

Knowledge

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Exchange

NEWSLETTER



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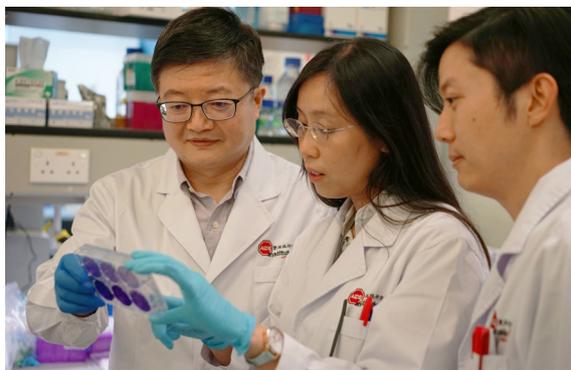
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Treatment as Prevention: Reducing Cases of HIV/AIDS



(From left) Professor Zhiwei Chen discussing with Post-doctoral Fellows, Dr Ada LY Yim and Dr Zhiwu Tan, in the lab

One of the biggest challenges to the global medical profession in the last four decades has been finding a vaccine or cure for HIV/AIDS. The disease was first identified in 1981 and the goal has yet to be achieved, but in the meantime advances in halting the disease have been made by focusing on treatment as prevention: reducing the number of cases of HIV/AIDS by focusing on stopping partners of HIV/AIDS carriers from becoming infected. Since the establishment of AIDS Institute in 2007, Professor Zhiwei Chen of the Department of Microbiology and his team have led HIV and AIDS research in Hong Kong.

For years, the focus was on patient care, but by 2009 views had changed. “The scientific community realised if you treat the patients very effectively, then the chance for them to give the virus to the partners will be very minimal,” said Professor Chen. He and his team embarked on a campaign to share everything they had learnt with the government, clinicians, NGOs and the wider community to promote the benefits of treatment as prevention and to build awareness and educate the public about the

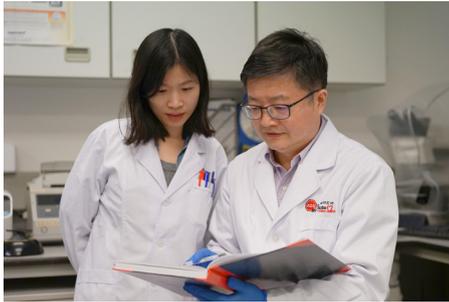
Fighting HIV/AIDS and COVID-19 using HKU Patented Technology

importance of AIDS prevention and control. The team published their work in scientific reviews, gave media interviews, attended local and international meetings, lectures and symposiums, organised community events and worked with NGOs to provide knowledge and training both locally and regionally. The team also organised community fund-raising activities to help more than 500 AIDS orphans in China.

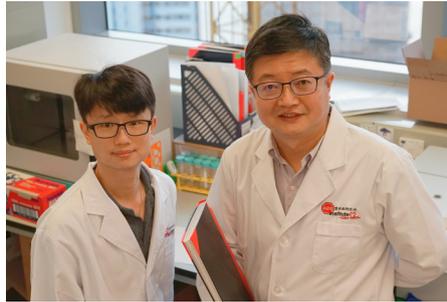
The persuasion effort took some time, but finally in 2017 the new approach became policy and has been implemented since then.

The results have been notable. “Based on the data, the annual number of infections indeed declined in recent years,” said Professor Chen. “I believe this strategy is one of the contributing factors. When you reduce the source of the virus, definitely you will see some reduction. For HIV, it’s using treatment as a biomedical intervention to minimise the secondary transmission.”

At the same time, the team has been working on the most critical scientific question in their field: the search for a vaccine or a cure for HIV/AIDS. In 2013, they made a breakthrough in vaccine technology. “We found that if we have a special way of delivering the antigen to the antigen-presenting cells, namely PD1-based vaccine, we were able to induce very potent antiviral immunity,” explained Professor Chen. “What we found is if the host immune response is strengthened, actually you can control the virus to an undetectable level in monkey models.”



