Knowledge Exchange

NEWSLETTER

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Waging War Against Tobacco

Most people in Hong Kong may take smoke-free restaurants, indoor workplaces and public indoor places for granted. Many might have forgotten that we used to be passive smokers in smoky homes, workplaces and restaurants, until 2007.

Individuals and societies have benefited from the research and advocacy work of Professor Tai Hing Lam, Sir Robert Kotewall Professor in Public Health, and his colleagues on the harms of smoking and second-hand smoke and the benefits of tobacco control. In 1998, he was awarded a World Health Organisation (WHO) Commemorative Certificate and Medal 'for achievement worthy of international recognition'.

Over the past three decades, their research and advocacy with others (Professor Judith Mackay and Hong Kong Council on Smoking and Health [COSH]) have contributed a lot to higher tobacco taxes and banning of smoking in all indoor workplaces, restaurants and bars in Hong Kong, and a fall in local smoking rates to the lowest in the developed world (about 10 per cent of adults and about 2 per cent of secondary school students). The accompanying decline in age standardised rates of new cases and deaths from cardiovascular diseases and cancers has resulted in Hong Kong's longest life expectancy in males and females.

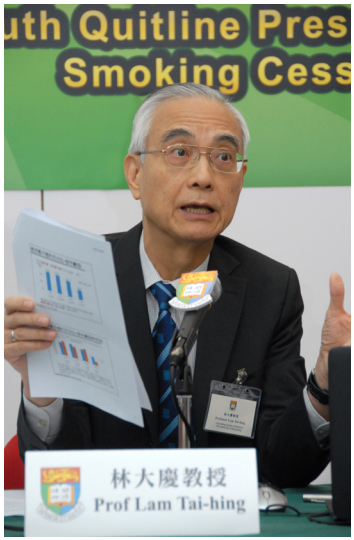
The findings of his team (including Professor Sarah McGhee, Dr Daniel SY Ho and the late Professor AJ Hedley) that smoking and second-hand smoke killed about 6,920 people and cost HK$5.3 billion to lost productivity and healthcare expenditure in Hong Kong in 1998 have been frequently cited. Following COSH's 2006 publicity campaign using their result that second-hand smoke kills 1,324 Hong Kong people a year, the Legislative Council passed the law expanding smokefree areas greatly from January 2007. The studies of Professor Lam and COSH have shown strong support from Hong Kong people for raising tobacco tax substantially, and that the tobacco industry has consistently exaggerated the problem of illicit cigarettes.

It's never-ending work but we advocate for a 'tobacco endgame 2027' towards a smokefree Hong Kong in about 10 years.

Their research on passive smoking has also been globally influential, demonstrating that people who never smoke have higher risks of lung cancer, heart disease, stroke and other diseases from other people's smoke. The evidence supports causation, not just association.

Increasing efforts have also been directed towards helping smokers to quit. About 15 years ago, Professor Lam and his former colleague Professor Sophia Siu Chee Chan, currently HKSAR Secretary for Food and Health, were the first to develop and test smoking cessation interventions in this region. They have shown through randomised controlled trials that even the simplest actions, such as briefly advising patients to quit, can work. They have trained more than a thousand smoking cessation counsellors and ambassadors, and set up pilot or demonstration smoking cessation clinics in Hong Kong and Mainland China to show the cost-effective ways to help people quit. Their pioneering Youth Quitline has helped many young smokers quit smoking. The trial evidence and successes have resulted in government allocating more resources to smoking cessation services. Professor Lam and colleagues in School of Nursing (Dr William HC Li, Dr Kelvin MP Wang and others) have started publishing results from innovative research at smoking hotspots (outdoor areas where smokers gather to smoke).

"WHO warns that one out of every two smokers who continue to smoke will be killed prematurely by tobacco. Recent evidence, including that from our research, shows that the risk could be up to two out of three. Hong Kong has 600,000+ smokers so at least 300,000 people will be killed by tobacco if they don't quit," Professor Lam said. "We will continue our research to support stronger tobacco control measures and evaluate the impact. It's never-ending work but we advocate for a 'tobacco endgame 2027' towards a smokefree Hong Kong."



