of charge.

Professor Tang said they had also signed a Memorandum of Understanding with Hong Kong Green Building System, whose majority shareholder Jinggong Steel Group is one of the top steel structure general contractors in the world, to use SuperApp to standardise their production processes.

"This still aligns with our core business, which is really about AutoCDE. The data input, how to manage and streamline the whole production process, how to cut time and costs, and maintain quality and be carbon-friendly – all this can be done through our SuperApp," he said.

> "The data input, how to manage and streamline the whole production process, how to cut time and costs, and maintain quality and be carbon-friendly – all this can be done through our SuperApp."
>
> Professor Llewellyn Tang Chun-ming

VISION FOR THE FUTURE

The Department of Ophthalmology, together with Orbis, is operating a free glaucoma AI screening for 3,000-plus public housing tenants using cutting-edge technology testing developed by HKUMed.

The screening programme – called Vision Matters: Glaucoma AI-ROTA Screening Project for 50+ – was launched in May last year through a collaboration between HKU's Department of Ophthalmology and Orbis, and was made possible through technology called ROTA (Retinal nerve fibre layer Optical Texture Analysis), which was developed over nearly four years by HKUMed working in collaboration with the Chinese University of Hong Kong.

"Glaucoma is the leading cause of irreversible blindness, but previously screening for glaucoma has not been effective because of the lack of clinical tools that are sensitive and specific enough to detect the disease, especially in the early stages," said Professor Christopher Leung Kai-shun, Chairperson and Clinical Professor of the Department of Ophthalmology, who directed the research team. "ROTA represents a highly sensitive and specific technology that makes glaucoma screening possible."

ROTA is a patented algorithm that enables direct visualisation of the nerve fibres on the retina in high resolution using standard optical coherence tomography (OCT) scans. It integrates the measurements obtained from the standard OCT scans commonly used to detect signs of glaucoma – namely the thickness and reflectance of the retinal nerve fibre layer (RNFL) – to discern the optical texture and trajectories of the axonal fibre bundles and reveal RNFL defects. ROTA can detect focal RNFL defects that are missed by standard clinical tests, significantly improving the accuracy of early detection of optic nerve damage within and beyond the macula caused by glaucoma.

The research results for ROTA have been featured in two leading academic journals – *Nature Biomedical Engineering* and *Ophthalmology*.

"It is ROTA technology that has enabled us to launch Vision Matters," said Professor Leung. "Through

> "Retinal nerve fibre layer Optical Texture Analysis (ROTA) represents a highly sensitive and specific technology that makes glaucoma screening possible."
>
> Professor Christopher Leung Kai-shun

offering free and comprehensive eye screening services to randomly selected Hong Kong residents aged 50 or above who live in public rental housing, Vision Matters will identify patients with glaucoma in Hong Kong who may not be aware of the disease."

Vision Matters is a joint programme with Orbis, the international non-profit organisation that fights avoidable blindness across the globe. "We shared the *Nature Biomedical Engineering* article with Orbis in 2021 and discussed the opportunity to collaborate," said Professor Leung. "HKUMed conceived the project and came up with research ideas (Vision Matters is also an epidemiology study and a clinical trial), as well as provided the manpower for eye examinations and investigations. Orbis coordinated the programme, and looked after logistics, patient scheduling and human resources activities."

As well as screening for glaucoma, the project also aims to get an overall picture of the state of eyesight in Hong Kong's over-50s. "We'd like to investigate the prevalence of glaucoma and other common eye diseases including cataract, diabetic retinopathy, age-related macular degeneration, and their risk factors in Hong Kong," said Professor Leung.

More than 1,100 participants have been examined so far, and the aim is to complete 3,000-plus examinations by year end. Study sites have been set up at the HKU Eye Centre, Wah Kwai Community Centre, Kwun Tong District Health Centre Express and Tai Po District Health Centre Express.

"There will be a second phase when open invitations will go out to Hong Kong residents who express interest in undergoing an eye examination with ROTA," said Professor Leung. "While there are no plans yet to extend Vision Matters to other districts, we do have a plan to set up primary eye care services in Hong Kong, building from the model of Vision Matters."