Professor Zhiwei Chen (right) discussing with PhD Candidate, Ms Dongyan Zhou, on COVID-19 antibody drug discovery



Professor Zhiwei Chen (right) and his Post-doctoral Fellow, Dr Michael YC Wong



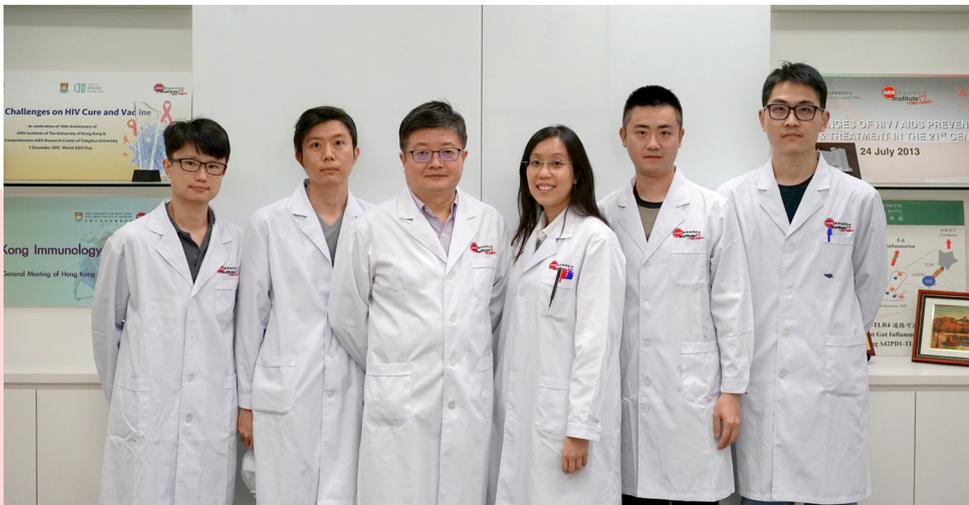
Professor Zhiwei Chen (left) advocating Treatment as Prevention in a Hong Kong Community Forum

To directly benefit the patients, Professor Chen's team has been working with a Hong Kong start-up through the University-Industry Collaboration Programme and is leading a Theme-based Research Scheme to develop a new biomedical product based on their discoveries which should enter clinical trials soon.

During their work, Professor Chen has learnt a lot about the steps and synergies needed to get a vaccine made. With the novel coronavirus sweeping the world, the team's work has taken on even greater urgency and the new patented PD1-based vaccine and the knowledge gained is being put to work in the search for an effective vaccine for COVID-19.

“Hopefully I think the impact of the platform of technology will be much bigger than we originally thought,” said Professor Chen. “Now not only we have something already manufactured and ready in the near future for the human trial for AIDS, but we can also apply the technology for this new coronavirus.”

Professor Zhiwei Chen of the Department of Microbiology received the University's Knowledge Exchange Excellence Award 2019 for the project 'Knowledge Exchange on HIV/AIDS to Promote HIV Prevention and Care'. 



(From left) Professor Zhiwei Chen's research team: Dr Michael YC Wong, Dr Zhiwu Tan, Professor Zhiwei Chen, Dr Ada LY Yim, Dr Runhong Zhou and Dr Tianyu Cao

Smart Springs for Stable Green Power Supply

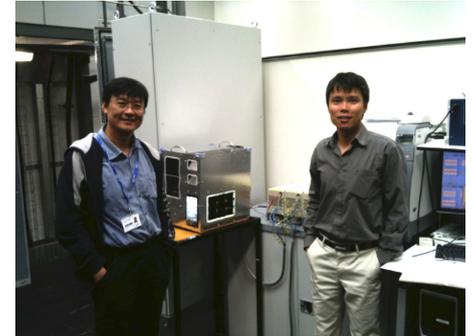
When Professor Ron Hui of the Department of Electrical and Electronic Engineering was presented with the problem of how to stabilise the electrical supply generated by wind and solar power by Professor Felix Wu in the Sydney Airport, he found the solution in a most unexpected place: in bed.

Professor Ron Hui found the solution in a most unexpected place: in bed.

“I was lying on my bed thinking about this problem,” Professor Hui recalled. “Suddenly I realised that the most stable structure in my house was my bed because underneath the mattress are many mechanical springs, in parallel, supporting the mattress. If some of the springs fail, overall it is still stable. The support is distributed and quite even.”

