Knowledge Exchange

NEWSLETTER

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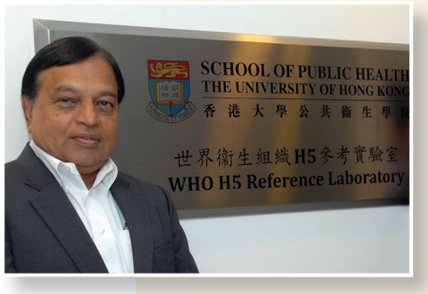

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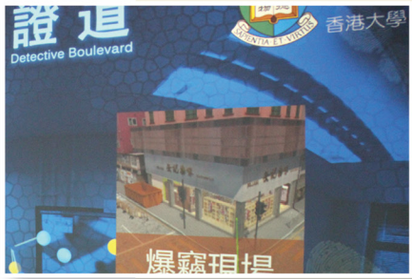
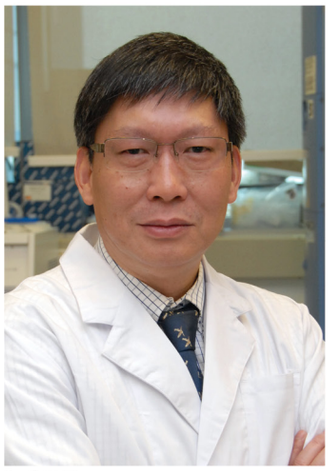


Innovation and Entrepreneurship

Engagement for Community Benefit

News in Brief


Prof. Malik Peiris


Prof. Yi Guan


Prof. Leo Poon

HKU Flu Fighters are First Responders Against Global Pandemics

Knowledge exchange, which is firmly underpinned by their excellent research, is an integral part of the School of Public Health's work to achieve impact in public health well beyond the academic world.

It is often said that the next global pandemic is not a matter of "if" but "when". The Director of the School of Public Health, Professor Malik Peiris, together with Professor Yi Guan, Professor Leo Poon and their colleagues, have been at the forefront of efforts to push that likelihood further into the future.

Although most popularly known for their work on SARS (Severe Acute Respiratory Syndrome), they have been key players in the ongoing battle against other emerging infectious diseases, from bird flu to swine flu and MERS (Middle East Respiratory Syndrome).

Their achievements started with the H5N1 bird flu outbreak in Hong Kong in 1997, which infected 18 people and prompted them to begin systematically monitoring poultry and eggs and step up their study of bird flu viruses. As a result, they found evidence that H5N1 was re-emerging in 2000 and worked with the government to devise a management plan that included banning quail in markets and enforcing rest days in markets to break the transmission of the disease.

That experience and know-how proved crucial in 2004 when bird flu was detected in several countries in the region – but not Hong Kong. Professor Peiris and his team spent time in Indonesia in particular providing training and advice to health professionals, and as a WHO (World Health Organization) H5 reference laboratory, provided laboratory support for the confirmation of the first human H5N1 case detected in that country.

"Hong Kong has not had a single locally acquired case of H5N1 or H7N9 [both avian flu viruses] since 1997," he said. "We can take satisfaction in providing understanding of what was going on, and providing evidence-based interventions to mitigate the threat."

Their work on SARS benefited from their bird flu experience. They were the first in the world to identify the coronavirus involved and they quickly assembled diagnostic tests that were shared with the world. During the outbreak they worked closely with local and international organisations, including the WHO, and gained worldwide recognition for their contributions – not only to the scientific frontier but also global pandemic control.

The School's persistent work in monitoring the human-animal interface and studying viruses also enabled it to contribute to the understanding and control of swine flu in 2009. "At the time of the pandemic, around half of all the genetic information about swine influenza viruses, globally, came from our group," Professor Peiris said. The School also contributed to an understanding about how the virus spreads among families and its virulence.

Most recently, they have been part of the international effort to contain MERS. They also continue to work closely with the WHO and the Food and Agriculture Organization of the United Nations to share information, conduct training courses and serve as members of various committees (for instance, the committees on vaccine strain selection and diagnoses).

And of course, Professor Peiris and his team continue to work closely with local health authorities and the community. They have even launched an awareness-raising programme for primary and secondary schools, called 'Little Dr Flu', to teach students about the ways in which viruses spread, provide basic scientific knowledge, and show them how to maintain good hygiene.

