Knowledge Exchange

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NEWSLETTER

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Hot Weather Relief for Labourers

Professor Steve Rowlinson (left) and Mr T.C. Chew, Projects Director of the MTR Corporation, on site together

Hong Kong summers can be brutal for most of us, but for construction workers the high temperatures and high humidity are downright dangerous.

Heat stress, which exhibits as anything from simple fatigue to heart attacks, has been a problem on construction sites. But the work of Professor Steve Rowlinson and his team in the Department of Real Estate and Construction is helping to improve the situation.

The team developed a model for dealing with heat stress based on on-site environmental measurements, such as temperature, sun exposure, humidity and wind speed, and measurements of workers' physical health such as heart rates, blood sugar levels and blood pressure. Their model recommended morning and afternoon rest breaks in addition to lunch time and the provision of shelter and access to water for workers at any time.

The model was incorporated with input from other sources into updated heat stress guidelines for workers that were adopted by the Construction Industry Council (CIC) in 2013. "The past guidelines were not scientific and they were not restful on the body," Professor Rowlinson said. "Our work has been able to scientifically plot the points at which heat stress becomes a dangerous issue and propose how to avoid that."

Professor Steve Rowlinson (left) received the Golden Helmet Award for safety leadership in 2015 from the CIC and Lighthouse Club (HK)

Sheltered rest areas, ventilators, unlimited supplies of potable water and promotional campaigns – are now commonplace on construction sites. "Workers have much better welfare treatment than they ever did in the past."

He received the Golden Helmet Award for safety leadership in 2015 from the CIC and Lighthouse Club (HK), but his work did not stop there. He also assessed the impact of the revised guidelines over two consecutive summers after their implementation, with support from the KE Fund.

This involved presentations and discussions with more than 250 construction workers, supervisors and managers on their awareness of the guidelines, workers' needs, and the sharing of views and practices. A report on that project was completed last summer.

"We found that the mitigation hardware recommended by the guidelines – such as sheltered rest areas, ventilators, unlimited supplies of potable water and promotional campaigns – are now commonplace on construction sites," he said.

Moreover, some companies have gone much further. Major players, such as the Mass Transit Railway Corporation and Gammon Construction Limited, have implemented health checks of their workers. "This is a significant change from 10 years ago when no health checks were done," he said. "Workers have much better welfare treatment than they ever did in the past."

The achievements are important not only to workers but the construction industry, where workers' average age is 46 years old and the industry has difficulty recruiting young workers at a time when demand is high. "There is an economic imperative to think about how to make the job easier for workers. The ageing workforce is a problem in Mainland China, too," Professor Rowlinson added.

HKU at Forefront in Developing New Sources of Lighting

The prospect of folding up a display screen and tucking it into a pocket or purse, or even having it sewn into a sleeve, is coming closer to reality thanks to the work of Professor Chi-Ming Che, the Dr Hui Wai Haan Chair of Chemistry, and his laboratory.

Professor Che holds patents for organic light-emitting diodes (OLEDs) that make groundbreaking use of platinum. OLED is an emerging technology for display, lighting and many other applications and it has huge potential over current technologies in terms of flexibility, efficiency and energy saving.

Professor Che has several patents that have been licensed by local, national and international companies, who are working with him to develop platinum OLEDs into industrial applications.

Professor Che first reported on the potential of platinum-based OLEDs in 2003 and since then he has been working to prove that this can be the case. He has several patents that have been licensed by local, national and international companies, who are working with him to develop platinum OLEDs into industrial applications.

"We are working interactively with industry to see what the problems are so we can address them. This is no longer basic research but real industrial research so we can see how it works in daily life. This is not an easy journey but we are making good progress," he said.

Professor Che was the first in the world to discover that phosphorescent metal complexes can make OLEDs widely usable by greatly increasing the efficiency in electroluminescence, among other benefits. He reported his findings in 1998 but he did not patent that discovery due to lack of resources (HKU now has a well-established patenting and licensing system under the Technology Transfer Office). An American firm made a similar discovery around the same time and got patents; its OLEDs using iridium are now the world standard.