“Mechanical springs provide support and absorb vibration,” he explained. His eureka moment enabled him to develop a smart grid technology solution to a pressing problem facing the world. Using solar and wind power to generate electricity can help fight climate change by providing a clean and renewable alternative to polluting fossil fuels but the adoption of wind and solar power on a widespread basis has been hampered by the inherent instability of the sun and the wind. To be a viable energy source, supply and demand need to be balanced in real time. Sun and wind power fluctuates and can be easily disturbed – a cloud moving across the sky can shade the sun from a solar panel and cut off the supply within seconds.

Basing his work on the scientific principle of mechanical springs developed by British physicist Robert Hooke in the 17th century and known as Hooke’s Law, Professor Hui worked



The first hardware test of electric spring in 2011 by Professor Ron Hui (left) and Dr Chi Kwan Lee

out the mechanical structure equation and then transformed it into the electrical equivalent that can resolve the instability.

“Now we have several versions of electric springs that can support the power system and at the same time absorb any fluctuation caused by the intermittent nature of wind and solar power,” he said.



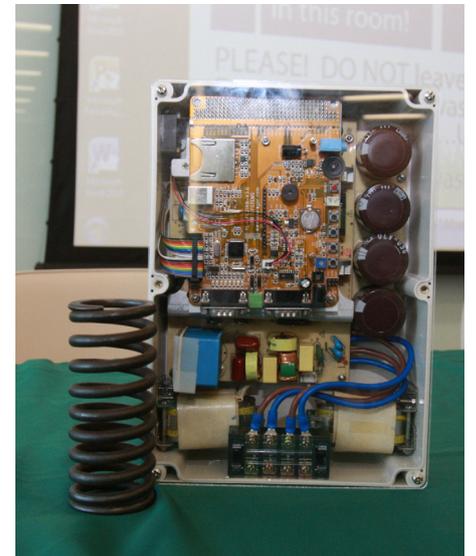
The HKU research team in Electric Spring: (from left) Professor Siew Chong Tan, Professor Felix Wu, Professor Ron Hui and Dr Chi Kwan Lee



The breakthrough was developed jointly by The University of Hong Kong and Imperial College London and will allow power companies to increase the amount of wind and solar power they use by about 20 percent or more while at the same time greatly reducing production of greenhouse gases. The system is now being tested by China Southern Power Grid.

Professor Hui is also working on green energy solutions to power electric cars with wind and solar power.

He is adapting his electric springs technology to provide stable wind and solar power in large multi-storey car parks that power electric cars. The aim is to encourage widespread use of cars powered by wind and solar energy and at the same time decrease the use of climate-damaging petrol or diesel. “Together, they become a complementary solution to drastically reduce greenhouse gases,” he said. 



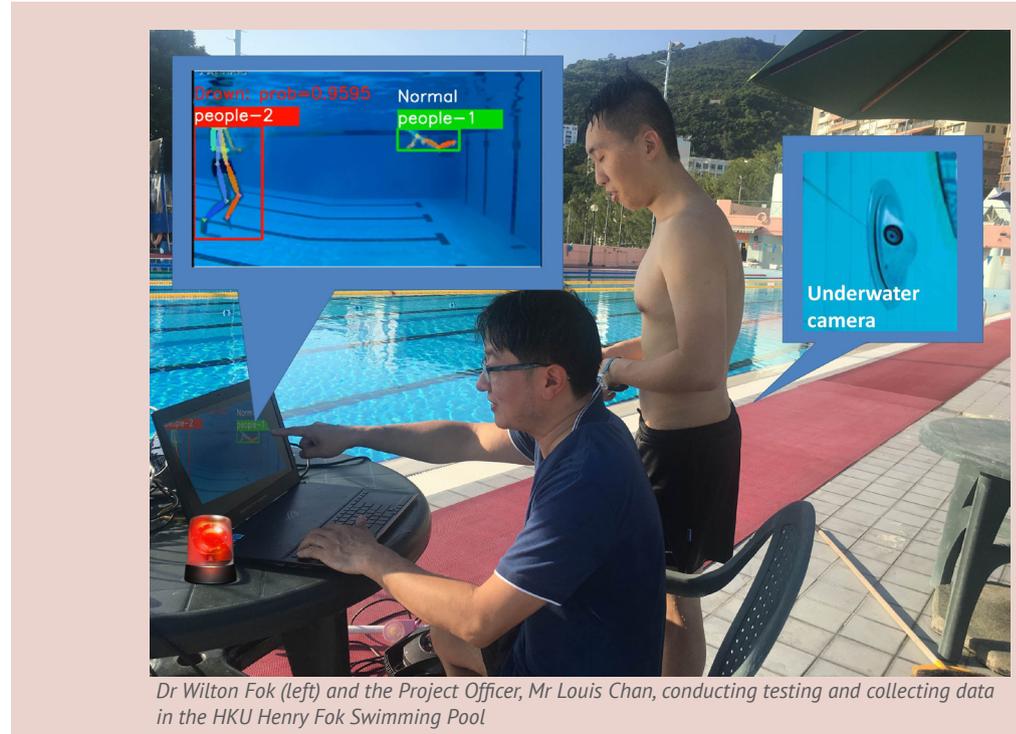
(Right) The electric spring invented by HKU research team and (left) a mechanical spring

