THE HONG KONG POLYTECHNIC UNIVERSITY
香港理工大學

Excel x Impact

06/2020

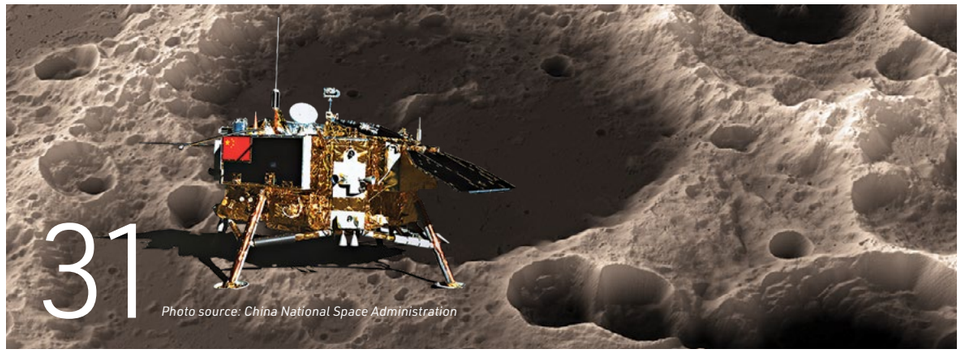
Coming Together to COMBAT COVID-19

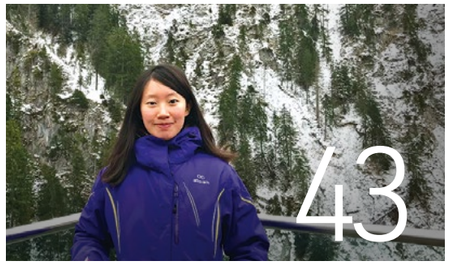
Big Data in a tiny package

PolyU ranked 75th in the world in latest league table

Alumni series
Mr Alfred Sit, Secretary for Innovation and Technology

Contents | June 2020





President's Message

Welcome to *Excel x Impact*, our new quarterly publication that celebrates the spirit of The Hong Kong Polytechnic University (PolyU) – to pursue world-class excellence and make a positive impact on society.

In this inaugural issue, readers will learn more about PolyU's achievements in education, research and knowledge transfer. At the time of publication, the world has been contending with the COVID-19 pandemic. For our part, the PolyU community has been harnessing innovation and expertise to fight the virus, while extending care to those in need. This is the kind of positive impact we should all be striving for.

I would like to thank our alumnus, Mr Alfred Sit, the newly-appointed Secretary for Innovation and Technology of HKSAR, who in this issue shares his vision for innovation as well as some memorable moments from his school days.

I also thank the Editorial Committee, in particular, Chairman Professor H. C. Man and Co-chairman Professor Kaye Chon, for their dedication and contributions to the launch of this university-wide publication.

This new publication could not have been successfully launched without the hard work of colleagues at the Communications and Public Affairs (CPA) Office. Many thanks to our CPA team for their excellent effort!

I wish you an enjoyable read.

Jin-Guang Teng
President

The Hong Kong Polytechnic University
香港理工大學

PolyU develops reusable face shields for both the public and healthcare service providers.

Coming Together to COMBAT COVID-19

How PolyU harnessed innovation and the technical expertise of its researchers to fight a deadly new virus

Mainland alumni join frontline fighters in Wuhan.

PolyU partnered with the Hospital Authority to develop 3D-printed face shields for medical professionals.

COVID-19 with only one test, in just one hour. With its patent-pending microfluidic and biochemical technologies, this system can provide ultra-sensitive detection while simultaneously differentiating various pathogens with extremely high specificity.

"Early and accurate detection of pathogens contributes to effective and efficient disease control and management, and prevent spreading of any contagious pathogens," said Dr Terence Lau, Interim Associate Vice President (Innovation and Technology Development) and Adjunct Professor at the Department of Applied Biology and Chemical Technology of PolyU. "It also benefits patients because timely therapy can then be applied to prevent complications."

Since the start of COVID-19 at the end of 2019, tens of millions of people across the world have been infected and hundreds of thousands of fatalities reported. During this difficult period, the entire PolyU family of staff, students and alumni has banded together in the fight against this virus, in keeping with the University's motto: "To learn and to apply, for the benefit of mankind."

We have been serving the community in combating the epidemic by making use of our professional expertise and creativity to design protective face shields for medical staff and the public. We also developed the world's most comprehensive automated multiplex diagnostic system for scanning respiratory infectious diseases, including COVID-19. Beyond this, our staff, students, alumni have been combining their resources to support those in need in the community. Some alumni even took part in frontline anti-epidemic work in Wuhan during the first few months of the outbreak. Together, we have been upholding the spirit of human kindness in a world tormented by this deadly disease.

Breakthrough technology for early detection

Rapid early detection is critical for containing the spread of COVID-19. In early February of this year, our researchers developed an efficient, cost effective diagnostic method – the rapid automated multiplex diagnostic system – that can identify

This automated multiplex diagnostic system can provide rapid detection of the COVID-19 virus.

Capable of detecting up to 40 infectious respiratory pathogens as well as the novel coronavirus, the diagnostic system comprises a fully automated machine and multiplex full-screening panel for point-of-care genetic testing (POCT). No manual handling is required at any time during the testing process.

PolyU has many years of experience conducting innovative research on virus detection. Together with the University of Hong Kong, it established

■ *Dr Terence Lau (third left), together with (from fourth left) Professor Wong Wing-tak, Dean of the Faculty of Applied Science and Textiles, Professor Alexander Wai, Deputy President and Provost, and Dr Manson Fok, Chairman of the Board of Avalon Biomedical Management Ltd.*

■ *The rapid automated multiplex diagnostic system*

the Respiratory Virus Research Foundation in 2015 and has been working on a variety of innovative technologies to tackle existing and emerging respiratory infectious diseases. This research, conducted over many years, is the reason why PolyU was able to develop the diagnostic system for COVID-19 so quickly.

The research team responsible for this system was led by Dr Lau and supported by Professor Yuen Kwok-yung, Chair Professor of Infectious Diseases from the Department of Microbiology, Li Ka Shing Faculty of Medicine of the University of Hong Kong. The team has also received valuable support from a local biotechnology company, Avalon Biomedical Management Ltd.

As the system can detect a variety of other diseases besides the novel coronavirus, including influenza A subtypes and severe acute respiratory syndrome coronavirus (SARS-CoV), it promises to be a powerful tool for infectious disease control, medical diagnosis and treatment in the future.

In collaboration with the Macau University of Science and Technology and other Chinese institutions, PolyU also developed an AI-assisted diagnostic system for the rapid diagnosis of COVID-19. The joint research team used a database of the computed tomography of the chest from over 3,700 patients to develop this novel diagnostic system. With the new system, COVID-19 pneumonia can be distinguished from other types of viral pneumonia and its severity level predicted in only 20 seconds, with an accuracy of up to 90% or above. This research was published in the prestigious international journal, *Cell*.

Meeting the urgent demand for face shields

When the COVID-19 outbreak hit Hong Kong at the end of January, face shields were in critical short supply. As PolyU has a strong reputation for research, the Hospital Authority and Queen Elizabeth Hospital asked us in early February to produce face and eye shields for medical professionals in Hong Kong.

Professor H. C. Man, Dean of the Faculty of Engineering and Director of the University Research Facility in 3D Printing (U3DP), led a research team to design the new face and eye shields. In addition to employing 3D printing technology, the team made reference to studies by the PolyU School of Design comparing the head sizes of Asians and Westerners in order to design a face shield that would better fit Chinese wearers.

Once a design had been settled, the U3DP team mobilised all of PolyU's 3D printers and worked around the clock to produce the first batch of face shields. In just 10 days, final production was completed thanks to the dedication and cooperation of all team members.

With support from local manufacturers, production lines began manufacturing up to 30,000 face shields per day in March so that the high demand for personal protective equipment among Hong Kong's frontline medical personnel could be met.

Better protection for the public

Members of the public, especially caregivers for the elderly, social workers, cleaning staff and customer services staff, also needed protection to reduce the risk of virus transmission. To meet their needs, Professor Man and his team designed two reusable face shields – the General Use Face Shield and Extra Protection Face Shield.

The General Use Face Shield fully covers the face while the Extra Protection Face Shield also covers the forehead and hair. Made of lightweight, low-cost, environmentally-friendly PET (Polyethylene Terephthalate) plastic, the face shields were produced utilising the vacuum forming technique. The new design resists fogging, provides a comfortable wearing experience and allows the face shields to be reused after cleaning.

To test the new face shields, the Department of Applied Social Sciences invited staff from the Hong Kong Christian Service to try them out. All users said the face shields provided a comfortable wearing experience and were especially suitable for staff working long hours. The feedback collected also helped to improve the design of the face shields.

Taking the measure of COVID-19

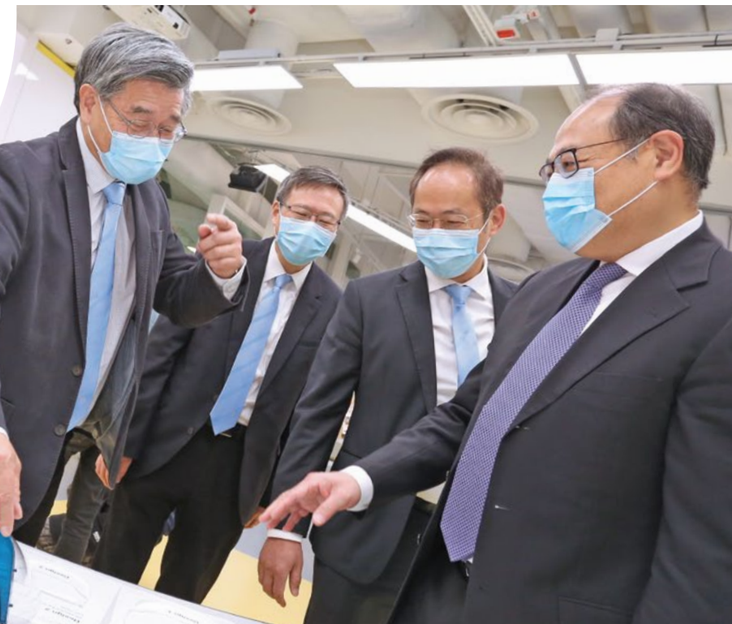
In order to gain a better understanding of COVID-19, scientists from around the world have been working non-stop to identify transmission patterns.

At PolyU three associate professors, Dr He Daihai and Dr Lou Yijun from the Department of Applied Mathematics (AMA) and Dr Yang Lin from the School of Nursing (SN), together with their students and collaborators from Mainland China, began conducting a series of studies in the early stages of the pandemic. The AMA and SN research team was among the first in the world to estimate the transmission rate, case fatality rate, and gender disparity of COVID-19 cases.

In addition, Wang Yimin, an alumnus of PolyU's Master of Business Administration programme, sent his engineering team to Wuhan to set up new equipment – the Portable Digital Radiography (DR) system and Dynamic DR Tablet – developed by his company. With this equipment, medical staff are able to make an early diagnosis of COVID-19 in patients and perform lung radiography imaging.

■ *Professor H. C. Man (first left) explains how his team came up with the final design of the PolyU face shield to (from right) PolyU Council Chairman Dr Lam Tai-fai, Professor Alexander Wai, and President Jin-Guang Teng.*

■ *The General Use Face Shield (left) and the Extra Protection Face Shield*



We care, we share PolyU on the frontline

Care for the local community

- The Department of Applied Biology and Chemical Technology produced 400,000 ml of hand sanitiser and distributed them to those in need through the Social Welfare Department. 1 2

- Dr Wang Peng, Associate Professor of the Department of Civil and Environmental Engineering donated 10,000 face masks to PolyU in February, easing the shortage of face masks among staff and students.