Knowledge exchange, which is firmly underpinned by their excellent research, is an integral part of the School's work to achieve impact in public health well beyond the academic world. "After 1997, after H5N1, our international connections have been gradually developing. We are very much on the international map in terms of emerging infectious diseases," Professor Peiris said.

Where Virtual Worlds have Become a Reality

The imseCAVE, developed by the engineers at HKU, has become the go-to technology in Hong Kong for creating virtual worlds used by industry, business, educational institutions and government for training, system development and many other purposes.

The Department of Industrial and Manufacturing Systems Engineering uses high-end computers, projectors and motion detectors that not only immerse users in imaginary environments but let them interact with these environments.

Its work began in the late 1990s when it developed CAVE technology imported from the US – for "cave automatic virtual environment" – and applied its own research to adapt it for training crane operators at the container terminal.

The imseCAVE has become the go-to technology in Hong Kong for creating virtual worlds

The walls and floor of the imseCAVE are full-scale screens and the user sits in the middle and, with more recent developments, can move around the space.

In more recent years the technology has even been used to train police detectives in inspecting a crime scene. Real-time position tracking means trainers can follow and record the user's body position and their movements as they inspect the scene.

A wide range of other clients, from the Airport Authority and Cathay Pacific to the Hospital Authority, other universities and even an international games manufacturer, have used the system or shown keen interest in doing so. Each client gets a system tailor-made for their needs.

Cathay Pacific Services Limited ramp operation VR training system

Dr Henry Y.K. Lau has been involved in the imseCAVE research from the early days. "This is a tool for creating a virtual world, with interactive objects, an interactive environment, even virtual people in it," he said. "Many fully immersive CAVE systems being used in Hong Kong has some involvement with us."

The imseCAVE technology is also being spun into a startup. Earlier this year Dr Lau's former PhD students received TSSSU@HKU (Technology Start-up Support Scheme for Universities) funding to set up a start-up company that will develop the technology for primary and secondary schools.

"Our vision for this startup is to push for a very reachable, low-cost immersive VR solution for school education. For example if you are talking about the Amazon basin, you can take schoolchildren there on a virtual boat ride and see what is living there. Or you can go to the base of the Himalayas and see the rubbish that is dumped there by mountaineers and ask students to discuss that," he said.

"The whole trajectory of imseCAVE is a fully successful roadmap to KE, from the university to commercial application. Ultimately we want to prove the concepts of virtual reality and if others want to commercialise it, they can do that."

Dr Henry Y.K. Lau and his team members, Dr Leith K.Y. Chan, Mr William W.L. Tam, Miss Yaqi Dai and Mr Ka Yik Chan, of the Department of Industrial and Manufacturing Systems Engineering received the Faculty Knowledge Exchange (KE) Award 2016 of the Faculty of Engineering for the project 'An Immersive and Interactive Virtual Reality System - the imseCAVE'.

Dr Henry Lau (second from left) and other members of imseCAVE team

Accosys-Team – Professor Victor Li (right) and Dr Miles Wen

The startup, Accosys Ltd, provides AI concierge services for the public sector and service industry that can give a much better user experience

Artificial Intelligence at Your Service

Imagine you are meeting a friend for dinner at a restaurant in a mall and you are running late. You don't know the restaurant's exact location but the mall's interactive service (regarded by some as a step backwards in efficiency) has a queue next to it and people are taking their time. The frustration mounts as the clock ticks away.

Or – you arrive at the mall, hit a button on its Facebook page or website, type or say the restaurant's name into your phone, and receive directions that take you straight there. The same site had also made the reservation for you and will get your parking validated. You can even tell it that you need cash and get directions to the nearest ATM. And after dinner, it will tell you about sales at your favorite stores.

This one-stop AI concierge service is the brainchild of Accosys Ltd, an artificial intelligence (AI) start-up headed by a recent engineering PhD graduate from HKU, Dr Miles Wen, and his former PhD advisor, Professor Victor Li, Chair Professor of Information Engineering at HKU. The team had been working on AI technology for several years when a chance encounter with the manager of a shopping mall made them realise the potential to apply their research to a concierge service.

"Some mall operators told us that they had been looking for solutions to improve customer services without having to hire more customer service representatives. We realised that we had the technology that could address this need," Dr Wen said.