Drowning Detection with AI

Swimming pools are usually places for fun and healthy exercise, but they can also be deadly. Even with an observant life guard on duty, swimmers can still get into difficulties underwater or in parts of the pool beyond the lifeguard's field of vision. Underwater cameras can see what is happening, but they can't call attention to a swimmer in difficulty. By studying body movement patterns and connecting cameras to an artificial intelligence (AI) computer, Dr Wilton Fok of the Department of Electrical and Electronic Engineering has devised an underwater pool safety system that reduces the risk of drowning.

Swimming pool safety enhancement by Artificial Intelligence

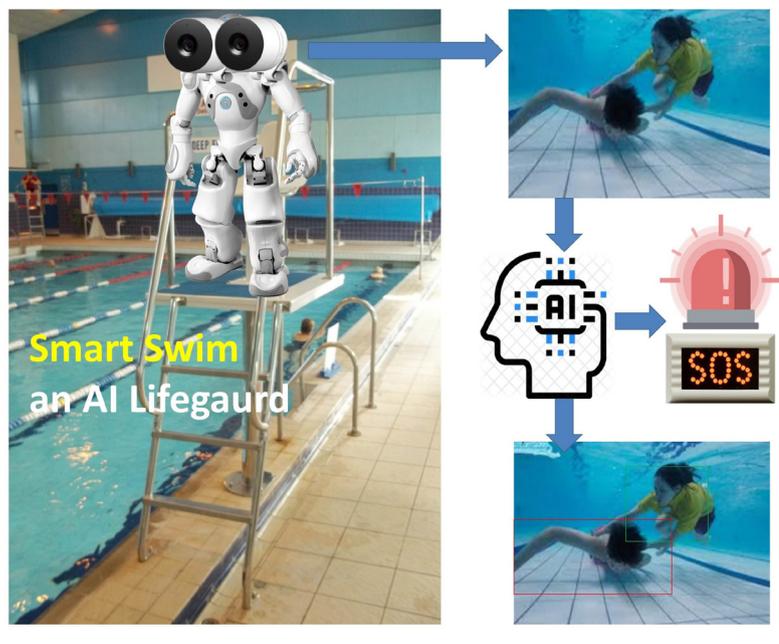
In this project titled "Artificial Intelligence for Drowning Detection and Swimmer Performance Analysis System" funded by the Innovation and Technology Fund for Better Living, 16 cameras are placed around the pool, 12 at different points underwater and four in the ceiling, and are connected to a computer and AI server that uses



Dr Wilton Fok (left) and the Project Officer, Mr Louis Chan, conducting testing and collecting data in the HKU Henry Fok Swimming Pool

a human pose estimation algorithm and deep learning. The cameras are used firstly to record the coordinates of knees, arms, shoulders and elbows in every swimming position. The pictures are then labelled and fed into the computer to teach it about body parts and movement, a process called annotation. Once the computer has amassed enough data, it can

monitor movements in the pool. When the pre-set threshold of a drowning probability is reached – for example, when the computer assesses that the probability of drowning is higher than an adjustable threshold, say 60 percent – an audio alarm is triggered to attract the lifeguard's attention.



also be used for other physical activity monitoring and coaching such as for improving golf and yoga practice. More effective than following an onscreen yoga tutorial, this system can provide a score according to how closely the learner's pose is aligned with the teacher's. It can also count how many calories the learner is using.