Professor Lam reporting the achievements of Youth Quitline at a press conference held on November 10, 2016

WHO Commemorative Certificate and Medal awarded to Professor Lam

A Waterproof Solution

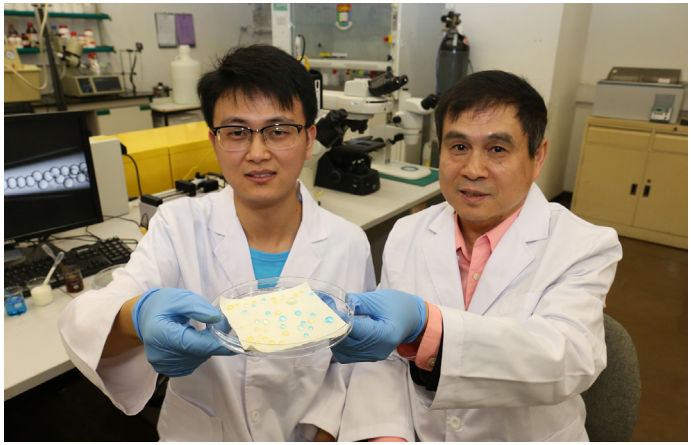
HKU engineers have created a novel solution to make surfaces liquid-repellent that was inspired by an insect and has potential applications in clothing, electronics, water vessels, buildings and a whole host of other fields.

The work, by Professor Liqiu Wang of the Department of Mechanical Engineering and his PhD student, Mr Pingan Zhu, uses mechanical engineering to solve a problem that has typically been solved through chemical engineering.

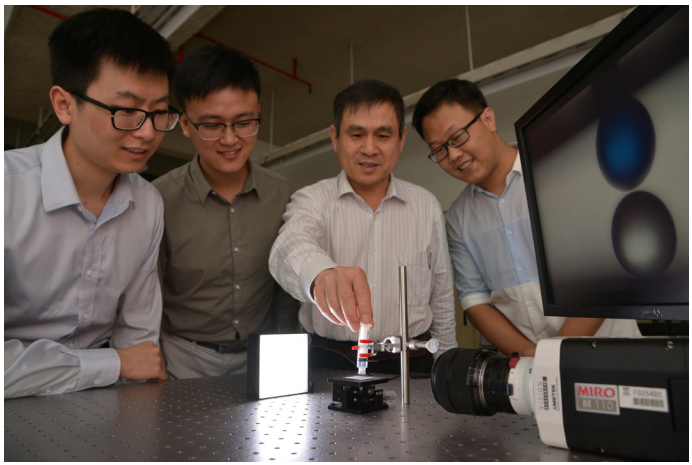
"The chemical method can be damaging to the environment. We use a physical method instead that creates very small physical structures at the microscale to get a liquid-repelling performance," Professor Wang said.

Their discovery also has a number of other advantages. It is able to repel both water and oil (and every liquid in between), whereas the current technology can only do one or the other. It can be produced to a large scale at the very cheap price of about HK$1 per square meter, versus HK$1,000 for conventional materials. It is also 21 times stronger than conventional, chemical-based technology.

The discovery's design is based on the cuticles of the springtail, an insect that lives in soil in habitats that experience heavy rains and floods. The cuticles are strong enough to resist friction from soil particles while also repelling liquids.



Professor Liqiu Wang (right) and Mr Pingan Zhu (left) showcase the liquid-repellent surface they innovated



Professor Liqiu Wang (third from left) and his team demonstrate droplet manipulation using liquid-repellent materials

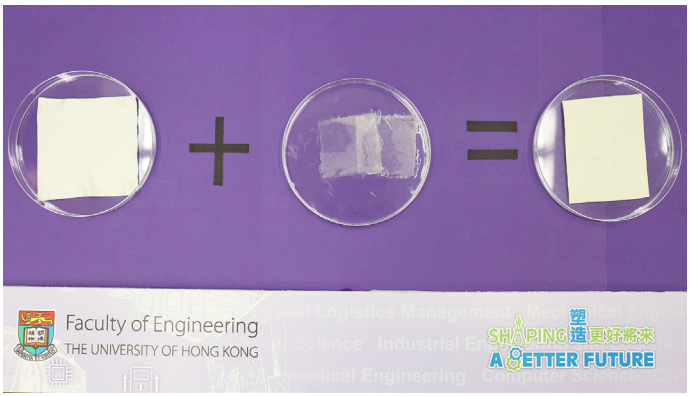
A major international clothing maker and a major producer of coatings for electronics are interested to test possible applications for their products.

Professor Wang and his team replicated these features into microfluidic droplets that can be applied to surfaces. This method can ensure uniformity of coverage and allow for better control by manipulating the size, structure and composition of the droplets.