"Our focus is on providing AI concierge services for the public sector and service industry that can give a much better user experience. Shopping malls and large institutions with a lot of contact with the public don't necessarily have enough customer servers to meet demand. We can serve millions of customers at the same time."

The technology works using both text and speech, in Cantonese, Mandarin and English. The beauty of it is that it does not require customers to download anything – they can access via a client's website, Facebook page, WeChat or WhatsApp accounts and other social media. All the client has to do is add an option that takes users straight to the AI concierge service.

Accosys also provides a data analytics service to help clients understand their visitors better and conduct targeted marketing.

Founded in 2015 by Professor Li and Dr Wen, the company received TSSSU@HKU (Technology Start-up Support Scheme for Universities) funding in 2015 and again this year, and is also supported by the Incu-Tech program of the Hong Kong Science and Technology Parks Corporation.

"The important thing of the TSSSU funding is that it has given us the time and opportunity to test things, make mistakes and correct them. Being able to do a lot of trial and error is as important in running a business as in conducting scientific research. We have also received a lot of mentorship support through HKU.

"The time for AI technologies is coming. We are working hard to create real values to our community using our technologies," Dr Wen said.

Cloud of Unknowing: an Exhibition about Modern Asian Architecture

East and West, buildings and the spaces in between, and art and architecture came together in an exhibition co-curated by Thomas Tsang of the Faculty of Architecture in 2014 to celebrate Taipei's 130th anniversary.

Mr Tsang was invited by the chief curator of Taipei Fine Arts Museum to put together the museum's first themed exhibition on architecture and the city with renowned Taiwanese writer and critic, Professor Roan Ching-yueh of Taiwan's Yuan Ze University.

They saw it as an opportunity to focus on the response to modernism – and its Western canons – in Asian cities and invited 25 unknown/renowned architects and artists from Taiwan, Hong Kong, Mainland China and Japan to develop new site-specific artworks to be exhibited.

"One question we had was, what are the beliefs underpinning East Asian modernism?" Mr Tsang said. "We didn't want the exhibition to feature works we already knew. We wanted unexpected and unknown works."

The broad concept was worked out during sessions that included a visit to misty hot springs in Taiwan – bringing to mind a phrase from a medieval English text, *The Cloud of Unknowing*, about submitting to the unknown and thereby getting a glimpse of god.

This became the title of the exhibition, which featured full-scale installations, photographs, drawings, collages and other exhibits that explored the modernism theme as well as the different ways of experiencing architecture and the ambiguous status of architecture as an object of display. For instance, the Tohoku Institute of Technology's Department of Architecture created a model of a town destroyed by Japan's 2011 tsunami, which showed the layout minus the buildings that were destroyed, with notes by people about their memories of the area, such as the spot they first fell in love.

"One question we had was, what are the beliefs underpinning East Asian modernism?"

The works were organised along seven "streets" that reflected such perspectives as learning, objects, utopia and landscape. Some of the works were hung on the walls, some suspended from the ceiling, some were on the floor, and some could be entered. "We wanted visitors to blur their expectation between fiction and reality, and inhabit inside the artwork," Mr Tsang said. "It's this idea of transmitting ideas. People came and it was totally different from what they expected."

Mr Tsang and Professor Roan also challenged the contributors to work in mediums they were less known for – for instance, C.Y. Lee, the architect of Taipei 101, once Asia's tallest tower, contributed paintings and was deliberately given one of the smallest spaces in the venues.

Mr Thomas Tsang

The three-month-long exhibition, held in 2014, also featured a public forum, public lectures, and observational touring workshops to promote discussion about cities. The exhibition was nominated for the Taishin Arts Award for Visual Arts and selected as a finalist in the 2014 ADA Awards for Emerging Architects, and was among the top five public exhibitions for 2014 in Taiwan according to a poll as reported by *China Times*.

Mr Thomas Tsang of the Department of Architecture received the Faculty Knowledge Exchange (KE) Award 2016 of the Faculty of Architecture for the project 'Cloud of Unknowing: A City with Seven Streets'.

未明的雲朵：一城七街 – 歐寧 – 碧山計畫 (Source: Forgemind ArchiMedia)

Back-up for Surgeons

Surgeons outside academia tend to be jacks of all trades – they have to have sufficient knowledge to treat a lot of conditions. Academic researchers, on the other hand, are more specialised and have capacity to develop new treatments and understanding. A new online reference tool, developed with input from HKU scholars, is bringing these two groups together in a more practical and immediate way than ever before.