- Our students donated anti-epidemic packs and face masks to people in need through the NGO Christian Concern for the Homeless Association.

Joining the frontline

- PolyU alumnus Li Haijian headed to Leishenshan Hospital in Wuhan as a volunteer in January. He supported the hospital by designing a negative pressure isolation ward and supplying disinfectant equipment. What's more, he helped establish a medical waste incineration facility and personally helped burn infectious waste. 3 4

- Current students and graduates of the MSc in Disaster Nursing programme at the Sichuan University–The Hong Kong Polytechnic University Institute for Disaster Management and Reconstruction (IDMR) joined frontline medical staff at various hospitals in Wuhan and other cities in Hubei and Sichuan in the battle against the epidemic. IDMR was established in 2013 after the 5.12 Wenchuan earthquake in 2008. 5

Donations for relief operations

- Under the leadership of PolyU alumnus Michael Ross, Vice Chairman of Charoen Pokphand Group (CP Group), CP Group donated 33 tons of disinfectants worth RMB1.2 million to Hubei province, which were distributed to hospitals and government units in the province. About RMB50 million in donations, including cash and supplies, were made towards virus prevention work in Hubei province. 6

- Donations came from many alumni bodies, including the 2003 Master of Science in International Real Estate, Zhejiang University – PolyU Joint Center Alumni Network. The PolyU Pearl River Delta Alumni Network also donated medical supplies to hospitals in various mainland cities.

To provide timely help for students experiencing financial hardship due to the pandemic, the University set up the PolyU COVID-19 Student Support Fund. As an initial step, the Senior Management team committed to donating 10% of their salaries over a period of 12 months from April 2020. It is encouraging to know that the PolyU community – including staff members, alumni and other supporters of PolyU – has responded positively during this challenging period. The Fund has received over 800 applications from students.

With the spread of the novel coronavirus across the globe, the PolyU community has been responding to this unprecedented crisis in a spirit of generosity and unity. By continuing to work together, we can all play our part in the fight against this pandemic.

Unleashing the power of

EDUCATION

A Conversation with Council Chairman Dr Lam Tai-fai

Dr Lam Tai-fai graduated from the then Hong Kong Polytechnic with a Higher Diploma in Textile Technology 40 years ago. He subsequently started his career as a trainee in the fashion and clothing industry, rising to leading roles in business and industry, politics, community service, education and sports. In 2019, he returned to his alma mater to take the helm of the PolyU Council.

You have gone from an alumnus to Chairman of the University Council. What changes have you seen at PolyU during this time?
I witnessed the transformation of the institution from a polytechnic into a university in 1994. Since then, the tremendous efforts by PolyU to provide advanced education and research has taken it to a 75th place out of 1,600 universities in the latest world university rankings. This is a recognition of PolyU's strengths as a world-class university. Credit for this achievement must go to the Management team and the efforts of our distinguished scholars and researchers.

What plans do you have for the next stage in your alma mater's development?
The University's vision statement is to "Be a leading university that advances and transfers knowledge, and provides the best holistic education for the benefit of Hong Kong, the nation and the world." The Council and I will support Management to realise this vision.

In addition, the nation's plan to develop the Guangdong-Hong Kong-Macao Greater Bay Area (GBA) into an international technology and innovation hub has created significant opportunities for Hong Kong and PolyU. To that end, we plan to establish a branch campus in Guangdong province, which will become an integral part of PolyU's academic system and complement its strengths in education, research and knowledge transfer. We can also offer PolyU's niche disciplines to students in the GBA in order to develop more talent for the region. Hong Kong students can also enjoy new opportunities to learn about the GBA through exchanges and activities. Furthermore, the branch campus can provide land on which to build additional research facilities, creating a boost for mission-driven research that meets society's needs.

Dr Lam with PolyU student athletes

> It is my wish to provide opportunities for every student to fully develop his or her own abilities. I truly believe in the power of education to change people's lives.

In your time, you have built 30 primary schools in rural areas in the Mainland, founded a secondary school (Lam Tai Fai College) in Hong Kong, and helped to advance higher education. Why is supporting education so important to you?
I truly believe in the power of education to change people's lives. While society requires different types of talent to meet evolving needs, traditional education may not be able to accommodate the demand for the human capital, skills and knowledge that are necessary in the 21st century. People indeed have different potential, and it is my wish to provide opportunities for every student to fully develop his or her own abilities so that they can learn, grow and become responsible citizens capable of making positive contributions to society.

You first connected with PolyU as a student in 1978. What do you and your contemporaries have in common with today's PolyU graduates? Do PolyU graduates have a particular set of attributes?
I think a certain DNA has been passed down through the generations of PolyU graduates. Like the students of my generation, they have professional knowledge and skills, set pragmatic goals and are dedicated to achieving them. Our graduates have always been valued by industry and society, and you can see this is in our 400,000 alumni who have been a driving force behind the development of Hong Kong.

Could you share some memorable moments from your time studying at PolyU?
My happiest memory was playing football with my teachers! Friendships and football – both continue to play a part in my life. My teachers have become my lifelong friends, and I am now working on developing youth football.

As the Chairman of the Hong Kong Sports Institute, you are well known for your love of sports. What do you think sports and education have in common?
I think sports are part of a holistic education and can shape a young person's personality and character. Both sports and education can help them develop desirable qualities, such as strategic and analytical thinking, leadership skills, team spirit, resilience and a positive attitude. In my view, participating in sports is not only about health but can also help with the development of society as a whole.

Over the years, you have excelled as an industrialist, legislative councillor, advocate for sports, and leader in education. What is the secret of your success?
Tolerance, hard work, and always being willing to make the extra effort, no matter what the challenges are. I give my all to overcome difficulties and achieve my goals. In short, I am part of Hong Kong's can-do spirit. I am always grateful for what I have and have seized every opportunity to give back to society.

> My ideal PolyU is a world-class university with a strong emphasis on excellence, societal impact and social responsibility.

EXCELLENCE and IMPACT

A Conversation with President Jin-Guang Teng

Professor Jin-Guang Teng is an internationally renowned scholar in the field of structural engineering. Starting his university studies at the age of 15, he has gone on to forge an impressive career nurturing young talent and pursuing ground-breaking research over a long period of nearly 40 years. Professor Teng assumed the office of President of The Hong Kong Polytechnic University in July 2019.

As you pick up the mantle from your predecessors as the new PolyU President, how would you describe PolyU today?

I joined PolyU in 1994 as a lecturer after spending nearly 10 years in Australia and the UK for my doctoral studies and early career. Over the past 26 years, I have witnessed and taken part in the momentous progression of PolyU from a polytechnic into a full-fledged university and, now, a world-class university. During this period, PolyU has been developing talent, advancing research and addressing changing societal needs. These efforts have borne fruit. A number of our disciplines are today ranked among the top 50 in the world by QS, while PolyU is among the top 100 in the QS World University Rankings 2021.

What is your ideal PolyU?

My ideal PolyU is a world-class university with a strong emphasis on societal impact. It is a university with a strong culture of excellence and social responsibility, offering a holistic education to students and undertaking world-class research. It is a place where interdisciplinary collaboration, innovation and entrepreneurship are highly valued. It enjoys a world-leading reputation in many of its disciplines, and fosters a caring and fulfilling environment where students and staff can realise their full potential.

What is your vision for the future development of PolyU?

We are in the era of the Fourth Industrial Revolution. As a university with a strong focus on science, engineering and technology, we need to ask ourselves how PolyU should respond to the challenges and opportunities brought about by the Fourth Industrial Revolution which is characterised by emerging technologies such as AI, data science, robotics, new materials, additive manufacturing and biotechnology. We will develop our education and research to help advance these emerging technologies.

As a university with a strong emphasis on societal impact, we also need to develop innovations and technologies related to housing, health care, smart cities, the environment and energy in order to address major societal challenges.

How are you going to realise this vision?

We need to upgrade our course offerings, recruit top scholars, build up our research capabilities, broaden our students' outlook and innovate teaching. To ensure that PolyU stays competitive over the long run, we must seize the opportunities offered by the Greater Bay Area development, which is opening up enormous possibilities for PolyU's education and research, while sustaining our leading position in the region and the world. For all of this, we need the concerted effort of the PolyU community.

How would you engage the PolyU community to share your vision and follow your lead?

Communication is obviously very important for us to strengthen our shared vision and common understanding of the PolyU community and to work together as a team. I will continue to step up my efforts to communicate with staff, students and alumni through regular updates and sharing sessions.

Professor Teng meets students at a lunch gathering.

What is your advice to young scholars?

I would like to share three observations.

First, most research nowadays is funded to address societal challenges. As researchers, we should stay alert to the major challenges that society faces and contribute effective solutions.

Second, for researchers to be recognised as leaders in any field, they need to have impacted the field with creative ideas that lead to ground-breaking research or tackled challenging problems that have defied previous efforts.

Thirdly, they need to demonstrate a very high-quality standard in all scholarly activities. The respect that scholars command in their field depends on not only what problems they have solved, but also how thoroughly, rigorously and elegantly they have solved them.

I would be pleased to exchange views on these issues with PolyU scholars.

Do you have a motto that you live by ?

I have a number of them. I adopted 非志無以成學 (Without aspirations, learning will come to naught) from《誡子書》by 諸葛亮 (Zhuge Liang's *Exhortations to my son)* as the name for the WeChat group for my research team.

As a university president, I have been pondering the line 大道至簡 (Great truths are always simple) from 道德經 (*Daodejing*), which is similar to a famous quote from Bruce Lee: "Simplicity is the key to brilliance". Here, "simplicity" is not to be misconstrued as being simplistic; rather, it stresses the importance of focussing on the essence of an issue. It is useful to be reminded of this wise perspective in finding effective solutions to complex problems.

LEARNING & TEACHING

during a time of social distancing

After the first confirmed case of COVID-19 on 23 January 2020, social distancing quickly became the new norm across the city. And while many businesses and schools shut down, PolyU remained open by offering classes in what has become one of the largest online teaching communities in Hong Kong.

Mr Scott Chin from the School of Design uses a webcam to show his online students how to draw a complex object.

The transformation of PolyU from a physical university into an online campus started in late January, when two high-level task forces reporting directly to the President – the Task Force on the Delivery of Online Teaching and the Task Force on Response Actions for the Novel Coronavirus – were set up to ensure three conditions were met.

These conditions stipulated that online teaching must continue to deliver the same learning outcomes, minimise any impact on the academic progress and graduation timeline of students, and maintain the health and safety of students and staff at all times.

The first step was to understand the expectations of staff and students. "Our strategy was to collect feedback from frontline teaching staff, and many discussions were held among Deans of Faculty and School, Heads of Department and teachers," said Professor Alexander Wai, Deputy President and Provost, and Chairman of the Task Force on the Delivery of Online Teaching. "We also communicated with the Students' Union and Staff Association."

Professor Ben Young, Vice President (Student and International Affairs), said, "We appreciated that students face challenges when abruptly switching to a new mode of learning. Therefore, we communicated closely with them to understand their needs and did everything possible to minimise the impact of the pandemic on learning."

How challenges were met

The process of going online was an enormous challenge, given that PolyU has the largest student population (more than 25,000 full- and part-time students) of all the publicly funded universities in Hong Kong.

Mr Andy Tong, Vice President (Campus Development and Facilities) and Chairman of the Task Force on Response Actions for the Novel Coronavirus, said that even though students were not physically in class during this period, a number of teachers and support staff still had to be on campus for online teaching or preparation work. Therefore, maintaining stringent virus-preventive measures on campus was essential for keeping everyone safe.