The discovery was published in *Nature Communications* last year and industrial manufacturers have taken note. A major international clothing maker and a major producer of coatings for electronics are interested to test possible applications for their products.

"We are now working together with them to make real products, hopefully within the next two years," Professor Wang said. "Until now, the work has just been in my laboratory but for real industrial production, we need to do large-scale testing with them."

The hope is that the discovery will have much spring in its tail, opening up the possibility of such things as clothing that does not need to be washed, self-cleaning buildings, and vessels that can travel much more quickly through water by reducing the drag caused by friction.



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

Transparent Success Heralds New Era for Displays

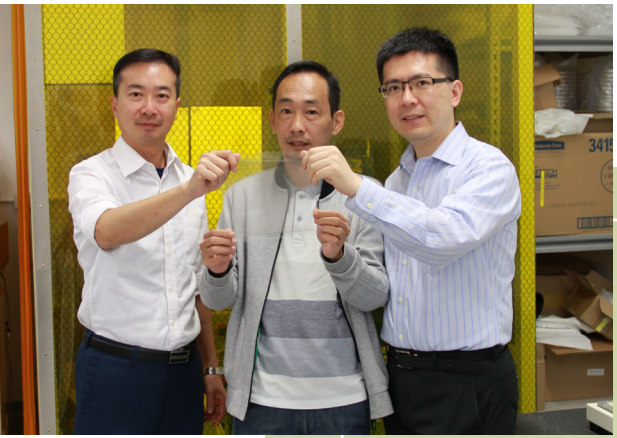
The development of a transparent conductive film based on a material and manufacturing process developed at HKU is attracting keen interest from leading firms that want to use it in the next generation of displays, among other products.

This new metal-mesh transparent conductor film (TCF) was developed by Dr Wen-Di Li in 2015, who then partnered with his colleague in the Department of Mechanical Engineering, Dr Tony Shien-Ping Feng, to apply TCF to dye-sensitised and perovskite solar cell technologies, which makes the solar cells more flexible and efficient.

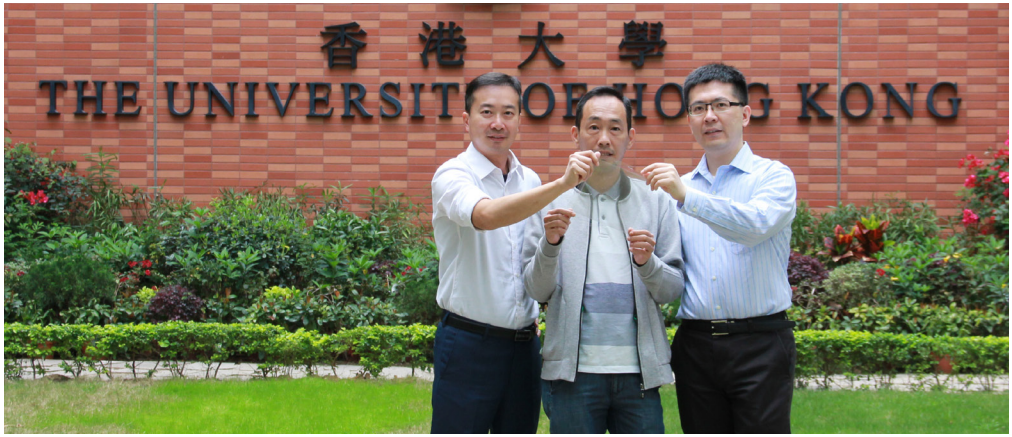
They have set up a start-up, Flectrode Technology Ltd, which was initially supported by TSSSU@HKU (Technology Start-up Support Scheme for Universities), and later received sizeable private investment, to market the flexible solar cell devices for use in consumer electronic products. In addition to solar cells, Flectrode actively explores a broad range of end products, among which the first target is the display market, where there have been promising results.

Flectrode's new TCF has been found to be far more effective than the current TCFs used in displays, which are based on indium tin oxide (ITO). It is cheaper to produce and has 100 times better conductivity than existing technology, meaning it wastes less electricity in power transmission. This not only is of obvious advantage in solar cells but also improves displays by making touchscreens more responsive.

The new TCF also can improve the photovoltaic efficiency in solar cells, so more electricity is produced from light, including artificial light. Moreover, it is flexible whereas ITO is rigid, which makes it potentially applicable to a wider range of products.