Major breakthrough

The development of AI-ROTA marked a major breakthrough in ophthalmic care. It provides clinicians with quantitative and objective assessment of RNFL defects, which can help them detect early signs of glaucoma and monitor disease progression over time. It is also an effective tool for improving the accuracy and reliability of diagnosis and treatment monitoring of non-glaucomatous optic nerve diseases such as optic neuritis in multiple sclerosis, compressive optic neuropathies, and hereditary optic neuropathies. ROTA has attracted great interest in the ophthalmic industry.

"Two multinational manufacturers of OCT have obtained licenses to implement ROTA into their clinical OCT systems across the globe. A third licencing agreement is about to be completed with another OCT manufacturer from Japan," said Professor Leung.

"In addition to its use for Vision Matters, HKUMed is working with the University of California San Diego, to apply ROTA in research and patient care. We are also investigating and applying the AI-ROTA technology for prediction of vision function and assessment of glaucoma progression."

At the launch ceremony for Vision Matters, Professor Chak-sing Lau, Dean of Medicine, said: "For 136 years and counting, HKUMed has maintained a steadfast record of promoting and protecting health in Hong Kong and beyond. As we have seen in the recent pandemic, mutual support and concerted efforts of all stakeholders, including the government, healthcare professionals and members of the public, are crucial in keeping diseases in check. We are delighted to partner with Orbis in launching Vision Matters in order to reduce the dire impact of glaucoma."

Professor Leung (fifth from left) shared the progress updates on the Orbis Flying Eye Hospital in February 2024.

People First

As AI and other innovative technologies become part of daily life, the Dean of Medicine wants to ensure his students — and the Faculty as a whole — do not lose sight of the importance of human kindness and empathy.

When Professor Chak-sing Lau, Daniel C K Yu Professor in Rheumatology and Clinical Immunology, was a young doctor in the UK in the late 1980s deciding what to specialise in, he was steered towards the emerging field of rheumatology. It turned out to be a fortuitous move. Not only did it open up many opportunities for him, including a move back to Hong Kong in 1992 and a chance to establish the field here, but it provided a non-medical lesson that has influenced his approach to medicine ever since.

"Rheumatology was a very young subspecialty and there were few effective drugs back then. But even though we could not offer patients much in terms of treatments, by listening to them and empathising with them, we could still offer them support. I came to realise the importance of the patient-doctor rapport and the need to show care for patients," he said.

That human touch is an overriding feature of the newly appointed dean's vision for the Li Ka Shing Faculty of Medicine, which he has framed as 'People First'.

The aim is to support the personal and social needs of staff and students, in addition to their professional and educational goals, with the expectation they will bring that understanding to patients. The Faculty could benefit, too – Professor Lau believes that offering people more than material rewards can contribute to higher morale and retention.

"When people are happy, they feel confident in the future and want to continue to contribute to the work of the Faculty. Gaining trust takes time, but I think our 'People First' initiative has been palpated and felt by colleagues," he said.

Building rapport

The initiative has several parts. One is a broad focus on well-being and quality of life. There is already a wellness office for undergraduate students and he hopes to offer such service to others in the Faculty, including mature postgraduate students and all staff ranging from caretakers to the professoriate.

Getting students to take charge of their learning comes under that umbrella, too. Students are being recruited to mentor their younger counterparts and help develop the curriculum, especially when it comes to the use of new technologies. "Young people know more about some of these advanced technologies than we teachers do, and they learn in a different way than how I learnt. We should therefore not be the ones solely determining what they learn and how they learn. Student participation is important," Professor Lau said.

There is also a societal element to 'People First' through the promotion of family medicine. "All over the world, over the last few decades, medicine has become too highly specialised. While it is good to have people with a lot of expertise, we tend to forget about the more common conditions and the need for rapport-building between patients and doctors. Therefore, we have to bring the pendulum back and emphasise family medicine training and service provision," he said.

Even research is getting the people touch. The Research Mixer series has been organised with staff from different disciplines, who meet over lunch for informal discussions. Already, this has led to the formation of a framework on big data collaboration. "No man is an island, we have to work with each other and only with that, will we prosper," Professor Lau said. Researchers are also being paired with industry partners who are willing to invest in HKUMed research through a new technology transfer unit in the Faculty.

Position of strength

To further boost collaborations and interactions, the Faculty is restructuring and rebuilding. All clinical departments were brought under one umbrella, the School of Clinical Medicine, in 2022 and construction will soon get underway on land next to Sassoon Road to provide even more space for working together (this is in addition to several other projects to expand the Faculty's footprint).