Using the same body-mapping techniques, the computer can track and analyse a golfer's swing and then deliver personalised feedback through a robo coach – a virtual on-screen coach.

The system will soon be installed in the pools of two schools and Dr Fok hopes to eventually see the system installed in every swimming pool in Hong Kong. 

The system is not designed to replace a lifeguard or other human monitor, but to act as an additional tool. “It helps the lifeguard to detect the underwater situation where they can't easily observe,” explained Dr Fok.

The primary aim of this innovation is to prevent drowning, but the system also

has other possible applications. As well as identifying problems, the computer can monitor swimming posture to identify differences in the techniques of swimmers as well as the progress and variations in individual swimmers over time, which can help swimmers pinpoint errors and improve their performance. The same equipment can



Dr Wilton Fok (left) and his project team

Making Dreams Come True for Multicultural Language Learners

Getting ahead in life is more difficult for students who do not have a good grasp of the local language. They find it harder to make friends or fully participate in school life. For some, life opportunities are limited in their country of origin, but their language abilities are insufficient for them to realise their dreams of a future in Hong Kong.

Hong Kong's teachers have been grappling with how to teach Chinese to growing numbers of multicultural students. The city's ethnic minority population grew by more than 70 percent from 2006 to 2016. Many teachers have little or no training in teaching Chinese as a second language. With a background in curriculum development in the Education Bureau (EDB), Dr Wai Ming Cheung of the Faculty of Education developed a multi-pronged approach to help teachers meet the needs of multicultural language learners of Chinese.

Teachers design and create these themselves, using words and pictures based on their own schools and students to create a truly effective learning tool that multicultural students can immediately relate to.

Dr Cheung and her team developed the Chinese Character Acquisition Assessment (CCAA) to pinpoint the difficulties that pre-school and primary



Multicultural students meeting the authors (local teachers) of their tailor-made picture book which combines theory and pedagogy

school students were having in learning the language. After intense evaluation of teachers' needs, the team also

developed a two-tiered professional development model to teach teachers how to teach Chinese as a second language. The first tier comprises

professional development talks on how to teach Chinese to culturally diverse student groups, followed by reflection and workshops where teachers practise the new teaching strategies. In observation and coaching, teachers implement what they have learnt in the classroom, while curriculum developers coach them and observe the lessons. Finally, teachers from different schools meet up to share their challenges and best practices. In the second tier, teachers put the theories into practice in their school setting.

A unique outcome has been the production of individual school-based picture books as a teaching aid. Teachers design and create these themselves, using words and pictures based on their own schools and students to create a truly effective learning tool that multicultural students can immediately relate to. The books encourage student learning by including pictures of school sites and facilities, making the learning practical, fun and multi-faceted.

The impact on students' learning has been remarkable. Across 17 partner schools that benefitted from intensive on-site support and 22 schools with flexible support, participating students' total CCAA scores for Chinese character learning rose to 144.05, an increase of 62.24 points. Scores for teachers' Culturally Responsive Teaching Self-

efficacy also rose. The project directly benefitted more than 1,500 students, 183 teachers and 39 schools. Schools' response to the two-tiered model has been overwhelmingly positive with an appreciation score of 87.2 percent.

The team published three books encompassing the knowledge gained and successful strategies learnt from the project, which are now available on EDB's website for all Hong Kong teachers to benefit from them.

Dr Wai Ming Cheung and Dr Sau Yan Hui received the Faculty Knowledge Exchange Award 2019 of the Faculty of Education for the project 'Supporting Multicultural Dreamers and their Dreamkeepers in Culturally Relevant Chinese Language Learning for Social Inclusion'. 