Every display supplier has been surprised by our product. The feedback we are getting is that our product is the best out there to replace indium tin oxide.



Dr Tony Shien-Ping Feng (left) and Dr Wen-Di Li (right) of the Department of Mechanical Engineering, and Mr Kent Chung, Flectrode's investor, holding a piece of prototype metal-mesh transparent electrode manufactured through the process developed at HKU

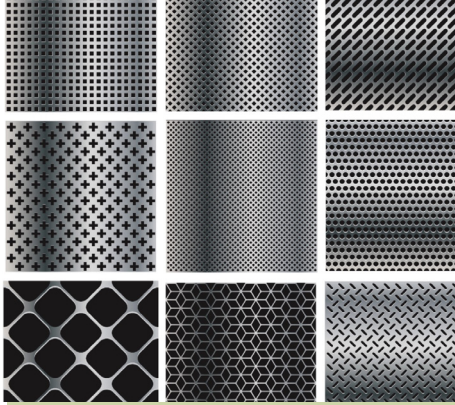
Flectrode is currently doing prototypes for major display manufacturers in Mainland China and has been singled out as one of the major technology companies in Xiamen, where its factory is based. It plans to launch a pilot line this year.

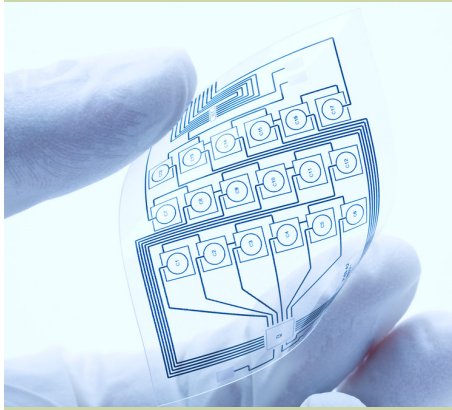
"Every display supplier has been surprised by our product. The feedback we are getting is that our product is the best out there to replace ITO," Mr Kent Chung, Flectrode's investor, said with full excitement.

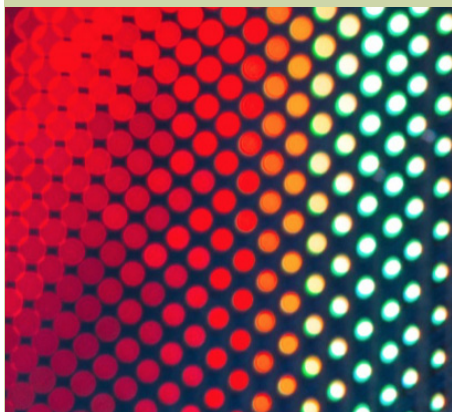
Dr Li has also developed an innovative manufacturing process that enables large-scale production of metal-mesh TCFs at 2-3 times lower cost than conventional vacuum-based material deposition methods.

"Dr Feng and I have worked together because the TCF substrate itself has very limited value without including it in a product. Only in products can you have better commercial value and more impact," he said.

Apart from displays, smartphones are an obvious potential target for the invention. Dr Li already has a track record working with Huawei to develop large-scale manufacturing of a component he and his team designed to offer unique control over the illumination and collection of light using microstructures.







Disasters of the Past as Powerful Lessons for Today

The adage that the past informs the present came to life for historian Professor J. Charles Schencking on March 11, 2011. At that time he was putting finishing touches to his highly-regarded study of the 1923 Great Kantō Earthquake for Columbia University Press. On that day, Japan was struck by a 9.0 magnitude earthquake and tsunami. Historical issues he had been writing about suddenly became current again.

As the disaster unfolded, people wondered what it would mean for Japan's future. "People asked, 'should we rebuild destroyed communities? If so, how should we rebuild them? Should it be a government-led, top-down exercise or a series of bottom-up community inspired initiatives?' Officials also debated how best to deploy humanitarian assistance," he said. These questions were not unique to 2011. Many similar questions had been asked in 1923. "I thought to myself, there is a real need for contemporary policy-makers to engage with what has happened before."

While his scholarly book provided historical perspective, he was also aware of the need to engage with people in other ways to promote broader understanding.

His first step in that direction was to upload images of his own materials, including more than 500 photographs, artefacts and maps from the 1923 earthquake, to a specially-created website (www.greatkantoearthquake.com/) that was accessible to the public.