But iridium-based OLEDs have a complicated construction and, because they are through one company, the cost is quite high.

Professor Che is addressing the concerns with his platinum-based OLEDs, which have a more simple construction that is not only stable and robust, but also allows for pulsing of light and a high efficiency in switching colours.

There is still further research needed on the platinum-based OLEDs – Professor Che and his team have produced red and green emissions and are now working on blue, which is the third and final colour needed for lit displays, but he is confident this will be achieved. He has received funding from the Innovation and Technology Fund and the National Basic Research (973) Program for his work. And he has even started exploring a cheaper substitute for platinum: tungsten. "Platinum is just the beginning of the enormous potential of OLED technology," he said.

Professor Chi-Ming Che (left) and Professor Matthew R Evans, Dean of Science

Professor Chi-Ming Che of the Department of Chemistry received the Faculty Knowledge Exchange (KE) Award 2016 of the Faculty of Science for the project 'High Performance Phosphorescent Platinum(II) Emitters for OLED Application'.

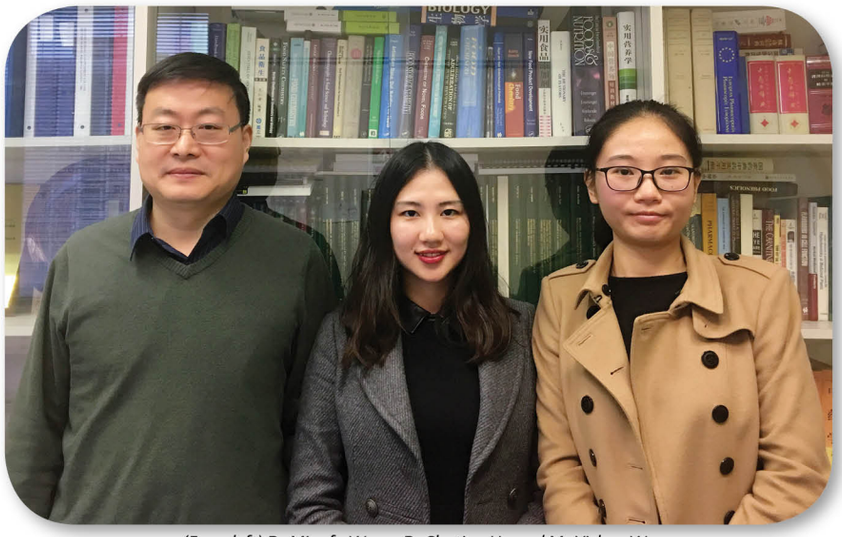
The Beauty of the Skin Industry

The founder of SkinData Ltd, Dr Shuting Hu, did her PhD and postdoc at HKU on molecular pathways and new ingredients for skin whitening, thinking academia would be her future. And it might have been had it not been for the foresight of her supervisor, Dr Mingfu Wang of the School of Biological Sciences.

He encouraged Dr Hu to present her research at an academic conference while she was still studying for her doctorate. With support and funding from HKU, she attended the International Federation of Societies of Cosmetic Scientists conference in 2013 and won the award for best scientific paper by an author under age 40 – and in the process, attracted great interest from international cosmetic companies interested in developing skincare ingredients from her findings.

"This showed me that my research was of great commercial value, not just academic, and that our technology was of a high level. It validated my research," she said. But the companies moved slowly. After completing her PhD in 2014 and postdoc in 2015, there were few signs of practical commercialisation of her research. So Dr Hu took matters into her own hands, again with the encouragement of Dr Wang, to start up her own company.

SkinData aims to develop products for skin pigmentation, photoageing and inflammation, using naturally-sourced, active pharmaceutical-grade compounds that are put through rigorous testing. It has received valuable support from HKU's Technology Transfer Office (TTO), which helped her to successfully apply for a place in the HKU Science Park Incubation Programme and for TSSSU@HKU funding.



(From left) Dr Mingfu Wang, Dr Shuting Hu and Ms Yizhen Wu

Dr Hu said that funding had bought time for the company to develop its products, rather than feel pressured to sell its intellectual property. The TTO has also provided help in filing patents and protecting their IP, and introduced them to investors and other useful contacts.