These activities are proceeding from a position of strength. The Faculty rose to global prominence during the COVID-19 pandemic and recently had 31 scholars named to the Clarivate Highly Cited Researchers 2023 list. Last autumn, it also received glowing praise in major review exercises by the Faculty Review Board and the Medical Council of Hong Kong.

> "When people are happy, they feel confident in the future and want to continue to contribute to the work of the Faculty."
>
> Professor Chak-sing Lau

As Professor Lau stays focussed on the well-being of others, he is also adapting his own self-care. He used to run marathons but has reduced to shorter-distance and leisure jogs. Fortunately, he does not get caught up in regrets or negative feelings. "I am the sort of person who is forgetful, so unhappy things don't last very long in my head. That keeps me going, as does our staff who work very hard, showing love for the Faculty and being very kind to me. That's already good enough therapy for me," he said.

Professor Lau (centre) was part of the HKUMed Marathon Team, an enthusiastic group of 300 runners, that took part in the Standard Chartered Hong Kong Marathon 2024.

AVOIDING THE
SAFE OPTION

**The Dean of Engineering likes taking risks.
It has given him a rich career across two continents.**

> "The name of the university matters to people's job prospects, so our reputation is worth quite a lot. Our challenge now is to live up to and exceed our reputation."
>
> Professor David Srolovitz

Professor David Srolovitz tells his students there are two characteristics to the ideal job. One, you look forward to going to work on Monday. And two, you just need to make enough money not to worry about it. He could add a third: find some fun in what you do.

Professor Srolovitz himself has been adept at landing jobs that have enabled him to build both an outstanding record of academic excellence and a repertoire of amusing anecdotes, such as the fortune cookie that helped convince him to move to Asia, the professor whose reference letter told potential employers not to hire Professor Srolovitz because he wanted to do it first, and the administrators who respond promptly to his requests, begging him not to complain to their bosses.

"I would say that if you really want to be successful, you need 'AI' – you need to be annoyed and impatient," he jokes.

It also helps to have the talent to be spoiled for choice and the wisdom to make good decisions.

Professor Srolovitz's talents include materials science, mathematics, physics and philosophy (he minored in the latter as an undergraduate, where he enjoyed arguing with the professor). But he listened to good advice from a family friend just before he entered graduate school, switching from condensed matter physics to materials science because, as the friend pointed out, the latter gets better jobs. His success was evident when he received multiple offers from universities and corporate research laboratories at the postdoc level. He decided at the time that academia did not appeal ("I didn't want to spend my career studying the freckle on the nose of a gnat.") so he joined the private sector, first with Exxon Corporate Research then at Los Alamos National Laboratory.

Moving beyond safe harbours

But he was not over with academia. As he progressed in his career, he began to reconsider his initial assumption about academia. "I came to the conclusion that if I want to control what I do, being a professor may be the best way to do it."

He was offered tenure at the University of Michigan and stayed for 12 years before joining Princeton as Chair Professor, choosing it over several other university offers for reasons that echoed in his decision to come to HKU in 2021 – he likes comprehensive universities with a sense of tradition. A highlight of his time at Princeton was co-authoring a *Nature* paper with a mathematician that solved a decades-old fundamental problem in the field.

Still, more choices arose. Professor Srolovitz had been spending two months a year with the Agency for Science, Technology and Research in Singapore and in 2009 they offered him a permanent post. "I said, what do you want me to do? And they had just the right answer: 'What do you want to do?'" This is where the fortune cookie came in. Professor Srolovitz cracked it open when he was deciding whether to accept the offer. "These fortunes are usually so silly, but this one said, 'A ship in harbour is safe, but that's not what ships are for.'" So off he went to Singapore.

After three years, he moved back to the US to join his alma mater, the University of Pennsylvania. But Asia beckoned again. In 2018, the City University of Hong Kong recruited him to establish a new department of materials science. Then in September 2021, HKU recruited him as Chair Professor of Materials Theory. Professor Srolovitz was confirmed as dean in 2023.

Professor Srolovitz (fourth from left) at the 8th Engineering Inno Show, a showcase carnival of students' inventive designs and projects.

A great future and a great 'now'

The most important role of the dean, he says, is people – hiring and tenuring the best. While he acts cautiously on the latter, he takes risks on the former and advises young scholars to follow suit. "I always tell my research students, if you're never wrong, it means you're not trying hard enough. If you're afraid to make mistakes, you won't ever be able to hit on the next big thing," he said.