A key player in the University's transformation to online teaching was the Information Technology Services Office. It was tasked with providing equipment to support online teaching and finding solutions for local and overseas students, as well as maintaining network stability and cloud capacity.

Some teachers, such as Dr Rodney Chu, Assistant Professor, Department of Applied Social Sciences, were able to apply their experience in online learning immediately as PolyU had actually begun promoting online teaching two years ago.

"I had converted one-third of the subjects I taught from a conventional classroom setting to an online

mode. I also took discussions online so that students could learn from their peers," said Dr Chu. "This was prior to the COVID-19 outbreak. So when the pandemic struck, these experiences came in handy."

In addition to traditional online platforms, many online tools were also used, including Blackboard, uRewind, Microsoft Teams, Zoom and mobile apps such as WhatsApp. All these tools allowed students and teachers to interact, exchange ideas, and express their opinions freely.

For teachers and researchers who were unfamiliar with the tools or the techniques for online teaching, PolyU's Educational Development Centre offered support and training, which included WhatsApp service support, e-Learning Clinics and a one-stop teaching website with information and resources for online learning and teaching, IT support, lesson planning, and more. Online workshops with live Q&A sessions were also organised.

A different approach for every discipline

Academics from different teaching units adopted a customised approach to engage students in their online teaching sessions. For example, Mr Scott Chin, Teaching Fellow of the School of Design, used a webcam with good lighting to show his online students how to draw a complex object. Students would then follow suit and upload their drawings for his comments and advice.

The School of Optometry, on the other hand, developed over 70 videos within a few weeks to demonstrate the use of sight screening equipment and patient cases to prepare students for practicum sessions when face-to-face teaching resumes.

Even laboratory experiments could be accommodated online. As Professor Wong Kwok-yin, Interim Vice President (Research and Innovation), described it, "Teachers and researchers could record the steps in experiments in the laboratory. Although students could not conduct experiments themselves, they were able to access the online platform anytime and take a closer look at the demonstrations."

Service-Learning and internship in a virtual world

Serving people in need has also continued during the pandemic. As PolyU's Service-Learning programme involves work in the community, including face-to-face contact, adjustments had to be made to avoid the risk of infection. One example was a Service-Learning project in which students design and develop assistive devices for the elderly and disabled, then visit them in their homes for evaluation. In this case, the subject leader Dr James Cheung redesigned the programme to produce small devices or mobile apps that help to maintain physical or mental fitness. The products were subsequently delivered by social workers to the elderly and disabled. After students obtained feedback from the service recipients by phone or video, they will refine the design for a better customised fit.

Mr Darren Harbutt
Educational Development Centre

Professor Bernadette Watson
Department of English

Dr Rodney Chu
Department of Applied Social Sciences

Dr Barbara Tam
Educational Development Centre

■ *(top) Each step in an experiment is recorded so that students can look at the demonstrations online.*

(bottom) Academic staff have taken a customised approach to engage students in online learning.

Online learning has also been applied to internships. One example is Jessie Wang, a student in the Tourism and Events Management programme of the School of Hotel and Tourism Management, who was able to switch to an online internship at the Pacific Asia Travel Association during the pandemic. She became the School's first student to serve in an online internship.

Top marks for a new learning experience

Over the past few months, PolyU has overcome the challenges of teaching online while helping its students to continue their education safely.

In providing this unprecedented learning experience, PolyU has shown itself to be resilient, resourceful and innovative in meeting the needs of students. This is affirmed by Professor Bernadette Watson from the Department of English, who said, "I find it is sometimes easier to get the sharing in the class online. The interactive activity is higher than it might have been." Mr Scott Chin from the School of Design added that students really enjoy online teaching. "They said it is actually better than expected."

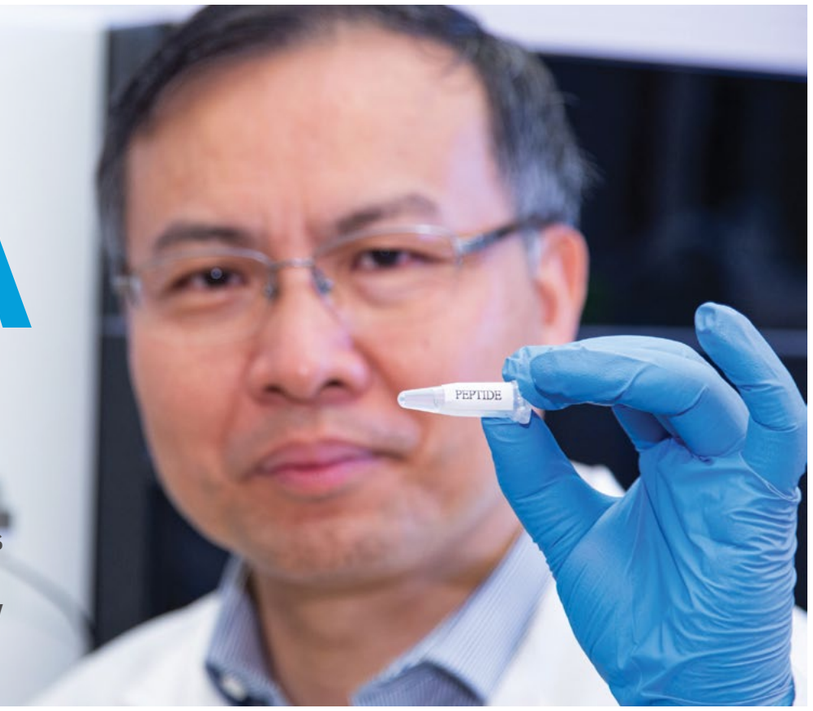
Michael Ng, a student from the Department of Civil and Environmental Engineering, agreed, saying that "the online platform allows me to learn at my own pace." Korean student Jason Kim from the Department of Electronic and Information Engineering believes that online learning is better than offline learning as it is easier for students to take part in anonymous polls and give anonymous answers to the professors. What's more, Jessie Wang from the School of Hotel and Tourism Management said she would definitely recommend an online internship to fellow students as "it introduces a new way in which a future workspace might operate." "This has been an unprecedented effort to move all face-to-face teaching to an online platform," said Dr Miranda Lou, Executive Vice President.

■ *Professor Ben Young, Vice President (Student and International Affairs) (second from right), says the University has been communicating closely with students to understand their needs when switching to a new mode of learning and teaching during the pandemic.*

"Frontline teachers did their best to prepare for the task of teaching online while other departments provided dedicated support behind the scenes." And although there have been challenges, the University has nevertheless succeeded in continuing students' education during the pandemic, without compromising quality of learning and teaching.

BIG DATA in a tiny package

A team of PolyU researchers is pioneering a new method that could revolutionise how we store data



PolyU researchers pioneer the use of peptides as a medium for storing data.

When scientists discuss peptides, it is usually in relation to biomedical research and the development of new pharmaceutical drugs. But now, a team of researchers at PolyU is investigating peptides for an entirely different purpose – as a medium for storing vast quantities of data.

According to International Data Corporation (IDC), the amount of data we generate worldwide is growing at an exponential rate – from 33 zettabytes in 2018 to 175 zettabytes by 2025. (One zettabyte is roughly equal to a billion terabytes or a trillion gigabytes.)

The question is, how can we store all this data? Most magnetic storage devices today are not large enough and last for only 10 to 20 years.

What exactly are peptides?
Peptides are molecules consisting of two or more linked amino acids. They are the fundamental building blocks of cells, body tissue, proteins, enzymes, hormones (insulin) and toxins (bee venom).

Fortunately, there is a solution in sight thanks to the efforts of a team at PolyU led by Dr Yao Zhongping, Associate Professor, Department of Applied Biology and Chemical Technology, and Professor Francis Lau, Associate Head, Department of Electronic and Information Engineering. Researchers from the Hong Kong University of Science and Technology and the Chinese University of Hong Kong are also participating in this revolutionary new project.

Converting data into peptides

The approach developed by Dr Yao and Professor Lau's team incorporates peptides as a storage medium for the first time. Compared with existing data storage devices and developing technologies such as DNA data storage, peptides offer much higher storage density, are more stable and can last for millions of years.

To write data with this new method, raw data is encoded as 1s and 0s, translated into peptide sequences, and finally stored as synthesised peptides in powder or solution. To retrieve the data, the peptides are sequenced using techniques such as tandem mass spectrometry, and decoded back to the raw data. Once the technology becomes mature, it would then be possible to store big data, such as the entire collections of national libraries, in vials of peptides occupying the same space as a shoebox.

Creating impact

Although the team has filed the patents of its new method and received encouraging feedback, there are still challenges to be overcome. Mainly, these are related to the high cost of reading and writing data as well as the amount of time needed for sequencing, which is still too slow for everyday usage.

The research team, however, have set clear targets for overcoming these challenges. These include making further improvements in data density, designing a better encoding scheme and creating prototypes for this next-generation peptide-based storage system.

To achieve these targets, the team has received a grant of more than HK$9.7 million from the Research Impact Fund of the University Grants Committee, in recognition of PolyU's leadership and expertise in this field.

Compared with other data storage devices, peptides offer much higher storage density, are more stable and can last for millions of years.

A particularly exciting prospect for the future of this project is space exploration, where massive amounts of data must be stored and managed in a confined area for long durations. In fact, this is already starting to happen with the launch of China's Long March-5B rocket on 5 May 2020, when the spacecraft carried peptides encoding the PolyU motto, *To learn and to apply, for the benefit of mankind* and *PolyU 80th Anniversary*. The purpose of this experiment is to test the stability and reliability of the peptides after exposure to the space environment. The PolyU team will decode and retrieve the data after the safe return to Earth of the spacecraft along with the experimental materials.

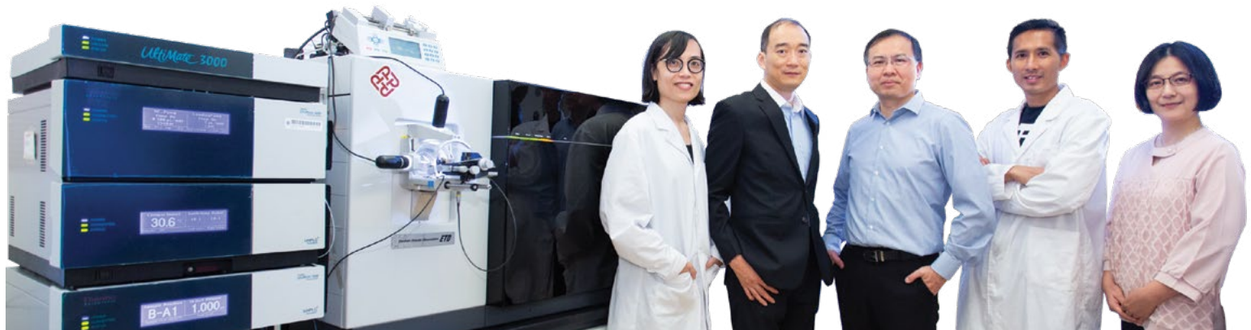
In the meantime, the team looks forward to collaborating with organisational partners such as Huawei, the multinational technology company, and developing commercial applications for their project.

Entering a new era of data storage

New developments are anticipated for this project in the next few years that will involve sequencing optimisation and software development as well as storage and retrieval of real-life data.

As Dr Yao points out, "We are very excited about this opportunity to continue developing our project. We believe it offers tremendous benefits to government agencies and corporations that generate and archive large volumes of data – it truly has the potential to radically transform the data storage industry and the way we manage data."