The plan now is to focus on designing and licensing patented products to cosmetic firms. In the longer term, the company may consider developing its own brand although this will need considerable investment.

SkinData aims to develop products for skin pigmentation, photoageing and inflammation, using naturally-sourced, active pharmaceutical-grade compounds that are put through rigorous testing.

Dr Shuting Hu attended the awarding ceremony of Henry Maso Young Cosmetic Scientist Award in Paris, IFSCC Conference 2014

Dr Hu said she was grateful for all the support she had received at HKU. "I had a good supervisor and good support from the TTO. I was actually expecting the TTO to be bureaucratic but they have been very helpful to me," she said. "I have learned a lot. It's much more difficult than I expected to start up this company because it's so different from my experience in academia, but there are many opportunities here." KE

Bringing ‘Mindfulness’ Back to Its Roots

Ven. Hin Hung showing students that it is important to set a goal and commit to it.

A clearer understanding of life coupled with the power of mindfulness has again shown to be an effective means to help people deal with stress and suffering.

Google the word “mindfulness” and tens of millions of entries pop up, as everyone from corporate executives to elite athletes to school teachers and their students are seeking to benefit from its stress-reducing, focus-enhancing benefits.

But amidst many of the mindfulness websites, apps and programmes, something has been missing, said Ven. Sik Hin Hung, Director of the Centre of Buddhist Studies – a well-structured theoretic foundation. His centre has developed a programme, initially aimed at secondary school students, to bring this element back into mindfulness practices. It has also shown in a quasi-experimental trial that a well-structured programme using the Buddhist pedagogy of Three Kinds of Knowing can improve students’ ability to handle stress.

“The practice of mindfulness has somehow moved out of the context of Buddhist teachings, so I thought, why not put together an intervention that incorporates the whole package of Buddhist teachings to help people cope with stress,” he said.

Ven. Hin Hung summarised and debriefed the students after they had finished the workshop on setting goal in life.

The “Orientation to Life” Enhancement Project provides students with knowledge about Buddhism and how to develop their ability to comprehend the world. “You can teach them more than just mindful breathing,” he said. “If you’re looking to make a significant difference in helping them, you must also help them understand the world and find meaning in life. Only with all of that can mindfulness practice become more effective.”

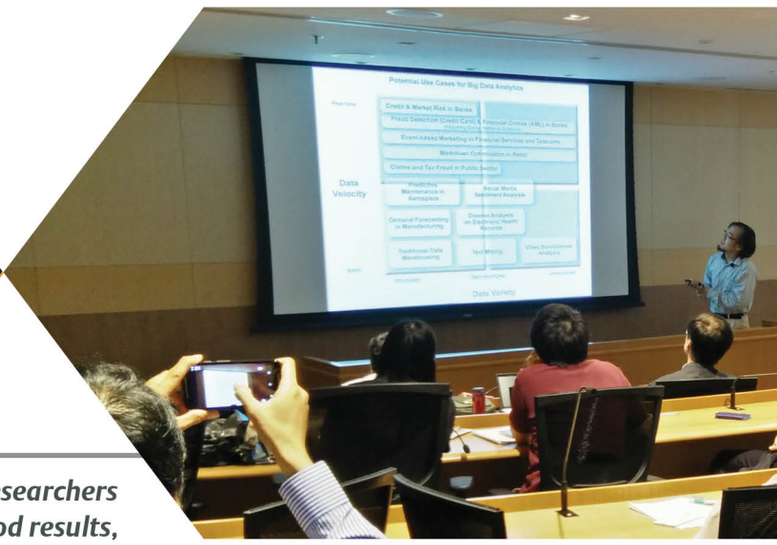
The project was tested on 614 students who were divided into three groups – one group received both Buddhist teachings and experiential workshops including mindfulness practice, one received only Buddhist teachings, and one received neither. Before and after questionnaires showed students in the first group developed a greater “sense of coherence”, indicating that their sense of comprehensibility, sense of manageability and sense of meaningfulness of life were enhanced.

The outcome of that project led to the development and distribution of a curriculum and textbooks to 13 Buddhist high schools and 8 elementary schools, as well as new meditation programmes for high schools which will soon be launched.