One big successful risk has been his decision to double the intake in Engineering's Master's programmes and double tuition fees for non-local Master's degree students. Paradoxically, applications have since increased. "The name of the university matters to people's job prospects, so our reputation is worth quite a lot. Our challenge now is to live up to and exceed our reputation."

That means beefing up not only teaching – particularly in attracting top students – but also research, where he supports a stronger focus on the fundamentals that underpin artificial intelligence, power electronics, materials and other technologies.

"With all the geopolitical turmoil, both Mainland China and Hong Kong are investing in developing technology to improve the economy for the long term. We need to get potential students and their parents to understand that technology development has a great future and a great 'now'," he said. It's a no-brainer for Professor Srolovitz. "Engineers are enthusiastic to go to work on Mondays because they actually accomplish something real."
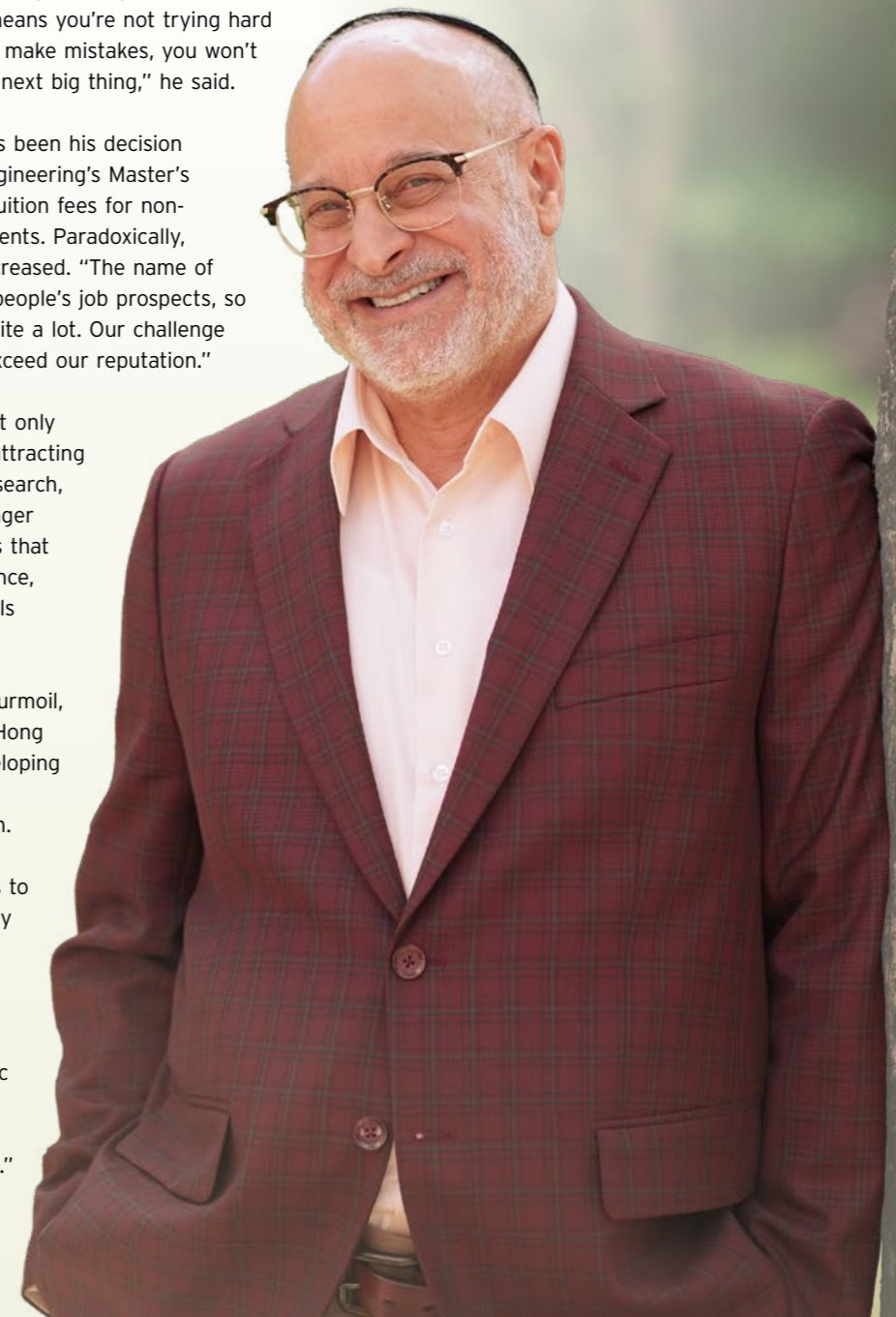
LIFE OUTSIDE THE LAW IN CHINA

China is a high-functioning authoritarian government, yet illegal markets have persevered under its watch. Professor Peng Wang has been studying why.