Dr Yao Zhongping (middle), Professor Francis Lau (second from left), with some researchers Dr Albert Ng (left), and (from right) Dr Tam Wai-man and Dr So Pui-kin



A different kind of FISH STORY

While looking for the causes of leukaemia, Dr Alvin Ma of PolyU made a discovery that could change the way researchers investigate disease

Dr Alvin Ma found zebrafish research of autophagy-related processes in the past could have produced invalid results.

For nearly 50 years, the zebrafish commonly seen in Hong Kong's tropical fish stores have been prized not so much for their distinctive black and white markings but for their contributions to scientific research. As test subjects, zebrafish are widely used in the search for a better understanding of vertebrate development and human disease.

But now, research findings based on studies of zebrafish embryos have been called into question in a potentially ground-breaking project by a PolyU researcher, Dr Alvin Ma Chun-hang, Assistant Professor in the Department of Health Technology and Informatics.

The role of zebrafish in research

Dr Ma did not originally set out to question the validity of research using zebrafish embryos. Instead, he was focused on investigating the causes of leukaemia, a form of blood cancer. While undertaking this research, he uncovered a problem in the methodology in which zebrafish embryos are employed.

Normally, zebrafish embryos are used as test subjects because they contain blood cell types similar to those found in humans. What's more, zebrafish are highly fertile, can be kept in large numbers even in cramped laboratories, and are much easier to care for than mice.

What is more surprising, though, is that over 70% of human genes have a zebrafish counterpart, and 82% of human genes related to disease can be found in these tiny striped creatures. Zebrafish embryos are also easy to observe as they are externally fertilised and transparent, which could be maintained using a chemical compound called 1-phenyl 2-thiourea, or PTU.

When observing zebrafish embryos, researchers watch for a process called *autophagy*, or self-eating. Autophagy is one of the essential processes in living organisms, including humans, as it plays a vital role in ridding cells of unwanted materials when, for example, they are not receiving enough nutrition. It is a vital element in anti-ageing, cell death, tumour suppression and tumour growth.

The problem with PTU

In research using zebrafish embryos, the pigment in the embryos must be supressed in order to increase optical transparency for better imaging of processes such as blood flow. "We treat fish with PTU to inhibit Tyrosinase which is a key enzyme that produces melanin," Dr Ma said. "By using PTU, the fish embryo will not develop pigment and will be completely transparent."

By making the embryos transparent, however, he discovered a strange phenomenon. "When I tried to suppress the pigmentation in the cells that had been introduced into the embryos, the autophagy levels went up. We tried to troubleshoot what was happening and eventually found that conventional targeting of cells with PTU actually induces autophagy.

"This means that when we are using this model to study any autophagy-related process like cancer, it is a problem."

The key takeaway from this discovery is that countless studies that have been using PTU in zebrafish embryos in the past could have produced invalid results. "It might mask or interfere with your study," Dr Ma said.

Setting a new standard

Dr Ma's discovery was published in the April 2020 issue of *Autophagy*, the highest impact journal in the field, and has since been frequently cited by peer researchers, receiving a high ranking of 14 out of 193 in the category of Cell Biology.

Two-day old zebrafish embryos – (top) with pigments in normal development, (bottom) transparent after PTU treatment

"The major reason that the journal accepted my paper is that it really tells the field you cannot use PTU anymore – you should avoid using this chemical in autophagy-related research."

As a result of his findings, the chief editor of *Autophagy* has invited Dr Ma as a co-author in publishing new guidelines on autophagy research using zebrafish embryos, a revision that takes place every three or four years.

But there is still more that needs to be done before we can fully understand how autophagy works. "Autophagy is important for killing cancer cells and plays a key role in developing new treatments," said Dr Ma. "We now know that autophagy is a much more complex process than we had previously thought."

With the new guidelines in place, however, Dr Ma is hopeful that other researchers will find better methods of suppressing pigment without affecting autophagy, facilitating the use of the unique zebrafish model and opening the door to new treatments for a variety of deadly diseases, including cancer.

PolyU researchers create

RADIATION-FREE DEVICE

to assess scoliosis

Researchers at the University have found a safer and more cost-effective way of assessing and monitoring the spinal deformity in children and adolescents

A team of researchers from PolyU's Department of Biomedical Engineering has invented a way to harness 3D ultrasound imaging technology to monitor the spinal condition scoliosis in children. Their innovative solution makes the assessment of scoliosis both easier and safer.

Scoliosis is a medical condition in which sideways curvature of the spine occurs. It affects millions of people worldwide and is the most common spinal diseases among adolescents. Health professionals have traditionally used X-ray imaging to diagnose and monitor scoliosis, with rapidly growing teenagers requiring regular X-ray check-ups. However, repeated exposure to X-rays increases the risk of cancer, limiting the frequency at which they can be carried out on patients.

Another shortfall of X-ray imaging is that the technology can only take 2D images of the spine. As most spinal deformities in patients with scoliosis are 3D, this does not provide enough information for non-surgical treatment of the condition. These shortcomings prompted scientists at PolyU to find an alternative solution for assessing and monitoring scoliosis.

The research team, led by Ir Professor Zheng Yongping, Head of the Department of Biomedical Engineering, and Henry G. Leong Chair Professor in Biomedical Engineering, has been working on the development of a 3D ultrasound solution for scoliosis diagnosis since 2006. Their research has demonstrated that 3D ultrasound technology can be used for both spinal imaging and spinal deformity measurement, with the team's novel volume projection method able to generate a radiography-like image of the spine.

The research team that developed Scolioscan Air

Benefitting patients in HK and beyond

Based on their pioneering research work, the team developed a 3D ultrasound imaging system specifically for scoliosis assessment, which was successfully licensed for commercialisation under the trademark Scolioscan in 2010.

Because it is radiation-free and more cost-effective than X-ray imaging technology, Scolioscan can be used for mass screening and frequent follow-up monitoring. Clinical trials conducted by multiple research groups have also proven that it is reliable, with the accuracy of spinal curve measurements comparable to that of X-ray assessments. The 3D images of the spine produced by Scolioscan also enable healthcare professionals to understand the condition of their patients better.

Scolioscan is seen as a breakthrough in the diagnosis and monitoring of scoliosis, and is being used in medical centres in multiple countries and cities, including the Netherlands, Italy, Australia, Poland, Romania, Bosnia, Beijing, Guangzhou, Shenzhen, Macau, and Hong Kong. More than 6,000 scoliosis patients have been scanned by Scolioscan, while a total of 24 patents for the related technology have been awarded to, or filed by, PolyU and the company with which it is collaborating.

A device that fits in a suitcase

Professor Zheng's team has also developed a portable version of the technology, known as Scolioscan Air. The portable device, which is composed of a palm-sized wireless ultrasound probe with an optical tracking device and a laptop or tablet computer with dedicated software, weighs just 5 kg and fits into a suitcase.

The device uses a unique 3D optical tracking method to capture the movements of the probe, giving real-time ultrasound images of the spinal tissues. The software programme then uses these images to reconstruct images of the whole spine and obtain accurate measurements of spinal deformity. A typical scanning of the back of an adolescent patient using Scolioscan Air takes only 30 seconds, and can be done anytime, anywhere as needed.

Improving public awareness of spinal health

The portable nature of the Scoliocan Air enables it to be used for scoliosis assessments in schools, youth and community centres, helping to increase public awareness of spinal health. It also enables real-time assessments to be conducted, optimising the outcomes of non-surgical treatment for scoliosis patients.

Scolioscan Air is a prime example of PolyU's commitment to conducting research that has real-world benefits. The innovation received a Grand Award, Gold Medal with the Congratulations of Jury, and a Special Merit Award at the 47th International Exhibition of Inventions Geneva in 2019.

The research team is currently working on automating the process of creating 3D spinal models, in the hope that the new software will help predict the progression of spinal curvature and assist in the design of orthosis devices and exercises to treat scoliosis.

Ir Professor Zheng Yongping demonstrates the use of Scolioscan Air.

Experts join hands to tackle environmental and energy challenges

PolyU is strengthening its research collaboration with institutes in the Greater Bay Area (GBA) through the establishment of two joint laboratories focusing on environmental and energy challenges. Experts from PolyU will serve as Co-Directors at both laboratories.

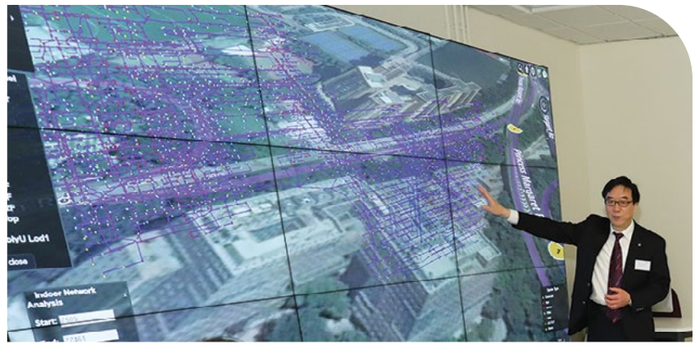
Guangdong-Hong Kong-Macao Joint Laboratory of Environmental Pollution Processes and Control

The University has co-founded the Guangdong-Hong Kong-Macao Joint Laboratory of Environmental Pollution Processes and Control in Guangzhou with the Guangzhou Institute of Geochemistry (GIG) of the Chinese Academy of Sciences. Professor Peng Ping'an from GIG and PolyU's Professor Li Xiangdong, Chair Professor of Environmental Science and Technology and Associate Dean of the Faculty of Construction and Environment, will serve as Co-Directors of the joint lab. The Laboratory is focusing on large-scale collaborative research to address pressing environmental issues in the GBA, such as air quality improvement, the environment and health in city clusters, the remediation of contaminated urban land, municipal solid waste and sewage treatment in rural areas, and the ecological management of estuary and coastal areas.

Guangdong-Hong Kong-Macao Joint Laboratory for Photonic-Thermal-Electrical Energy Materials and Devices

PolyU and Southern University of Science and Technology (SUSTech) have joined forces to establish the Guangdong-Hong Kong-Macao Joint Laboratory for Photonic-Thermal-Electrical Energy Materials and Devices. Professor Zhao Yusheng, Associate Vice President of SUSTech, is serving as Director and Professor Chen Guohua, Associate Vice President (Research Support) of PolyU, is Co-Director. The Laboratory's research will focus on solar cells, fuel cells, thermal energy conversion and storage, and advanced batteries for energy storage. With support from the Guangdong provincial government and industrial partners, as well as the University of Macau, the Hong Kong University of Science and Technology and the University of Hong Kong, the Laboratory offers a platform for experts in the GBA to work together to tackle major energy challenges, expediting the transfer of technology from universities to solve real-world problems.

New Futian institute boosts PolyU's impact in GBA



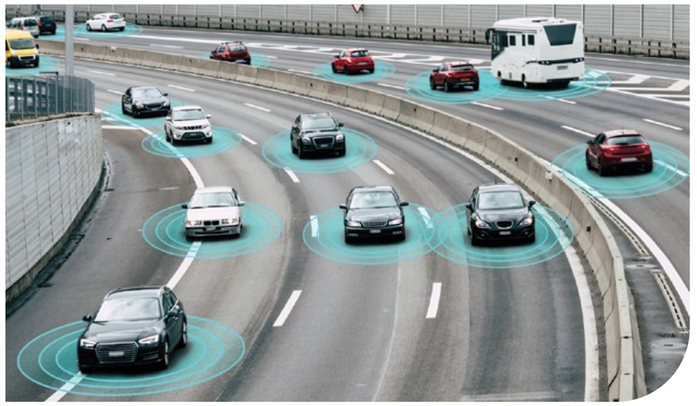
Under the Pilot Scheme, Professor John Shi will lead a research project on Geo-Artificial Intelligence spatial Big Data analytics.