Two young primary school students enjoying role-play with Dr Wai Ming Cheung after reading the picture book

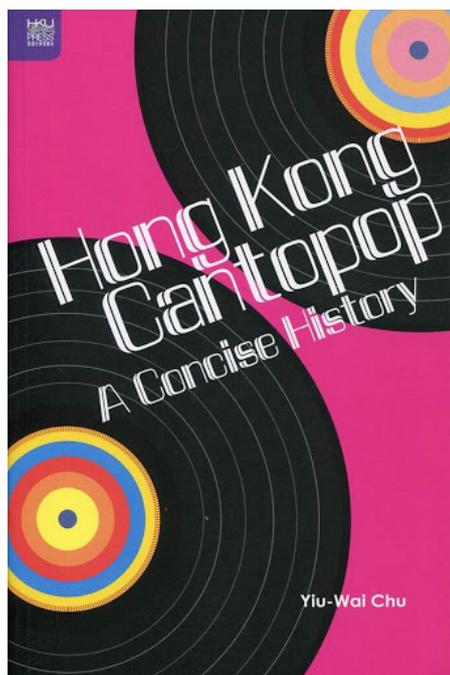


Teachers showcasing their school-based picture books in the territory-wide conference to promote Chinese reading with pleasure



High quality, culturally responsive picture books developed jointly by the HKU team and local teachers to engage multicultural learners' reading interest in Chinese

Preserving the Cultural Riches of Cantopop



"Hong Kong Cantopop: A Concise History" by Professor Stephen Chu, Hong Kong University Press (2017)

The lyrics of Cantopop songs have been a source of fascination to Professor Stephen Chu of the School of Modern Languages and Cultures (Hong Kong Studies) for decades. He believes that popular song lyrics can contain as much cultural richness as any literary works, but he recognised that Cantopop as a music genre was declining in popularity and worried that lyrics of old hits had never been preserved. Starting about 1995, Professor Chu took on the

painstaking task of studying the lyrics by visiting the archives of Radio Television Hong Kong (RTHK) and copying some of the lyrics by hand. Back then lyrics were not easily accessible on the internet. His collection of transcribed lyrics numbers several thousands.

Professor Chu's contributions (to Cantopop studies) earned him "The Spirit of Culture Award" at The 7th Spirit of Hong Kong Awards 2019.

His choice of which lyrics to study changed over time. "Initially, I focused mainly on the literary quality of those lyrics," he said, adding that he believed they could be compared to traditional Chinese poetry. Later, he adopted a more interdisciplinary approach that focused more on "...the relationship between the lyrics and Hong Kong identity and other social issues."

He published the lyric analyses as well as interviews with poets and personal stories in, among others, a Chinese language book whose English name he translates approximately as *The Years are Like Songs – The Poetics of Hong Kong Cantopop*.

Professor Chu's work caught the

attention of local story-telling group Hong Kong Stories who interviewed him on the importance of Cantopop. That led to a series of lectures on the topic in Hong Kong primary and secondary schools, which sparked the interest of a new generation of music lovers. "Some of my students are now teaching Chinese in secondary schools and they have started using Cantopop lyrics," he said, explaining that they use the lyrics to introduce literature and classical Chinese poetry to students. "Students are very much inspired by the lyrics."



Professor Stephen Chu (left) and his nominator, Ms Tracy Ho, Founder of the Hong Kong Stories, at The 7th Spirit of Hong Kong Awards 2019



(From left) Mr Manfred Wong, Mr Kwok Kwong Cheng and Professor Stephen Chu at the Book Fair 2015 Press Conference

Professor Chu's work reached a broader audience through a collaboration with the Hong Kong Book Fair 2015, which featured an exhibition in the Fair's art gallery entitled "Lyrics that Moved a Generation: Half a Century of Cantopop" and he delivered a talk on the relationship between Cantopop and Hong Kong identity. The fair attracted around one million visitors that year, many of whom visited the exhibition.

In 2017, Professor Chu published *Hong Kong Cantopop: A Concise History*, a book charting the genre across four decades

and connecting Cantopop to the rise of a Hong Kong identity. The book was lauded by Jeroen de Kloet, a Professor of globalisation studies at the University of Amsterdam, as "... a milestone in the study of East Asian popular cultures."