The Chinese central government has introduced many policies over the years to spur economic growth and curtail excesses such as corruption. But there have been unintended consequences.

For instance, policies to develop coastal cities have attracted millions of people from rural and northern areas seeking economic opportunity, but jobs and housing cannot keep up. To meet the demand, illegal housing and illegal street vending have flourished. Similarly, while campaigns have cracked down on activities such as illegal online lending, they have not eliminated them and only driven them further underground.

"Traditionally, we think the state is responsible for repressing illegal markets. But my observation is that in many circumstances, it actually enables their growth,"

said Professor Peng Wang of the Department of Sociology, who is finalising a book on the topic with Dr Lin Wanlin, now with Sun Yat-sen University, titled *Extra-legal Governance: The Social Order of Illegal Markets in China* (to be published by Cambridge University Press in 2025).

The book aims to explain why and how illegal markets continue to thrive outside the bounds of the state and how participants mitigate their risk and uncertainty.

'Legitimate' illegal markets

Illegal markets come in two varieties – socially legitimate or not – with differing power imbalances, he said. For example, both illegal housing and illegal street vending have high social legitimacy, so the government often turns a blind eye to them.

"Unlicensed street vending is part of the informal economy, and it is facilitated by government policy on developing coastal cities, which encourages migration from inland areas. If migrants cannot find enough jobs, many of them become street vendors. Similarly, the arrival of illegal migrants has coincided with a government focus on commercialising land in major cities like Shenzhen, Beijing and Shanghai. The cost of housing has become so high that illegal housing markets have arisen," he said.

The latter markets often centre on urban villages that are enveloped by cities and have become magnets for migrants. The original village residents are allowed to build flats and rent or sell them to each other, but they have capitalised on demand to trade with migrants, too, who are now their prime market. "This housing is cheaper than commercial housing and it helps middle- and lower-income groups settle in the city," Professor Wang said.

The government treats these villages with a light touch so long as things do not get out of hand. Village committees therefore have introduced such things as non-binding informal certificates of title, lawyer's testimonies and even contract-signing rituals to legitimise sales and leases. They also keep registries of transactions that anyone can inspect, and maintain dedicated WeChat groups that ensure everyone knows when a villager reneges on deals. "The village committees have a strong motivation to resolve disputes because they do not want to give the government reason to intervene in the market," he said.

On the flip side of such arrangements are practices which have no social legitimacy and face market, political and legal risks. Professor Wang looked at how illegal online lenders and corrupt government officials mitigate these risks.

Less open exchanges

Online lenders acquire information about borrowers and will threaten non-payers with such things as text-bombing their contacts or publishing nude photos of them. The problem was fairly widespread until 2020, but an anti-crime campaign has eliminated many such practices.

Corrupt officials, however, have been more adaptive. They used to face little risk of investigation or punishment. But in 2013, President Xi Jinping launched his 'tigers and flies' anti-corruption campaign. More than two million officials were prosecuted, yet that has not halted corrupt practices. People still seek to bribe higher-ranking officials for appointments and favours. These exchanges now happen less openly, through social networks and connections as embodied in *guanxi*.

"The condition for initiating transactions is now based on close ties with each other and strong trust and commitment to the exchange. These transactions

> **"Traditionally, we think the state is responsible for repressing illegal markets. But my observation is that in many circumstances, it actually enables their growth."**
>
> Professor Peng Wang

are less rampant, but they still happen among people in very close networks," he said.

Professor Wang said his book is the first to provide a comprehensive framework for analysing how even strong states like China may enable illegal markets to flourish and how extra-legal governance emerges. It extends his earlier research on collusion between police officers and local gangsters in Chongqing in the early 2000s. Both projects have involved extensive interviews with participants and regulators, including more than 300 interviews for the current book.