PolyU is launching a new research institute in Futian to leverage the opportunities offered by the Greater Bay Area (GBA) development. The PolyU-Shenzhen Technology and Innovation Research Institute (Futian) will run research projects supported by the Shenzhen-Hong Kong Science and Technology Innovation Cooperation Zone (Pilot Scheme). The Institute will add impetus to the impactful research produced by PolyU.

The first project under the Pilot Scheme will be led by Professor John Shi, Head of Department of Land Surveying and Geo-Informatics, and will investigate "Theories of Geo-Artificial Intelligence and Reliable Spatial Data Analytics". This project, which benefits from a start-up grant and rent-free office from the Futian Government, will contribute to smart city development in Hong Kong and GBA cities, as well as other cities in Mainland China and around the world.

Joint laboratory to explore innovation in autonomous vehicles

PolyU has joined forces with an institute in Guangzhou to conduct research into autonomous vehicles and intelligent navigation systems. Technological advances mean vehicles will soon be able to exchange information with other vehicles and smart devices along roads.



ICVs and autonomous vehicles are a promising area of technological development in China.

To explore innovations in this area further, the University has partnered with the Institute of Software Application Technology, Guangzhou and Chinese Academy of Sciences (GZIS) to create a Joint Laboratory of Collaborative Communication, Navigation, Positioning and Sensing. Dr Hsu Li-Ta, Assistant Professor of Interdisciplinary Division of Aeronautical and Aviation Engineering, is leading a team from PolyU to work with GZIS, focusing on intelligent navigation and unmanned vehicle communication and positioning, vehicle networking, and vehicle-road collaborative sensing technologies and equipment.

Research from the Laboratory will not only foster the development of Intelligent Connected Vehicles (ICVs) and autonomous driving in Guangzhou, but also across other major Mainland cities, after the central government highlighted its support for the industry in the Strategy for Innovation and Development of Intelligent Vehicles, issued by the National Development and Reform Commission of China earlier this year.

BEATING THE HEAT

for construction workers

Researchers from PolyU's Department of Building and Real Estate have spent the past decade finding innovative ways to help protect construction workers from the heat. Solutions produced by the Department range from smart alert systems that detect if workers are in danger of overheating, to specially designed clothing, to the creation of optimal work schedules. The Department's contributions have won multiple awards, influenced industry guidelines and even been adopted internationally.

Heat stress danger

Hong Kong's hot and humid summers put construction workers at risk of developing heat stress, which can lead to heat exhaustion, heat stroke and even death. Heat stress occurs when the body is no longer able to get rid of excess heat, and regulate its internal temperature. A range of factors contribute to the condition, including age, temperature, humidity, habit of cigarette and alcohol intake, the type of clothing worn and work intensity.

As part of an ongoing effort to improve the safety of construction workers, Professor Albert Chan, Head of the Department of Building and Real Estate and Able Professor in Construction Health and Safety, and his team have spent the past decade looking for ways to reduce the risk of heat stress.

Creating an early warning system

The team's most recent innovation has seen it partner with a mobile communications company to develop an early warning system that monitors heat stress levels in workers. One of the devices the system uses is a smart helmet which monitors workers' vital signs, including body temperature and heart rate, in real time to detect early signs of heat stress. The innovation won first prize in the Construction Industry Council's (CIC) Construction Innovation Award 2019 in the Construction Safety category.

Anti-heat stress clothing made from nano materials

In another project, researchers from the Department collaborated with experts in occupational safety, textile science and sports science to develop an Anti-heat Stress Uniform (AHSU) for construction workers. "The uniform is made up of a polo shirt top and cargo pants bottom, both made with advanced fabrics that leverage nanotechnology to wick sweat away from the skin so that they feel drier and more comfortable. At the same time, sweat is evaporated more effectively because of a larger surface area while heat is absorbed from the skin. That is why the uniform also feels cooler," Professor Chan explains.

Professor Albert Chan (front row, third from left) with his research team, and Dr Francis Wong (third from right), Director of Hong Kong Institute of Construction

In order to give back to the community, PolyU licensed the technology for the multi-award winning uniform to the CIC for a nominal fee. The Council ordered 20,000 sets of AHSU for its trainees and recommended the uniform as the standard attire in all training centres. In 2017, the Civil Engineering and Development Department of the HKSAR Government included a term in all public works contracts specifying AHSU as a standard uniform for all workers. Within the first year of its launch, contractors and other organisations in Hong Kong had ordered around 100,000 sets of the uniform, while it has also been licensed to government agencies and manufacturers in Macao, the Middle East and Cambodia.

The project won the 44th International Exhibition of Inventions of Geneva: Grand Prize and Gold Medal, the Innovation Achiever's Award at the UK's Chartered Institute of Building's International Innovation and Research Awards 2015, and the Local Grand Prize of the CIC's Innovation Award 2015.

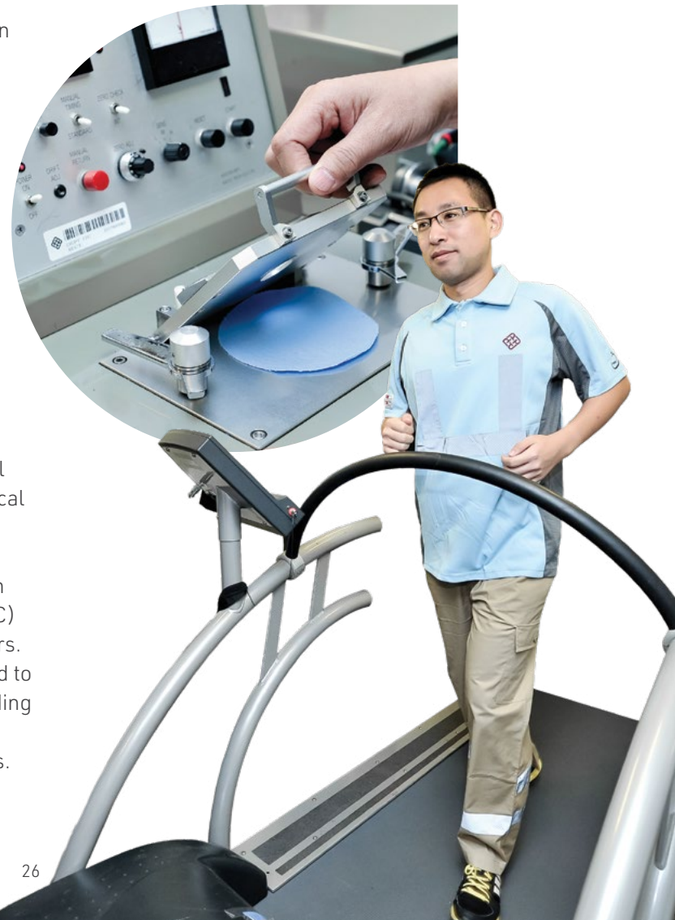
In 2013, the team also carried out a pilot study with the Occupational Safety and Health Council (OSHC) to test different models of cooling vests for workers. The study found that wearing a cooling vest helped to protect people working in high temperatures, leading to the Labour Department and OSHC launching a pilot scheme promoting their use in four industries.

When taking a break increases productivity

The team has also researched the impact that rest periods can have on construction workers' wellbeing. "To reduce the risk of heat stress, our team developed a model to scientifically determine an optimal work-rest schedule that strikes a balance between productivity and workers' health," Professor Chan says.

Researchers found that productivity could be maximised and the incidence of heat stress minimised if workers took a 15-minute break after working continuously for 120 minutes in the morning, and a 20-minute break after working continuously for 115 minutes in the afternoon. Their recommendations have been adopted by the CIC in its *Guidelines on Site Safety Measures for Working in Hot Weather*.

The research of Professor Chan and his team is just one example of how PolyU commercialises its innovation to help change the world for the better.



Made from nano materials, the Anti-heat Stress Uniform has been adopted as a standard workwear for construction workers.

Educating ENTREPRENEURS and supporting START-UPS

PolyU has long incorporated entrepreneurship training into its holistic education model to help students excel in today's dynamic environment and make a difference to society.

Dr Miranda Lou, Executive Vice President (middle of second row), meets with local, mainland and overseas students from the entrepreneurship training programme.

Edwin Wong was in his third year of studying marketing at PolyU when he set up an online sales platform for restaurants and small-to-medium sized brands with HK$120,000 of seed funding he received from the PolyU Micro Fund. The experience led to him co-founding social media analysis platform Cloudbreakr, which uses big data to help companies understand market trends. Today Cloudbreakr operates in Hong Kong, Singapore, Taiwan, Thailand and Malaysia.

Cloudbreakr is just one of many enterprises founded by students who have benefitted from PolyU's support for entrepreneurship. To date, more than 145 start-up ventures have received pre-incubation assistance and funding from the PolyU Micro Fund since its launch in 2011. Not only are 75% of these organisations still in operation, but they have collectively secured more than HK$118 million of further funding and investment support.

Pioneering entrepreneurial education

PolyU is a pioneer in recognising the importance of promoting entrepreneurial culture among students. It was the first university in Hong Kong to provide financial support for student-led start-ups, while its Institute for Entrepreneurship, which forges closer links between academics and business, was set up back in 1999.

Dr Miranda Lou, Executive Vice President, says: "Entrepreneurial mindsets and skills are very much needed in today's dynamic and ever-changing environment. PolyU therefore offers holistic education, seed grants, incubation and acceleration support to foster innovation and 'Do Well Do Good' entrepreneurship development among students, alumni and research staff to generate social and community impact."

From skills to seed funding

The University has put in place a comprehensive framework to incorporate entrepreneurial training into its education model.

It has a range of funds that disburse more than HK$10 million every year to support 40 to 50 start-ups and student innovation projects. Alongside the PolyU Micro Fund, the Student Entrepreneurial Proof-of-Concept Fund supports students' in-classroom entrepreneurship learning through awards of up to HK$20,000 per project for prototyping and market testing. Meanwhile, the Tech Launchpad Fund provides gap funding of up to HK$1.5 million per project to accelerate the growth of technology start-ups founded by PolyU members.

PolyU supports students and graduates through different entrepreneurship funding schemes

Start-ups supported ~300

Entrepreneurs nurtured ~1,000

Follow-on funding secured HK$ 430+ million (2011 - 2019)

Support is not limited to funding, with aspiring entrepreneurs also offered credit-bearing courses, extra-curricular activities and entrepreneurship training programmes to hone their skills. The PolyU InnoHub acts as a nurturing ground for young entrepreneurs, with major partners engaged in regular local collaborations including MIT Hong Kong Innovation Node and Hong Kong Science and Technology Parks Corporation. Students can also seek advice and guidance from PolyU alumni. The University has coined the term "Poly-preneur®" for a network of venturous graduates who created their own companies. There are now 800 Poly-preneurs® who regularly take part in seminars and workshops organised by the University to share their insights and experience with the aspiring entrepreneurs.

Supporting start-ups beyond Hong Kong

The University also fosters entrepreneurship in the Greater Bay Area (GBA) through PolyU InnoHub (Shenzhen) and the GBA International Institute for Innovations, which it established with the Shenzhen University. The latter offered a seven-week, first-of-its kind Start-up Internship and Immersion Programme in May last year, giving students from Hong Kong, Mainland China and overseas insights into entrepreneurship and innovation in the GBA.

PolyU also partnered with Shanghai Technology Entrepreneurship Foundation for Graduates between 2013 and 2019 to offer the first ever China-Hong Kong cross-border matching fund for PolyU graduates to start new businesses in Shenzhen and Shanghai, with RMB200,000 of funding available per project. The scheme benefitted 59 projects which went on to raise more than HK$226 million in further funding support.