The AO Surgery Reference is an internet-based resource for surgeons around the world. HKU academics played a major role in the AOSpine section to provide the latest information and step-by-step guides on managing various spinal conditions.

The reference will show the different surgical options and describe the skills and equipment needed to perform each procedure

"Not all surgeons are academics and they may not have done a lot of research, so what they need in their practice are guidelines on when to do which procedure," said Professor Keith Luk Dip-kei, who co-wrote the section on spinal deformities. His colleague, Professor Kenneth Cheung Man-chee, was one of the editors of the whole section.

The visuals and click-through instructions help surgeons quickly grasp the treatment options and techniques.

For example, if the patient has a severely curved spine, the reference will show the different surgical options and describe the skills and equipment needed to perform each procedure, as well as the procedure itself. There is also a difficulty rating.

"Techniques are always being updated and whatever manuals can do, they are not designed to take you through the procedures step by step, minute by minute. You can now access this on a smartphone and carry out very careful preoperative planning prior to taking the patient to the operating room," Professor Cheung said.

"Deformity surgery in particular is difficult and very demanding in terms of the surgical skills and principles. A comprehensive tool like this also means surgeons can be exposed to different approaches from different senior surgeons around the world."

The mobile app version of the AOSpine surgery reference tool has been installed in more than 200,000 smartphones around the world.

Professor Cheung will also be disseminating his expertise globally in his role as president of the Scoliosis Research Society. He is the first non-North American surgeon to become president of this society in her 51 years of history.

"One thing I have heard around the world is surgeons asking us to teach them about deformity treatment. Such surgeries are technically very demanding and care tends to be concentrated in specialist centres. There are countries where such centres do not exist," he said.

The AOSpine reference tool is one way of addressing that need. It can be accessed at https://www2.aofoundation.org/wps/portal/surgery?showPage=diagnosis&bone=Spine&segment=Overview

Professor Kenneth M.C. Cheung and Professor Keith D.K. Luk of the Department of Orthopaedics and Traumatology received the Faculty Knowledge Exchange (KE) Award 2016 of the Li Ka Shing Faculty of Medicine for the project 'Internet-based Guide to the Management of Spinal Deformities: The AO Surgery Reference'.

Internet-based AO Surgery Reference

Prof. Kenneth Cheung (first from left), Prof. Keith Luk (first from right) and colleagues of the department

Prof. Shui-fong Lam (5th from left) and the Chief Secretary for Administration, Mrs Carrie Lam, visited a kindergarten that participated in the pioneering project of Heep Hong Society and joined the pre-schoolers in fine motor skills training

Racing Against Time to Help Special Needs Pre-Schoolers

Children with special educational needs (SEN) benefit most when they receive early intervention, such as speech therapy. But in Hong Kong, achieving that goal has been difficult. More than 6,000 children are on a waiting list for help, held back by a shortage of services and a disconnect between schools and services. Now, with the government poised to provide free pre-school education from 2017, there is both an opportunity and an imperative to change things.

a model to improve the link between pre-schools and intervention services

Professor Lam Shui-fong and Heep Hong Society spotted the opportunity in 2014 when they developed a model to improve the link between pre-schools and intervention services. Over the following school year, they tested their model in 10 kindergartens and showed it can improve children's outcomes.

The government was so impressed that in late 2015, it announced it would extend the model to 450 kindergartens for a two-year pilot project and thereby cut the waiting list for services in half, to about 3,000 children.

"This is a really big move because the queue is so long," Professor Lam said. "And the timing is so important. With a big leap coming in free education for pre-schools, if we are going to improve things for children with SEN, we have to act now. I'm pleased our model has had this big impact on government policy."

The model calls for specialists to provide therapy for children and training for their parents at their centres, and also visit pre-schools on a monthly basis to provide training to teachers.

"The teachers receive individual coaching on handling children's behaviour, for example when they throw tantrums in class. And they get advice on enhancing the curriculum and the physical environment for children with special needs," she said.

"The experts can give teachers a lot of specific and concrete support on the spot, and even students who are not identified as having special needs but who may be lagging behind can benefit – the entire school can benefit."