Exhibition materials at 'Aftershocks: Experiences of Japan's Great Earthquake'

I thought to myself, there is a real need for contemporary policy-makers to engage with what has happened before.

"Disasters," he said, "generate powerful and emotive images and that really motivated me to build the website." The site has received more than 250,000 visits since its launch in December 2013. Following on from that, a public exhibition of the artefacts and images was held at the University of Melbourne, where Professor Schencking worked before coming to HKU. It garnered English and Japanese-language press coverage and attracted thousands of visitors. He gave a keynote address at the opening.

After a 7.0 magnitude earthquake struck Kumamoto Prefecture in April 2016, the Discovery Channel contacted Professor Schencking and Dr Janet Borland, an HKU assistant professor in Japanese Studies researching the impact of disasters on children and local communities. They were asked to assist with a documentary on disaster preparedness in Japan. Its initial broadcast attracted more than 2.5 million viewers.

"Japan today is one of the great leaders in disaster mitigation and preparedness," he said. "It wasn't always the case, but from 1923 the government began taking clear policy decisions to make society better prepared for the next earthquake. We can learn a lot by looking at the long history of disaster preparedness measures, both successes and failures."

Professor Schencking said his research has been positively affected by his engagement work on the Kantō earthquake because he now always thinks of how to reach a wider audience. "The humanities can have real life impact today, as well as contribute to understanding the past," he added.

Professor John Charles Schencking of the School of Humanities (History) received the Faculty Knowledge Exchange Award 2017 of the Faculty of Arts for the project 'The Great Kantō Earthquake and a new understanding of responses to natural disasters'.

Professor J. Charles Schencking and Dr Janet Borland (third and fourth from left) at the photo exhibition held in April 2017 about the Mitsubishi Young Leaders Tour of Japan, a field trip initiated by Dr Borland for students to explore post-3.11 earthquake and tsunami reconstruction initiatives

Speaking Up for Women and Ethnic Minorities

Fair and equal treatment of women and ethnic minorities is too frequently unrealised in Hong Kong, but work by Associate Professor Puja Kapai Paryani in the Faculty of Law is helping to shed light on some of the ways in which society can redress the balance.

Since 2012, Ms Paryani has compiled strong evidence on the extent of discrimination, unconscious bias and unfair practices in Hong Kong, which she has presented to the government and international organisations. She has also conducted training sessions for non-governmental organisations, corporations and the Equal Opportunities Commission on these issues, and brought together a wide range of stakeholders for roundtable discussions on the plight of domestic workers, ethnic minority children and the victims of sexual violence.

These efforts have produced tangible improvements, such as a pledge by the government to officially disband the designated schools policy, improve school admission policies, and provide additional resources for Chinese language education for ethnic minorities after Ms Paryani's research showed they were marginalised in education at every stage and effectively segregated from ethnic Chinese students in public schools; and a decision by the Department of Justice to install screens in court from behind which victims of sexual violence can testify, following lobbying by Ms Paryani and RainLily, a centre for victims.

Her work has also promoted discussion on issues that previously were ignored. After she produced a report on the status of ethnic minorities from 1997-2014, the Legislative Council set up a special sub-committee on the rights of ethnic minorities. Her research on sexual and domestic violence against ethnic minority women also led to a special sub-committee to receive input from various stakeholders on this problem.

Her oral submissions contributed to the remarks made in the Concluding Observations issued by the United Nations' Human Rights Committee and Committee on the Rights of the Child in 2013 on Hong Kong's international human rights obligations.

People talk about gender-based discrimination or violence, or racial discrimination, but what my work highlights is that people are more than just a single identity holder. I want to raise awareness that we inhabit multiple identities and when you locate and recognise the multifaceted identities all together in one person, that creates distinct vulnerability and disadvantage, which needs to be understood.

Ms Puja Paryani (third from left) was part of the Hong Kong delegation to United Nations Human Rights Committee in March 2013

"People talk about gender-based discrimination or violence, or racial discrimination, but what my work highlights is that people are more than just a single identity holder. We inhabit multiple identities and when you locate and recognise the multifaceted identities all together in one person, that creates distinct vulnerability and disadvantage, which needs to be understood. We cannot develop effective laws or policies unless we can understand the populations we serve. I want to raise awareness about this across the societal, professional, governmental and non-governmental sectors," she said.