International recognition

Products and technologies developed by PolyU-supported start-ups have gained impressive industry recognition, receiving more than 200 awards over the years, while some of the enterprises have expanded beyond Hong Kong into Greater China and ASEAN countries.

Going forward, the University plans to further reinforce its programmes to continue to provide a multidisciplinary, comprehensive and experiential entrepreneurship education. It will also offer academic support to deep tech start-ups to bring researchers closer to markets, and market opportunities closer to the University, thereby promoting 'Do Well Do Good' entrepreneurship within PolyU and the start-up community at large to advance social and economic developments.

Founders of PolyU-supported start-ups exchange views on the challenges and opportunities for entrepreneurs at PolyU InnoHub (Shenzhen).

PolyU ranked 75th in the world in latest league table

6th QS Top 50 Under 50 Rankings 2021

25th QS Asia University Rankings 2020

75th QS World University Rankings 2021

The Hong Kong Polytechnic University, which constantly strives for excellence in education, research and knowledge transfer, was ranked 75th out of more than 1,600 universities globally in the recently announced QS World University Rankings 2021. It was also ranked 25th in the QS Asia University Rankings 2020.

PolyU has previously been recognised as one of the leading young universities in the world. Granted full university status in 1994, PolyU was ranked sixth in the QS Top 50 Under 50 in 2021.

Highly rated in a number of disciplines

PolyU was also ranked highly for individual subjects, with the QS World University Rankings by Subject 2020 rating six disciplines at PolyU as being among the top 50 in the world. Hospitality and Leisure Management led the way being ranked 7th, followed by Art and Design at 15th, with Civil and Structural Engineering placed 19th, Architecture/ Built Environment 22nd and Nursing, and Linguistics ranked 31st and 45th respectively.

In addition, PolyU was named as being the best place in the world to study Hospitality and Tourism Management by the ShanghaiRanking's Global Ranking of Academic Subjects 2020. Its Faculty of Business was also rated as being the world's 61st best business school in the latest University of Texas in Dallas Top 100 Worldwide Business School Rankings, which is based on research contributions. The University also ranked first in the world in Operations Management and Management Science in 2018, according to the Korea University Business School Worldwide Business Research Rankings.

These impressive rankings are achieved through the concerted efforts of the university community. Going forward, PolyU will continue its pursuit of excellence and impact through its education and research endeavours, strengthening its position as a world-class university, while making significant contributions to Hong Kong, the nation and the world.

Campus expansion to meet allied health professionals' training needs

An artist's impression of the academic building and hostel building at the Ho Man Tin Slope

PolyU is pleased to announce that its funding proposal for a campus expansion project at Ho Man Tin Slope was approved by the Finance Committee of the Legislative Council on 26 June 2020. The proposal for a new academic building, which is needed to meet the increase in UGC-funded healthcare training places, was supported by both the Secretary for Food and Health and the Secretary for Education.

The project involves the construction of an 11-storey academic and administration building, providing over 10,000 square metres for classrooms, lecture theatres, teaching and research laboratories, study spaces, amenities and additional facilities for students of optometry and rehabilitation sciences. It also includes the provision of a hostel building providing 1,279 places, which is being partially funded by Government's Hostel Development Fund. The project is planned to be completed in 2026.

Largest share of Research Impact Fund two years in a row

Recognition of the significance of PolyU's research endeavour to society received a major boost when the University gained the most support among Hong Kong's publicly funded universities from the city's Research Impact Fund in the number of projects and level of funding in 2019/20.

This achievement marked the second year in a row that PolyU led the way in these two criteria, with more than HK$97 million secured for its impact-related proposals over the two years.

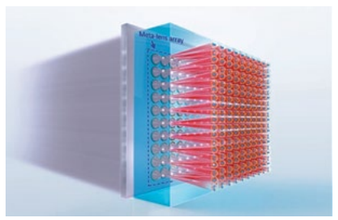
The Research Impact Fund is administered by the Research Grants Council (RGC), which operates under the University Grants Committee. The Fund seeks to encourage universities in Hong Kong to conduct more collaborative research projects that benefit the wider community.

In the 2019/20 exercise, five PolyU-led projects were awarded more than HK$32.6 million from the Fund, representing 45% of the projects supported and funds granted.

In 2018/19, 10 out of 30 projects supported by the Fund were headed by PolyU. These proposals were granted more than HK$65 million, around one-third of the Fund's total support for the year.

The funding results testify to the University's strength in undertaking impactful and translational research projects that meet society's needs and improve people's well-being.

Collaborative research in quantum information optics published in *Science*



An illustration of metalens-array-based high-dimensional and multi-photon quantum source

PolyU has joined forces with Nanjing University, University of Science and Technology of China, National Taiwan University, Academia Sinica, East China Normal University, and National United University to conduct cutting-edge research into quantum information optics. The research findings are detailed in a research paper titled "Metalens-array-based high-dimensional and multi-photon quantum source", which was recently published in top international journal *Science*.

Professor Tsai Din-ping, Chair Professor and Head of Department at PolyU's Department of Electronic and Information Engineering, is one of the leading academics in this field contributing to the breakthrough research. The research will help to realise many applications of quantum information science in people's daily lives in the future, in areas such as quantum mobile communications, email access, online transactions, cashless payments, ATMs and e-banking, internet security, machine learning, artificial intelligence, neural networks and other applications related to security and confidentiality.

Professor Yung Kai-leung (left) with the Camera Pointing System and Dr Wu Bo with a 3D map showing the landing location of the lander

> We encourage young people with an interest in scientific research to explore the universe, to potentially help reveal, not only the secrets of the origins of humanity, but also the earth's future.

Scholars named Leader of the Year for their contributions to China's lunar exploration

Two PolyU scholars have won the Leader of the Year Award 2019 presented by Sing Tao News Corporation for their outstanding contributions in the historic landing of the nation's Chang'e-4 lunar probe on the far side of the Moon. Professor Yung Kai-leung, Associate Head of the Department of Industrial and Systems Engineering and Sir Sze-yuen Chung Professor in Precision Engineering, and Dr Wu Bo, Associate Professor in the Department of Land Surveying and Geo-informatics, won the award in the Education/Professions/Technology and Innovation category.

The research team led by Dr Wu Bo developed a lunar topographic mapping and geomorphological analysis technique to help find the best location for the Chang'e-4's landing. In 2016, Dr Wu and his team began amassing large volumes of lunar remote sensing data to create topographic models and geomorphological maps of potential landing regions, with the aim of finding an area that was flat enough to enable the lander to touch down safely and for the rover to explore freely.

Meanwhile, Professor Yung's team, in collaboration with the China Academy of Space Technology, developed a Camera Pointing System which was mounted on the upper part of the probe's lander, enabling the spacecraft to send back stunning images – providing the world with the first-ever glimpse of this uncharted region. Weighing just 2.8kg, the system was designed to be able to perform a wide range of motion functions despite the Moon's low-gravity and hostile environment.

Dr Wu said the success of the landing was due to the combined efforts of numerous scientists and engineers working behind the project. Professor Yung added that the award would have a positive effect in attracting talent to aerospace research.

PolyU is the only university in Hong Kong that has contributed to this space mission. The University has adopted a cross-disciplinary approach, integrating its pool of expertise and resources to develop sophisticated and effective solutions to assist the nation's space missions, including the Chang'e-5 lunar exploration and China's first mission to explore Mars later this year.

Lee Hysan Foundation partners with PolyU to tackle elder abuse

Lee Hysan Foundation, as a strategic partner, has made a generous gift to The Hong Kong Polytechnic University to launch a four-year project "Collaborative Efforts to Intervene and Prevent Elder Abuse". The project will create the first evidence-based protocol for detecting, intervening and preventing elder abuse.

By 2038, it is estimated that 32% of Hong Kong's population will be aged 65 or above. The rapidly ageing population could lead to increased cases of elder abuse, with victims at risk of suffering mental distress, physical harm, and even death in extreme cases. Without timely and effective intervention and mitigation, elder abuse could become a serious social issue and a huge public health problem.

The project will be spearheaded by the Faculty of Health and Social Sciences, with expert input from its five disciplines of Applied Social Sciences, Nursing, Optometry, Rehabilitation Sciences, and Health Technology and Informatics. It will also collaborate with external partners, including six NGOs and two medical professional bodies.

PolyU's project team will develop a set of screening tools, a practice manual and training procedures to better handle and manage cases of elder abuse. The abuse assessment service will initially be made available to 1,500 elderly people, with 400 at-risk and confirmed abuse cases also receiving a follow-up service from the project. In addition, the team will run a training and awareness programme to equip 2,000 elderly people and their caregivers, as well as 600 professionals and students, with the knowledge to detect elder abuse.

In the long run, we hope the project will raise community awareness of the issue and train up professionals to detect suspected cases, contributing to the prevention of elder abuse in society.

Hotel ICON recognised for training and service excellence

PolyU students undertake internship at Hotel ICON to gain management experience.

PolyU's Hotel ICON, the world's first fully-integrated teaching and research hotel, has consistently earned recognitions from major international travel industry bodies.

The hotel, part of the School of Hotel and Tourism Management, has won the Pacific Asia Travel Association (PATA) Gold Award 2019 (Education and Training category) for its 'We Love to Care' training programme. The programme aims to inspire and develop talents for the hospitality industry, enhance their self-awareness and emotional intelligence at work, and drive guest service excellence.

Meanwhile, Forbes Travel Guide 2020 has granted Hotel ICON a four-star rating – the sixth consecutive year that the hotel has earned this distinctive accolade from the global authority on luxury travel. The Forbes award, which is based on thorough inspections by highly-trained professionals, recognises Hotel ICON as an outstanding hotel with a stylish design, polished service, and modern facilities.

Furthermore, the premier hotel is consistently placed among top hotels in Hong Kong by TripAdvisor and is currently rated among top three in the city. It showcases work from celebrated local designers and acclaimed international architects, and sits among the top 16 luxury hotels in Hong Kong.

Major external appointments and awards of PolyU members

In the first quarter of 2020, the following PolyU members were either appointed significant duties to share their scholarly expertise to benefit the wider community or had their academic efforts duly recognised.