In 2019, Professor Chu's contributions earned him "The Spirit of Culture Award" at The 7th Spirit of Hong Kong Awards 2019 organised by the *South China Morning Post*. The award honours those who celebrate and preserve Hong Kong's culture and traditions. [天](#)



Professor Stephen Chu (second from left) at the Book Fair 2015 Press Conference

Expanding Access to Financial Protection

In a boost for investor protection, the Hong Kong Financial Dispute Resolution Centre (FDRC) adopted new rules in January 2018 that enabled consumers to claim more and benefit from a longer window for lodging claims. The new rules have led to many more consumer claims being resolved and have also strengthened the FDRC's role by enhancing access to its services and increasing the amounts claimable. These policy changes have also enhanced Hong Kong's reputation as a global financial centre.

Justice should rely on universal participation and should be accessible to all.

Research conducted by Professor Shahla Ali of the Department of Law directly impacted the FDRC's 'Proposal to Enhance the Financial Dispute Resolution Scheme', which was launched in October 2016, and the FDRC's consultation conclusions, which were published in August 2017. In these conclusions, the FDRC adopted three key reforms. The first was to increase the maximum claimable amount to

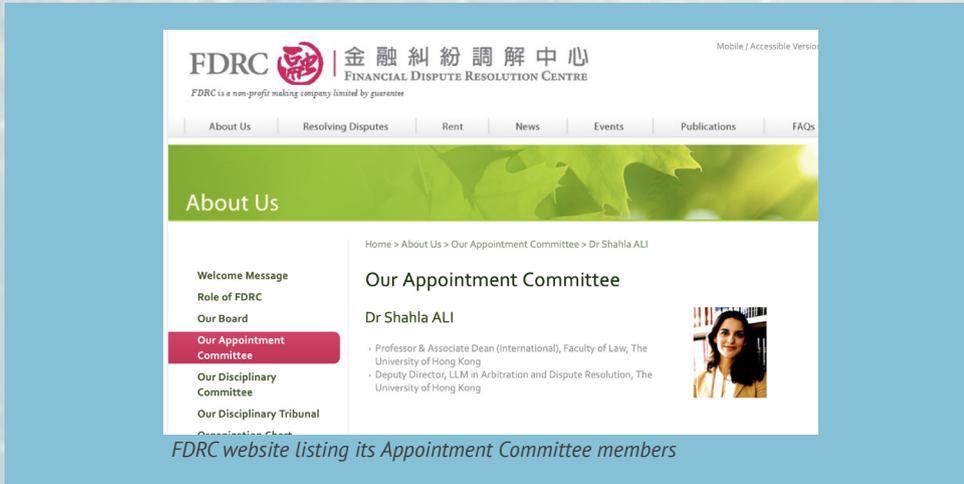
HK\$1,000,000 (up from HK\$500,000 in the original rules). The second was to extend the time limit for lodging a claim to 24 months (up from 12 months) from the date of purchase or the date of first knowledge of the loss, whichever is later. Thirdly, the FDRC expanded its coverage to small and medium-sized enterprises (SMEs) that have a relationship with financial institutions.

Professor Ali proposed six principles for reforming financial dispute resolution

following the global financial crisis of 2008, which saw many investors in Hong Kong and beyond suffer significant losses, many of which were attributed to a lack of transparency in the financial system and limited protection for investors. The principles were independence, impartiality, accessibility, efficiency, fairness and equity emerging from the view that justice should rely on universal participation and should be accessible to all.

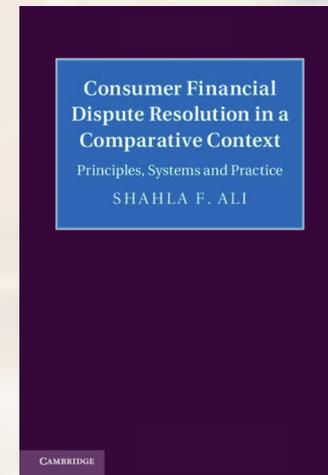


Consultation with members of the financial sector, banking industry and academics at Renmin University of China



amendments have made Hong Kong's financial dispute resolution mechanism amongst the global leaders in the provision of such services and have alleviated pressure on the courts by allowing more individuals to access consumer financial dispute resolution services.