Ms Puja Paryani (right) and Dr York Chow, former Chairman of the Equal Opportunities Commission (EOC), at the research presentation on Gender-Based Violence held by EOC in November 2015

Ms Paryani has also encouraged sensitivity training for social workers, NGOs, healthcare workers and the police so they can deal more sensitively with situations involving ethnic minorities and women – for instance, by highlighting the importance of making use of translation services, which are often bypassed to save time. She also played an instrumental role in helping HKU identify more gender-friendly policies in her work as Chair of the Equal Opportunity Unit's Working Group on Race, Family Status and Gender Identity.

"I'm gratified that there has been a change in culture," she said. "The government moved from saying there was no race discrimination problem in Hong Kong, to allocating resources to remedy what they now acknowledge as unacceptable patterns of racial marginalisation. NGOs are also now inspired to do their own research in this neglected area, monitor policies and call on the government to do better."

Ms Puja Kapai Paryani of the Department of Law received the Faculty Knowledge Exchange Award 2017 of the Faculty of Law for the project 'Plugging the Justice Gap for Minorities under the Law: Applied Intersectionality Research and Substantive Equality'.

Ms Puja Paryani (left) at the research presentation on Help-seeking Behaviours of Ethnic Minority and Immigrant Victims of Domestic Violence in Hong Kong held by the Hong Kong Council of Social Service in March 2018

Citizen Scientists Aid Global Forestry Research Effort

Hundreds of 'citizen scientists' have helped HKU scholars to count and identify 81,000 trees in a 20-hectare plot in Tai Po, as part of an international programme to deepen understanding of the diversity and sustainability of forests.

The project was initiated in 2011, when HKU joined the Forest Global Earth Observatory (ForestGEO), a programme that originated in Panama in the 1960s and now operates in 24 countries on six continents. Every five years, each country counts, measures and categorises trees within a set plot to provide scientists with long-term data for local and international studies. Local project partners include Kadoorie Farm and Botanic Garden and the Society for Community Organization. The Hongkong Bank Foundation funded the project in the first four years.

Dr Chi Hang Hau of the School of Biological Sciences is leading Hong Kong's contributions. He firstly organised forest education programmes for more than 2,000 people including green group leaders, journalists, corporate staff of HSBC, interns from eight local universities, secondary school teachers and students, and the general public, and produced training and teaching materials for geography, liberal studies and biology under the New Senior Secondary curriculum. They were trained on climate change, forest dynamics and sustainability topics.

From these groups, about 360 volunteers were recruited to help measure and count every tree and stem that was larger than one centimetre in diameter at 1.3 meters or higher at the Tai Po plot. These citizen scientists also identified 173 tree species under the supervision of HKU scientists.

"Such wide engagement of community stakeholders and the general public in scientific forest and climate change research has been an effective way to nurture their environmental stewardship," Dr Hau said.

A team of secondary school students practising tree survey in the ForestGEO plot under the supervision of the research team

Citizen scientists in action: a group of volunteers conducting tree survey in the ForestGEO plot at Tai Po Kau

The HKU research team celebrating the tagging of the last and 81,021st tree in the ForestGEO plot in Tai Po Kau on December 8, 2015: (from left) Lett Lee, Ray Chu, Bond Shum, Shirley Mak, Helen Lo and Wai Ling Lam

Such wide engagement of community stakeholders and the general public in scientific forest and climate change research has been an effective way to nurture their environmental stewardship.

The survey was completed in 2015. With the Agriculture, Fisheries and Conservation Department's support, the 20-hectare forest observatory plot at Tai Po Kau Nature Reserve has become a permanent site for education and training and long-term forest biodiversity monitoring.

"The data can also be used to decide how to offset carbon by calculating how much carbon is absorbed by different forests in the world," Dr Hau said.

The training packages developed by the project team were endorsed by the Education Bureau, and many teachers are using the materials for teaching geography, liberal studies and biology.

Dr Chi Hang Hau of the School of Biological Sciences and his team members in the Faculty of Social Sciences, Dr Winnie Wai Yi Law, Ms Joyce Wan Chi Chow, Mr Ryan Siu Him Leung, Miss Vivian Hoi Shan Leung, Miss Sianna Si In Yiu, Mr Kimchi Wing Fung Lo and Miss Shirley Yuen Ling Mak, received the Faculty Knowledge Exchange Award 2017 of the Faculty of Science for the project 'Global Forest Observatory: Public Involvement and Training in Scientific Research in Hong Kong'.