Professor Chetwyn Chan
Associate Vice President (Learning and Teaching)
Chair Professor of Rehabilitation Sciences
Director of the University Research Facility in Behavioral and Systems Neuroscience

Appointments

- Member, Quality Assurance Council, University Grants Committee
- Member, Employees Retraining Board (ERB)
- Convenor, Quality Assurance and Review Committee, ERB

Award

- Second Class Prize, State Scientific and Technological Progress Award 2019

Professor David Shum
Dean, Faculty of Health and Social Sciences
Chair Professor of Neuropsychology
Yeung Tsang Wing Yee and Tsang Wing Hing Professor in Neuropsychology

Appointments

- Chairman, Regional Advisory Committee of Hong Kong, Hospital Authority
- Member, Hospital Governing Committee, Hong Kong Eye Hospital & Kowloon Hospital

Professor John Xin
Chair Professor of Textile Chemistry
Lee Family Professor in Fashion and Textiles

Award

- Second Class Prize, State Scientific and Technological Progress Award 2019

Senior staff appointments and promotions
(between 1 July 2019 and 30 June 2020)

Congratulations to the following PolyU members who have recently taken up a new capacity at the University. (listed in alphabetical order)

Promotions

Professor Lau Shu-ping
as Chair Professor of Nanomaterials
on 1 July 2019

Professor Ni Yiqing
as Chair Professor of Smart Structures and Rail Transit on 1 July 2019

Professor To Chi-ho
as Chair Professor of Experimental Optometry on 1 July 2019

Professor Hector Tsang Wing-hong
as Chair Professor of Rehabilitation Sciences on 1 July 2019

Ir Professor Alexander Wai Ping-kong
as Deputy President and Provost on 1 March 2020

Ir Professor Zheng Yongping
as Chair Professor of Biomedical Engineering on 1 July 2019

Appointments

Professor Chen Guohua
as Director, Research Institute for Smart Energy on 1 May 2020

Dr Cheng Siu-kei
as Director of Chinese Language Centre on 1 July 2019

Professor Han Xiaorong
as Director of Confucius Institute of Hong Kong on 1 November 2019

Professor Leung Yun-chung
as Director, University Research Facility in Life Sciences on 1 March 2020

Professor Li Ping
as Dean, Faculty of Humanities and Chair Professor of Neurolinguistics and Bilingual Studies on 2 September 2019

Professor Liu Wu
as Head, Department of Management and Marketing on 1 January 2020

Professor Lu Haitian
as Director of Chinese Mainland Affairs on 1 February 2020

Dr Grace Ngai
as Head, Service-Learning and Leadership Office on 1 March 2020

Professor Poon Chi-sun
as Head, Department of Civil and Environmental Engineering on 1 July 2019

Professor Shi Wenzhong
as Director, Smart Cities Research Institute on 1 May 2020

Professor Sun Defeng
as Head, Department of Applied Mathematics on 1 July 2019

Professor Tsai Din-ping
as Head, Department of Electronic and Information Engineering and Chair Professor of Nanophotonics on 1 August 2019

Brain, language and HAPPINESS

Professor Li Ping, Dean of the Faculty of Humanities and Chair Professor of Neurolinguistics and Bilingual Studies of the Department of Chinese and Bilingual Studies, is an internationally renowned scholar. He was appointed Changjiang Scholar Chair Professor by the Ministry of Education of China and was a recipient of a US National Science Foundation (NSF) grant through the Obama White House Brain Initiative in 2015. He also served as President of the Society for Computation in Psychology in 2012, and as Director at NSF for the Programmes in Perception, Action and Cognition from 2007 to 2008 and in Cognitive Neuroscience from 2008 to 2009.

With an impressive record of obtaining research grants from national and international funding bodies, Professor Li focuses his research on understanding the developmental, neural and computational bases of language learning and representation, and the relationships between language, culture, and technology.

In laymen terms, he is exploring the way the brain handles and stores language, considering not just one, but multiple languages. One of his on-going projects looks at the effect the excessive use of electronic devices has on the brain's ability to absorb and interpret the hierarchical knowledge structures used in scientific writings. Equally interesting is the Virtual Reality (VR) Language Laboratory he has set up at PolyU, which uses technology to facilitate language learning. Professor Li found that VR learning induces positive brain changes, meaning that with the same amount of time and learning materials, a VR setting promises to be much more conducive to the acquisition of a new language than a conventional classroom setting.

Professor Li describes his career as being interdisciplinary, leading to diverse perspectives and approaches. Prior to joining PolyU, he was Professor of Psychology, Linguistics, and Information Sciences and Technology at Pennsylvania State University in the US. He is currently Editor-in-Chief of *Brain and Language*, Associate Editor of *Frontiers in Psychology: Language Sciences*, and Editor Emeritus for *Bilingualism: Language and Cognition* and *Journal of Neurolinguistics*, among other editorships.

Professor Andrew Li Ping

- MA in Theoretical Linguistics, Peking University
- PhD in Psycholinguistics, University of Leiden, The Netherlands
- Assistant Professor, CUHK, 1992-1996
- From Assistant Professor to Full Professor, University of Richmond, 1996-2008
- Professor of Psychology, Linguistics, and Information Sciences and Technology, Pennsylvania State University, 2008-2019
- Joined PolyU in 2019 as Chair Professor

Humanities matter

Professor Li believes that the study of humanities is central to PolyU's mission to provide a holistic education to the younger generation. He points out that all world-class universities, including those known for their technical orientation, such as MIT and Caltech, are very strong in the humanities. He explains that students need to be armed with imagination and curiosity, critical thinking and communication skills, and a broad perspective to look at the world and to understand what it means to be 'human'.

He points out that having a broad perspective not only prepares students for a fruitful career but also makes them globally-minded citizens. When Professor Li reflects on the state of divisiveness that plagues many societies in the world today, he sees that many groups are locked stubbornly in their own position and are unable to communicate, let alone reconcile, with one another, which may be due to their lack of empathy. The study of humanities can help to find future solutions to these issues, for example, by collaborating with neuroscience and psychology, to unlock the mysteries of the human brain and to help people become more open and receptive to other points of view.

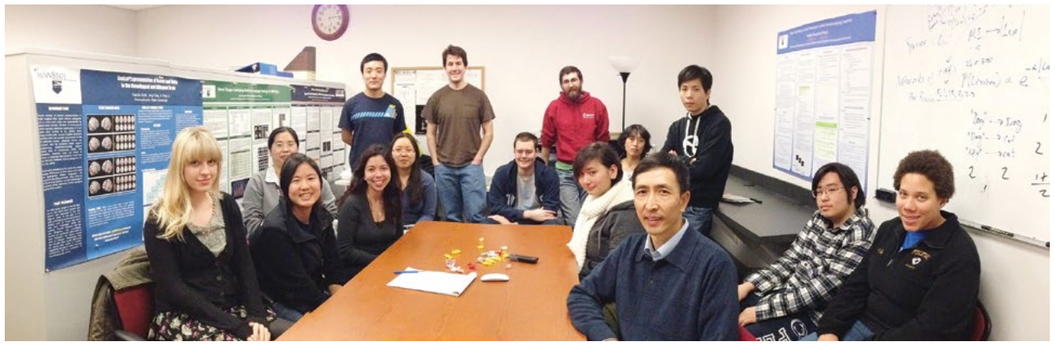
Professor Li regards his present appointment at PolyU as an opportunity, as well as a challenge as he breaks out of his comfort zone. For him, the spirit of PolyU is best captured by the bricks with which it is built. A brick is solid and resilient and has many angles, edges and faces. It symbolises for him the *gravitas* and multi-faceted character of this University.

Professor Li with his family

A life of passion, commitment, and optimism

When he has free time, which is admittedly rare, Professor Li likes to curl up with a good science fiction book, where imagination merges with scientific curiosity. He lives by two mottos, one in Chinese and the other in English: "老老實實做人，認認真真做事 (Be earnest with your life; be serious with your work)" and "Don't worry, be happy", respectively reflecting a responsible and optimistic approach to life. He suggests pursuing a virtuous circle of passion, commitment, and optimism: if we are passionate about what we do, we become responsible; because we are responsible, we perform well in our work and life, which makes us happy; and because we are happy, we become all the more passionate about what we do.

Professor Li and his students



Ablaze with CURIOSITY

Professor Asif Sohail Usmani

- MS in Structural Engineering, Stanford University
- PhD from University of Wales, Swansea
- From Lecturer to Professor of Structural Engineering, University of Edinburgh, 1995-2015
- Head of the Division of Civil Engineering, Brunel University London, 2015-2016
- Joined PolyU in 2016

For someone who has spent his career working in structural engineering and fire safety, the 9/11 terrorist attacks in New York stand out as a pivotal event. Professor Asif Sohail Usmani, Head of the Department of Building Services Engineering, particularly remembers that many of the firefighters who died that day were killed after entering the World Trade Center Twin Towers shortly before they collapsed. "They had no clue what was going to happen. Firefighting is still a relatively conservative field and there haven't been significant changes in the way it is done for a long time," Professor Usmani says.

Harnessing AI to predict and control fires

His current research focuses on forecasting in real-time how fires will behave, to enable firefighters to be better informed about the hazards they face. After being awarded HK$33 million for his project "SureFire: Smart Urban Resilience and Firefighting" by the Theme-based Research Scheme of the University Grants Committee last year, Professor Usmani is leading an international team to conduct this research in fire prediction, prevention and control, and emergency management.

"We have proposed using artificial intelligence (AI) technologies to predict the growth of fires in large buildings, just like weather forecasting, albeit on a much shorter time scale," he explains. He adds that fires are too complex for computers to analyse in real-time. As a result, the project will investigate whether AI can be used to match live fires to ones that have been previously simulated, to predict how the fires will develop. "We want to make sure cities like Hong Kong have state-of-the-art, smart firefighting." The research project is the latest in his long career combining structural engineering, computational methods and fire safety.

An enormous research contribution

Professor Usmani's predominant research interest over the past 20 years has been to understand the thermo-mechanical behaviour of structures in real fires using analytical and computational methods validated with experimental data. The aim of this work is to move away from the prevalent prescriptive practice for the design of structural fire resistance by developing new and rational design methods in which realistic representations of demand (fire and loads) are set against scientifically-robust estimates of structural capacity (resistance) in order to ensure a reliable performance.

He has found that the prevailing one-size-fits-all approach to fire resistance design is potentially unsafe, and he has introduced an alternative approach for large structures. This approach was used by Arup in Plantation Place, London. The structure met all safety standards while saving £250,000 in fire protection costs. Large consulting firms have since applied this approach to many of their projects.

Professor Usmani with son, Mrs Usmani, daughter and son-in-law in a family gathering

> PolyU is an exciting university with an amazing future ahead as a leading research university, particularly in infrastructural engineering.

Professor Usmani's research work has already yielded over 300 peer reviewed publications, authored and edited books, as well as technical reports resulting from research funding in excess of HK$100 million.

30 years in UK academia

Professor Usmani became interested in architecture and engineering at an early age walking to primary school flanked by the Red Fort and the Jamia Mosque in Delhi, India. His father taught civil engineering at the Karachi Polytechnic in Pakistan, and Professor Usmani remembers being fascinated by a town planning project his father did with his students.

After studying civil engineering at university, he worked in Saudi Arabia, before going to Stanford University to do a Master of Science in Structural Engineering. It was while he was at Stanford that Professor Usmani first became interested in the finite element method, a mathematical technique that is used to analyse large and complex structural frameworks. He went on to do a PhD in this area at the University of Wales.

Professor Usmani's research on fire safety began in 1995 when he took up his first lectureship at the University of Edinburgh, when he used the finite element method to see if the behaviour of steel-frame buildings in fires could be predicted.

Working in the best place in the world

After working in Edinburgh for more than 20 years, an opportunity arose for Professor Usmani to join PolyU. "I think my career path has finally brought me to the best place in the world. I love civil infrastructure and buildings and high-octane urban environments," he says.

He has been particularly impressed by graduates from the Department of Building Services Engineering. "When I go out, I am amazed to see how many of our alumni are running Hong Kong. I would say 50% of Hong Kong's building services engineers are probably graduates of PolyU." *

A curiosity for life and languages

In his spare time, Professor Usmani has a passion for languages. He already speaks English, Hindi, Urdu, as well as some Persian, Arabic and French, and he is currently learning Putonghua. He also enjoys taking city breaks with his wife, and tries to visit his son and daughter, both in their 20s and working in London, once a year.

Professor Usmani says he has always been driven by curiosity, and his advice to students is to keep their eyes open for new opportunities and find a niche they can explore. "While the world is becoming more competitive, there are a great deal of opportunities becoming possible with the growth in new knowledge and technologies," he says.