In terms of helping special needs children, results from the pilot study, which involved 120 children including a control group, found improvements in cognitive skills, language skills, motor skills and self-directed skills compared to children who did not receive the intervention.

Teachers also reported improved self-efficacy in their teaching. "The growth and development they witnessed were not only in their students with SEN but also in themselves and their schools. The results provide strong empirical support for the success of both centre-based and school-based services," Professor Lam said. KE

Professor Shui-fong Lam of the Department of Psychology received the Faculty Knowledge Exchange (KE) Award 2016 of the Faculty of Social Sciences for the project 'Evaluation of a Pioneering Service Delivery Model for Preschoolers with Special Educational Needs'.

Congratulations also to ...

Warm congratulations are also extended to the following colleagues who have won the Faculty Knowledge Exchange (KE) Awards 2016 of their respective Faculties:

Faculty of Arts
Dr Eva N.S. NG, School of Chinese
'Resources for Interpreting'

Faculty of Business and Economics
Dr Michael CHAU, School of Business
'Engaging Young People Online'

Faculty of Dentistry
Dr King Lun HO and team members – Professor Chun Hung CHU, Dr Mike Y.Y. LEUNG, Dr Duangporn DUANGTHIP
'Empowering a Non-governmental Non-profit Organization to Deliver Primary Oral Care to Hong Kong Citizens'

Faculty of Education
Dr Samuel K.W. CHU, Division of Information and Technology Studies
'Reading Battle: Enhancing Students' Reading Interest and Ability with a Gamified, Self-paced, Interactive Children Literature e-Quiz Platform'

Faculty of Law
Mr Benny Y.T. TAI and team members – Professor Johannes M.M. CHAN, Miss Karen K.Y. KONG, Miss Isabella Wenting LIU, Department of Law
'Rule of Law Education Project (ROLE)'

Faculty of Science
Professor Chi-Ming CHE, Department of Chemistry
'High performance phosphorescent platinum(II) emitters for OLED application'

And to the following colleagues who have won the KE Award (Non-Faculty Unit) 2016:

Dr King-wa FU and Mr Chung-Hong CHAN, Journalism and Media Studies Centre
'Weiboscope: Open Data, Data Analysis and Visualization of the Chinese Social Media'

HKU DreamCatchers 100K

DreamCatchers, HKU's entrepreneurship series launched in 2015, provides a platform to inspire innovation and entrepreneurship. The **HKU DreamCatchers 100K** was launched in early 2016 to provide seed fund for young entrepreneurs to kick off their businesses. There were over 140 applications and 20 teams were shortlisted after 5-minute pitch rounds in April. Their business ideas cover various areas like catering, biomedical, social innovation, hardware, etc. Each team has been assigned a mentor from start-ups or the industry.

The Final Pitch was held on August 28 at Rayson Huang Theatre, HKU where 18 teams pitched before a panel of judges and a full house to compete for ten $100,000 awards. The winners are:

1. **Chillazy**: A physical hammock lounge for the exhausted working class
2. **CONZEB**: To build a fully automated instrumentation for easy and simple cancer screening
3. **DNA Replicator**: To provide an affordable and portable PCR machine for DNA am in schools and developing countries
4. **Living Tissues Company Limited**: To develop an automated system to fabricate cartilage from stem cells and biomaterial for repair in-house with minimal human interference
5. **MedEXO Robotics**: Exo-Stabilizer: public affordable wearable robotic device for Parkinson's disease patients
6. **Movabar**: TA platform (Web & App) and system for off-site food & beverages (F&B) catering services
7. **Motion**: To enable an affordable solution for self-contained motion tracking and sports training for the general public and professionals alike
8. **RECIPIO**: A revolutionary digital receipt solution that replaces traditional paper receipts to streamline the whole aftersales process, while enhancing customer loyalty
9. **ROOTS**: Your curated online food and food lifestyle marketplace that revives the everyday artisan and his/her products through a community-driven platform of experienced foodies
10. **Smiley Box**: To deliver boxes of toys to households on a tiered and annual subscription basis, which will be recycled to generate educational opportunities for underprivileged children later

There was also a People's Choice Award, which was supported by HKU Graduates Association, and it went to **RECIPIO**.

Share the fun and inspirations at http://www.dreamcatchers.hku.hk/?p=1388