A secondary school teacher measuring wind speed in the ForestGEO plot in the Geography module training workshop

Dr Stuart Davies (principal trainer), Director and Frank H. Levinson Chair, Senior Staff Scientist, ForestGEO, Smithsonian Institution, demonstrating the tree survey protocol in the field in the ForestGEO training workshop on June 24, 2011 at Shek Kong Centre, HKU

Dr Billy Hau introducing the research protocol in the ForestGEO training workshop on June 24, 2011 at Shek Kong Centre, HKU

KE Excellence Award 2017

Warm congratulations are extended to Professor Paul Siu Fai Yip and his team members, Dr Yik Wa Law and Dr Qijin Cheng, of the Hong Kong Jockey Club Centre for Suicide Research and Prevention, Faculty of Social Sciences, who received the Knowledge Exchange Excellence Award 2017 for their "Public Health Approach to Suicide Prevention".

(from left) Dr Qijin Cheng, Dean of Social Sciences Professor William Hayward, Professor Paul Siu Fai Yip and Dr Yik Wa Law

Led by Professor Yip, the Centre uses a public health approach advocated by the World Health Organisation for suicide prevention that involves multi-layer intervention: indicated, selective and universal. They have worked with community stakeholders to launch community based suicide prevention programmes. With support of the Coroner's Court, they have developed the most comprehensive surveillance and monitoring system of suicides using Coroner's court data. They have done vigorous psycho-autopsy research in identifying risk and protective factors for suicidal risks. With the support of donors and government funding, they have been testing good practice models including positive mental work for school children, restriction of means of suicide, social media engagement with vulnerable youth, and knowledge exchange with and for the community.

All the suicide prevention work of the Centre is evidence-based and empirically validated, and the Centre has become a knowledge hub for suicide prevention locally and internationally. Their work has reduced the myth of suicide and improved awareness of mental health in the community. The quality of suicide news reporting has significantly been changed to avoid copycat effect. Combined with the concerted effort in the community, the suicide rate of Hong Kong has gone down from its historical high 18.8 per 100,000 in 2003 to estimated 12.6 per 100,000 in 2016, which is an impressive 36.9% reduction.

Watch the KE video on their project:
https://www.ke.hku.hk/story/video/CSRP

The university-level KE Excellence Award was introduced in 2015-16 to recognise the significant impact that our academic staff had made to benefit society.

HKU Three Minute Thesis (3MT®) Competition 2018

The 3MT Competition is an academic competition that challenges research postgraduate students to explain their research within 3 minutes to a general audience, using only one static PowerPoint slide. The 3MT was developed by The University of Queensland, Australia in 2008. The HKU 3MT Competition has been an annual event jointly organised by the Graduate School and the Knowledge Exchange Office since 2011.

This year 23 final-year MPhil and PhD students participated in the HKU 3MT Competition held on March 7, 2018. The range of topics is again fascinating: from managing swallowing difficulties, novel medical device for cancer patients, unraveling the hidden code in Leukemia, to international humanitarian assistance to Japan following the 3.11 disaster, and even the making of a Soviet San Francisco. The winners are:

Champion and People's Choice Award Winner
Ms Mei Li Khong
PhD candidate in the Li Ka Shing Faculty of Medicine
'Too Many P-s Spoil the Protein'
(Primary Supervisor: Dr Julian Alexander Tanner)

1st Runner-up
Ms Jasmeen Kaur Sethi
PhD candidate in the Li Ka Shing Faculty of Medicine
'The Ovarian Cancer Games: Catching HNF-1β targets'
(Primary Supervisor: Professor Annie Nga Yin Cheung)

2nd Runner-up and Online People's Choice Award Winner
Ms Pang Chong
MPhil candidate in the Faculty of Arts
'Altruism or Opportunism: International humanitarian assistance to Japan following the 3.11 Disaster'
(Primary Supervisor: Professor John Charles Schencking)

Videos on the presentations of the awardees and finalists can be viewed on our 3MT website: www.ke.hku.hk/hku3mt/

Finding Experts

The **HKU Scholars Hub** is the University's online expertise directory, which makes HKU researchers and their research visible. It provides an expert finder for businesses, industries, social enterprises, the public sector, and interested student applicants to find HKU experts for contract research, consultancies, and postgraduate student supervision etc.
Please visit the HKU Scholars Hub at https://hub.hku.hk/.

Tech Ready

For a complete list of HKU technologies that are currently available, please visit: http://www.tto.hku.hk

Entrepreneurship Series

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