Professor Shahla Ali of the Department of Law received the Faculty Knowledge Exchange Award 2019 of the Faculty of Law for the project 'Increasing Access to Consumer Financial Dispute Resolution in Hong Kong'.



"Consumer Financial Dispute Resolution in a Comparative Context: Principles, Systems and Practice" by Professor Shahla Ali, Cambridge University Press (2013)

"In 2008, there was no systematic mechanism to handle consumer financial claims against banking institutions in many jurisdictions including Hong Kong," said Professor Ali. "Retirees and others had to search for recourse. This was true in many other parts of the world. Why not learn from one another about the principles at play, share what is working and build stronger institutions?"

Her research covered seven jurisdictions including Hong Kong, Mainland China, the United Kingdom and the United States, and was published as a book

in 2013 by Cambridge University Press entitled *Consumer Financial Dispute Resolution in a Comparative Context: Principles, Systems and Practice*. The book was lauded for its significance, methodology and impact. Professor Ali was appointed as a member of the FDRC's Appointments Committee following the book's publication.

Other changes at the FDRC broadened its functions and widened the criteria for its mediation and arbitration services, which increased the number of consumers who could benefit from the FDRC's interventions. These

Sustainable Solutions for Hong Kong's Villages

Hong Kong is one of the world's greatest cities, famous for its gleaming skyscrapers, dramatic harbour setting and dynamic lifestyle.

Less well-known is that there are also 600 villages in Hong Kong, mostly in the New Territories and outlying islands. Over the decades many have been abandoned or become rundown as villagers moved overseas and young people left to seek better jobs.

Sustainability is trying to use less resources, achieve more for everybody.

One of the more established ones is Lai Chi Wo, a Hakka village in a remote valley in north-eastern New Territories,



Lai Chi Wo, a Hakka village in a remote valley in north-eastern New Territories

which is only accessible by boat or a 2-hour hike. But it has still suffered from years of neglect after many villagers gave up farming and migrated to the UK in the 1950s.

As part of an ongoing project through the Policy for Sustainability Lab under the Centre for Civil Society and Governance at The University of Hong Kong since 2013, a programme supported by HSBC, villagers are being encouraged to return to Lai Chi Wo to revitalise the village so that it will survive for future generations.

Dr Winnie Law, Deputy Director of the Centre, said the key to the success of Lai Chi Wo's revitalisation is the closely bonded village community as the people have a strong sense of belonging and stewardship, willing to help look after the natural environment and pass down their culture and traditions.



Professor Wai Fung Lam (right), Director of Centre for Civil Society and Governance, and Mr Wai Yip Tsang, village representative of Lai Chi Wo, at Lai Chi Wo Cultural Hub



As part of an ongoing project through the Centre for Civil Society and Governance, the project team is helping Lai Chi Wo to become more sustainable by reactivating their farmlands and revitalising the village

“We are trying to reactivate the farmland using eco-friendly methods, low carbon farming methods,” Dr Law said. “And what’s also very important is to help them to set up a collective management system, where small farms, when they are together, they can have shared resources to use.”

And in 2017, the Policy for Sustainability Lab launched a new phase of the revitalisation work with a range of socio-economic models, including eco-production and co-creation of the community, to help Lai Chi Wo become a sustainable and resilient village.

“Sustainability is trying to use less resources, achieve more for everybody,” Dr Law said.

As a measure of the success of the project, it has been recognised by the United Nations Development Programme as one of the best nature-based solutions to achieve sustainability, and Lai Chi Wo has been listed in *The Lonely Planet* as one of the “must visit” destinations in Asia. The project was mentioned in the Policy Address 2017, the top-level policy directive in Hong Kong, as an exemplar of successful rural revitalisation.

Some of the principles developed from Lai Chi Wo are now being used in five other villages in Hong Kong, including the nearby Mui Tsz Lam, and if they prove to be successful, Dr Law hopes to create a feasible model and replicate it in other Hong Kong villages, and possibly elsewhere. 



Coffea and non-GM papaya cultivated in Lai Chi Wo



Watch the KE video on this project:
<https://www.ke.hku.hk/story/video/sustainability>

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Entrepreneurship Series

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