The Centre has also developed a meditation training programme for adults, the Awareness Training Programme. Similar to the “Orientation to Life” Enhancement Project, this programme helps illustrate that the full benefits of mindfulness are best realised with an approach that goes beyond treating it as essentially a physical activity. A clearer understanding of life coupled with the power of mindfulness has again shown to be an effective means to help people deal with stress and suffering.

Social Network Tools to Reach People In Need

Participants interacting with the speaker in a workshop on data analytics organised for NGOs



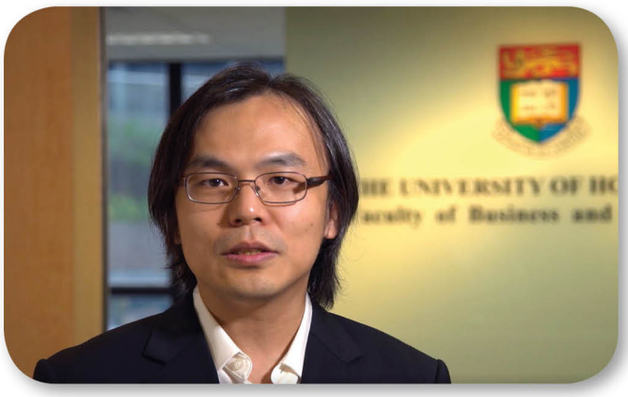
Dr Chau delivered a seminar on online engagement and business analytics for NGOs

When researchers have good results, we should be sharing them and promoting them to society so people can benefit.

A young person writes a blog or Facebook post about feeling suicidal. An organisation wants to find such youths and help them. How can they connect?

Dr Michael Chau, Associate Professor in the School of Business, has an answer: use data analytics. He has been sharing his expertise in this area to help non-governmental organisations identify troubled youths and also to build up the organisations' capacity. Ten free workshops were organised between 2012 and 2016 and more than 50 NGOs participated.

"My research has involved analysing people's behaviour on social media and how consumers use platforms like blogs or Facebook to form communities for products and companies. I've also analysed different kinds of interventions between users and gained experience on what people do and what can attract more attention," he said. "I thought these findings could be used to help provide knowledge and training to NGOs."



Dr Michael Chau of the School of Business received the Faculty Knowledge Exchange (KE) Award 2016 of the Faculty of Business and Economics for the project 'Engaging Young People Online'.

For instance, an NGO could use data analytics to search for words appearing in blogs, Facebook or other social media that would identify someone in emotional distress, such as "suicide", "depression", "self-laceration" and "family problems". In the workshops, Dr Chau and his team have shown how this can be done effectively using various online tools.

They have also provided NGOs with training in such things as how to promote their website and social media accounts through targeted online advertising, and how to make their web pages easier to find, for instance, by ensuring their website is prominent in search results when someone types in words such as "suicide prevention" or "unmarried mother".

Business students have also been deployed to smaller NGOs to look carefully at their social media accounts and advise them on how to better reach their target groups and how to raise money.

The workshops have been funded by ExCEL3, an HKU project funded by the Hong Kong Jockey Club Charities Trust to build capacities in NGOs, and the KE Fund. Dr Chau said a follow-up survey found 75 per cent of respondents were applying or planned to apply what they learned in the workshops.

"Even larger organisations may not have the resources for this training so this has been a good way to power them up," he said, adding: "When researchers have good results, we should be sharing them and promoting them to society so people can benefit. Otherwise, it is like the work is wasted. We've tried to make our findings useful and practical to others."

Taking It to the Street

The Faculty of Dentistry's programme has complemented the work of Project Concern Hong Kong by focusing on prevention to benefit people from low-income backgrounds.

A team from the Faculty of Dentistry has been travelling to Hong Kong districts that have significant populations of people from low-income backgrounds to deliver oral health education and free dental checks.

Many of the people in those areas cannot afford a visit to the dentist and are suffering from cavities, gum disease and other oral health problems.