"The existing literature on illegal markets and extra-legal governance has focussed on Western countries or dysfunctional countries. We are the first to analyse illegal markets and understand risks and solutions in China. It's a very strong state, but still its policies can enable the growth of illegal markets," he said.

Illegal housing in Shenzhen. (Courtesy of Dr Lin Wanlin)

STORM IN A TEACUP?

A new book delves into what really happened at the Boston Tea Party and gives a novel interpretation of tea's significance to the American Revolution.

The generally accepted image of the Boston Tea Party is of defiant colonists dumping crates of tea belonging to the East India Company into Boston Harbour in protest at British taxes on tea. Then they opposed the goods themselves, boycotting tea and British products, and ultimately revolting from British rule all because of their opposition to taxation without representation.

However, author James R Fichter, Associate Professor and Programme Director of Global and Area Studies at HKU's School of Modern Languages and Cultures, argues in his new book – *Tea: Consumption, Politics, and Revolution, 1773-1776* – that the reality was more complex.

"Some of the Company's tea shipments survived, and while some colonists destroyed tea, others still drank it," he explained. "The boycott was hard to maintain and utterly collapsed. Tea smuggling was widespread, and various excuses allowed colonists to buy, sell, and drink tea openly. It was sometimes allowed as a medical remedy (or maybe a 'medical' remedy). Tea seized from British ships and soldiers was drunk as a prize of war. In 1776, Congress repealed its ban on tea, reasoning that the ban was so widely ignored as to be irrelevant."

The idea for the book came about in the 2010s, when Professor Fichter was researching an article on tea advertising, and was puzzled to see that the same newspapers that contained articles about tea protests or essays declaring that no one should or did drink tea anymore, also contained advertisements for tea.

"The contradiction between the advertisers on the one hand, and the newspaper editors on the other was striking, and it repeated over and over," he said. "This compelled me to ask what people really thought and did about this? Did the essays and newspaper articles speak for the public more than the advertisers spoke to the public?"

> "The tea's survival and the threat of its sale made the Boston Port Act and the response to it even more of an all-or-nothing conflict than has been previously understood."
>
> Professor James R Fichter

Shipments survived

Further research revealed that two shipments of tea survived the Tea Party, and not only survived but were traded and consumed. "Two of the seven shipments of tea sent by the East India Company survived and were sold, despite the Boston Tea Party," said Professor Fichter. "The tea's survival and the threat of its sale made the Boston Port Act and the response to it even more of an all-or-nothing conflict than has been previously understood. And that tea's eventual sale reveals that tea was not nearly as unpopular as Patriots would have us believe."

The whereabouts of those two shipments became one of the great mysteries of the research and uncovering the answer, one of Professor Fichter's favourite anecdotes. "I wanted to find out what happened to the tea the East India Company sent to Boston on the [tea ship] *William*. I knew it had been stored in Castle William in January 1774, and that British engineers blew up the castle when they evacuated in March 1776. I searched far and wide for any source on the tea or the castle between those dates," he said.

"In the end, I discovered the tea's fate in the most obvious place: the East India Company's own records. Historians of the Boston Tea Party had been using Company records for a century, and just missed it. It was a triumph, but I also felt a little foolish for not checking this earlier. It's always in the last place you look!"

Until now, the protests in 1774 of 'consumers who refused to consume' have been interpreted as ways colonists (especially women) who were not normally engaged in politics could be political. The book re-reads these protests instead as the Patriot struggle to politicise consumption. "When 'tea parties' were held nearly a year after the Boston Tea Party, there was still tea to destroy," noted Professor Fichter. "The prevalence of tea advertising in 1774 suggests efforts to get colonists to join the boycott were only partially successful. Boycotts are often ineffective and collapse, as this one did. So, it wasn't a way to see the broad American public opposing Parliament. It was a way to see the broad American public ignoring Parliament and Congress."

Looking to the future, Professor Fichter is keen to take the research further. "Loyalists are one of the most understudied and important topics in the American Revolution," he said. "While Loyalist studies is a thriving sub-field, the study of Loyalists remains somewhat relegated to this and is thereby too easily ignored by historians wanting to write the Revolution as the history of the making of America. This is now changing, but there is more to be done. Further integration of Loyalist voices and sensibilities as part of the panoply of 'normal' views people held is an important step toward understanding the range of colonial perspectives, from Patriot to Loyalist to both and neither."

Tea: Consumption, Politics, and Revolution, 1773-1776

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