The dentistry team, led by Professor Chun-hung Chu, Dr Mike Yiu-yan Leung, Dr Dominic King-lun Ho and Dr Duangporn Duangthip, visited seven districts in 2015-16 with more than 20 supporters including dental students, research assistants, volunteer dentists and dental staff of their community partner, Project Concern Hong Kong.

Project Concern Hong Kong is a non-profit social service organisation that delivers dental and medical services to those in need after disease has already set in, and the Faculty's programme has complemented that work by focusing on prevention.

"Our epidemiology studies have shown that in disadvantaged communities, people don't tend to have regular dental checks and they don't practice prevention, so they are at risk of disease," Professor Chu said.

(from left) Dr Dominic K.L. Ho, Dr Mike Y.Y. Leung and Professor Chun-hung Chu

A few years ago he started providing empowerment training and continuous professional development to Project Concern's dentists and nurses, with a particular focus on how to most effectively deliver dental services from a mobile van (the group has three vans). That led to the KE Fund-backed project to help the group deliver prevention programmes.

The Faculty's team and Project Concern have paid one-day drop-in visits to each of the seven districts, providing free oral health checks to about 200 patients at each place and oral health education to many more who visited their booth. Follow-up emergency care was provided to relieve pain in Project Concern's van. Patients needing more treatment were provided with notes to present to a dentist.

The Faculty team also helped Project Concern to apply for funding from the Hong Kong Jockey Club Charities Trust to cover the cost of this follow-up treatment.

"We have received good feedback from the patients and also from District Councillors in the places we visited. Now these stakeholders understand the importance of oral health," Professor Chu said.

The KE project is continuing in 2016-17 with visits to four more districts, and hoping to do another four next year. "Hopefully we will be able to visit every district, depending on resources," he added. KE

Dr Dominic K.L. Ho and his team members, Professor Chun-hung Chu, Dr Mike Y.Y. Leung and Dr Duangporn Duangthip, received the Faculty Knowledge Exchange (KE) Award 2016 of the Faculty of Dentistry for the project 'Empowering a Non-governmental Non-profit Organisation to Deliver Primary Oral Care to Hong Kong Citizens'.

KE Excellence Award 2016

Warm congratulations are extended to Ms Amanda S. Whitfort of the Department of Professional Legal Education, Faculty of Law, who received the Knowledge Exchange Excellence Award 2016 for the "Review of Animal Welfare Legislation in Hong Kong". Ms Whitfort's research provided the first and, to date, only empirical study of the adequacy of animal protection legislation in Hong Kong. The study generated widespread public discussion and impetus for law reform and was used by the Agriculture, Fisheries and Conservation Department of the HKSAR Government to introduce new legislation controlling the breeding and sale of companion animals in Hong Kong with the enactment of the *Public Health (Animals and Birds) (Animal Traders) Regulations* 2016. The study also resulted in significant policy change in stray-animal management and introduction of specialised training for police and prosecutors in presenting animal cruelty cases at court. Watch the KE video on her project: www.ke.hku.hk/links/video/AnimalWelfareLaws

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

HKU Three Minute Thesis (3MT®) Competition 2017

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 organized by the Graduate School and the Knowledge Exchange Office since 2011.

This year 31 final-year MPhil and PhD students participated in the HKU 3MT Competition held on March 6, 2017. The range of topics is again fascinating: from saving Chinese culture in World War II, relationship between music and language, to wastewater management, faint distant galaxies, and healthy ageing. The winners are:

Champion and Online People's Choice Award Winner

Mr Ming Yan Chan, MPhil candidate in the Faculty of Science
'Peering Through Space and Time with Nature's Cosmic Telescope'
(Primary Supervisor: Dr Jeremy Jin Leong Lim)

1st Runner-up and People's Choice Award Winner

Ms Shrestha Ghosh, PhD candidate in the Li Ka Shing Faculty of Medicine
'Live Life...Queen Size...'
(Primary Supervisor: Professor Zhongjun Zhou)

2nd Runner-up

Ms Sze Yi Mak, PhD candidate in the Faculty of Engineering
'Control of Water-Based Fluid in Microfluidics'
(Primary Supervisor: Dr Anderson Shum)

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 **hub.hku.hk/**.

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

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