** The Department of Building Services Engineering has nurtured more than 10,000 graduates since it was established in 1981. Graduates have worked in the fields of consultancy, contracting, operations and maintenance, and facilities management, for employers including the Government, developers, builders and public utilities.*

AN INNOVATIVE VISION for Hong Kong

Mr Alfred Sit Wing-hang

- Appointed Secretary for Innovation and Technology of HKSAR in April 2020
- Former Director of Electrical and Mechanical Services
- Alumnus, Department of Electrical Engineering, Hong Kong Polytechnic
- Chairman, Departmental Advisory Committee, Department of Building Services Engineering, PolyU
- Chairman, Departmental Advisory Committee, Department of Electrical Engineering, PolyU

Alfred Sit, Secretary for Innovation and Technology (I&T), reflects on how his time studying Electrical Engineering at the then Hong Kong Polytechnic (predecessor of PolyU) instilled in him the values that continue to guide him today. He still remembers one of his PolyU classmates showing him how to withdraw HK$50 from an Electronic Teller Card machine. It was the first time it had been possible to get cash without queueing at the bank. Despite occurring in the late 1970s, it is an experience that has stayed with him because it encapsulated what he considers to be the purpose of I&T: namely to improve people's daily lives and boost the economy, something that was as true back then as it is today.

Mr Sit sees I&T as the future of Hong Kong, and he encourages young people to participate actively in our rapidly changing knowledge-based society, and to pursue further studies or careers in fields related to I&T. "The development of I&T requires collaboration among Government, industry, academia and research institutes to create synergies. We need to think out of the box to improve people's lives," he says. An engineer by profession, he adds that it is part of the engineering spirit to provide solutions and fix problems.

Mr Sit also sees the current crisis caused by the COVID-19 epidemic as an opportunity for research and development (R&D), such as through providing the software and hardware required for conducting business remotely and for e-learning. Determined to turn the crisis into an opportunity, the Government has been adopting local R&D outcomes to help control the epidemic and has approved HK$65.2 million of funding for products and applications to combat COVID-19 under the Public Sector Trial Scheme.

Building the future through innovation

Mr Sit says universities play a key role in innovation. He points out that PolyU has been highly praised and is widely regarded as a forerunner in technology transfer, topping the list of eight local universities in terms of the total number of licences granted in 2018/19. He also commends PolyU's capabilities in knowledge transfer for improving the community.

To help facilitate synergies between universities and other sectors, the Government is establishing two InnoHK research clusters, which will focus on healthcare, and artificial intelligence and robotics, with the first batch of R&D laboratories due to open later this year. The initiative has already received 65 research proposals from universities and research institutes around the world, including PolyU.

The Greater Bay Area initiative, with its aim to develop an international I&T hub, also creates significant opportunities for Hong Kong. Mr Sit points out that while Hong Kong has strong R&D capabilities, it lacks the advanced manufacturing facilities that Mainland GBA cities have, while the region provides a sizeable market to commercialise R&D results. Locally, the Government is also promoting reindustrialisation and will inject HK$2 billion into subsidising manufacturers setting up smart production lines.

"Hong Kong, with its good infrastructure, legal system, and copyright and patent protection, can act as a bridge between the East and the West, facilitating technology transfer and the flow of talent," Mr Sit says.

Nurturing talent in Hong Kong

A key aspect of developing I&T in Hong Kong involves nurturing talent. To encourage this, the Government subsidises enterprises recruiting graduates and postdoctoral talent for R&D projects through the Researcher Programme and Postdoctoral Hub. By the end of April 2020, funding worth HK$1.33 billion and HK$580 million respectively had been allocated to the two programmes.

STEM (Science, Technology, Engineering and Maths) education is also being promoted in schools to nurture young people's interest in I&T. Yet Mr Sit stresses that education is not just about academic excellence and professional competencies but also developing positive values, something he learnt at PolyU. He adds that there are more opportunities for students today than in his time, such as through exchange programmes and internships, and young people must make the most of these to broaden their horizons.

Giving back

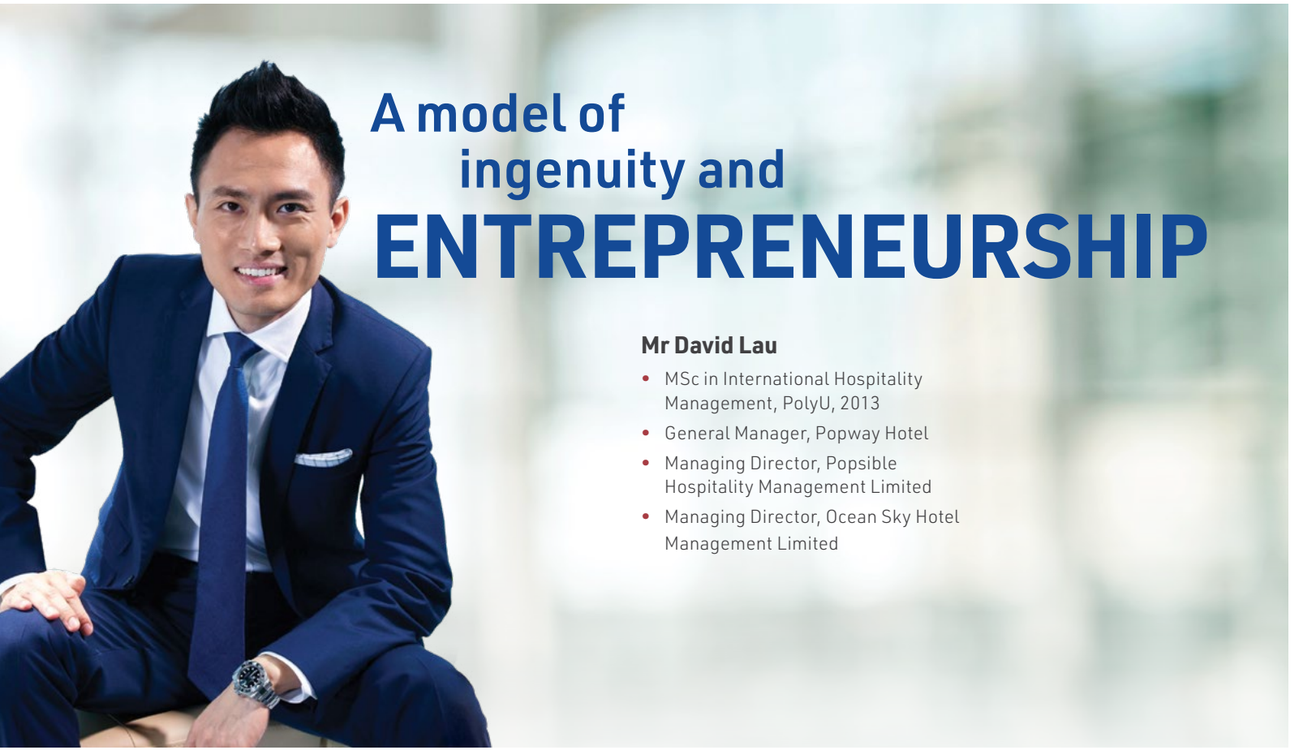
Mr Sit looks back on his days at the Hong Kong Polytechnic with great fondness, remembering everything from queueing up outside the library before it opened to get a space to study for the day, to the food he ate in the canteen. "I do not come from a well-off family. Back then, it cost only HK$2.50 for a lunch at the canteen and, therefore, I very much enjoyed having lunch on campus."

Mr Sit describes himself as a naughty student who would sometimes run away from classes to do private tutoring and earn money for his own studies. But in fact, he was a hard-working and motivated student, who spent most of his time in the library studying. He was also the youngest in his class and regarded his classmates as big brothers. Even 40 years later, he is still in touch with many of his classmates, and they have supported each other in their careers.

His alma mater also inspired him to give back to society by doing volunteer work tutoring underprivileged students and serving NGOs, such as Heep Hong Society. In his capacity as Chairman of the Departmental Advisory Committees of PolyU's Department of Building Services Engineering, and Department of Electrical Engineering, Mr Sit has given valuable advice on various aspects of the departments' development. "I received a lot of help and support, so it is time to return it," he says.

Mr Alfred Sit (right) and Professor H.C. Man, Dean of the Faculty of Engineering and Chairman of the Editorial Committee of Excel x Impact

> Have faith and trust in people, build good credit over time.



A model of ingenuity and ENTREPRENEURSHIP

Mr David Lau

- MSc in International Hospitality Management, PolyU, 2013
- General Manager, Popway Hotel
- Managing Director, Popsible Hospitality Management Limited
- Managing Director, Ocean Sky Hotel Management Limited

David Lau Ka-wai, a graduate of PolyU's School of Hotel and Tourism Management (SHTM), started running his first guest house in 2008 while he was still an undergraduate student. Hong Kong's hotel industry was booming at the time as a result of the launch of Mainland China's Individual Visit Scheme in early 2000, and David was keen to capture the opportunity. He opened a second guesthouse in 2011. But after running his hostels for several years, during which time he relied on his intuition, he wanted to increase his knowledge of hotel operations to enable him to expand his business further.

Putting learning into practice

David already had a plan to open a new 20-storey boutique hotel - Popway Hotel - in Tsim Sha Tsui, but in order to make it a success, he felt he needed to sharpen his entrepreneurial skills. This ambition led him to enrol on the SHTM's MSc in International Hospitality Management because of the world-class teaching hotel facility - Hotel ICON - that SHTM provided. "While I worked on my hotel project during the daytime, I rushed to the nearby PolyU campus at night to attend classes in hotel management," David said. He studied hard and completed the programme in one year, half the time usually required. His diligence paid off and he graduated with distinction in 2013.

SHTM's programmes put a strong emphasis on students being able to utilise what they learn in class in a workplace setting. David credits the MSc programme for strengthening his knowledge in design concepts, revenue management, inventory management and marketing, all of which have proved to be highly useful in his new business venture. "I was able to apply what I learnt from PolyU in my hotel project," David said.

Alongside teaching practical skills, PolyU also strives to instill an innovative and entrepreneurial mindset in its students. David reflected this approach in his novel idea of sharing a fixed portion of the hotel's income with its staff. This application of entrepreneurship in management - known as intrapreneurship - increases the sense of ownership among David's staff, motivating them to excel.

Unfortunately for David, when his hotel opened in 2015, Hong Kong was seeing a slowdown in the growth of mainland visitors. Undeterred, David decided to expand his customer base for the hotel to new markets in South Korea, Japan and Taiwan.

Winning and losing

David has used his expertise to provide management services. He set up a business venture to provide comprehensive hotel management and marketing services for local hotels in Hong Kong to help them weather the current business downturn caused by COVID-19. He also founded a company which started managing a hotel in Osaka earlier this year, and has plans to operate another hotel in Japan next year.

Doing business has not all been plain sailing for David, and he also experienced a setback when expanding into the nap lounge business a few years ago. "Even though there are gains and losses in life, the important thing is to learn from your mistakes," David said. "When there is a crisis, there is an opportunity. Always sharpen your skills and be prepared for when your opportunity comes."

> SHTM's MSc programme has strengthened my knowledge in design concepts, revenue management, inventory management and marketing, all of which have proved to be highly useful in my new business venture.

David believes education can change a person's life and, for that reason, he has been sponsoring the tuition fees of grass-root university students through a scholarship programme. "Education is all about finding your direction and passion, about knowing what you want to do", he said. He stays connected with his alma mater by sharing his experience as a successful entrepreneur at talks organised by faculties and schools, and at conferences and activities targeted at young entrepreneurs.

From running small hostels to managing a boutique hotel, David's adventures in the hospitality industry really embody the entrepreneurial spirit that PolyU advocates. Popway is located only a short distance from the PolyU campus. When at the hotel, David often remembers when he divided his time between overseeing his dream hotel project and studying at his alma mater. Both were memorable moments that marked a turning point in his life.

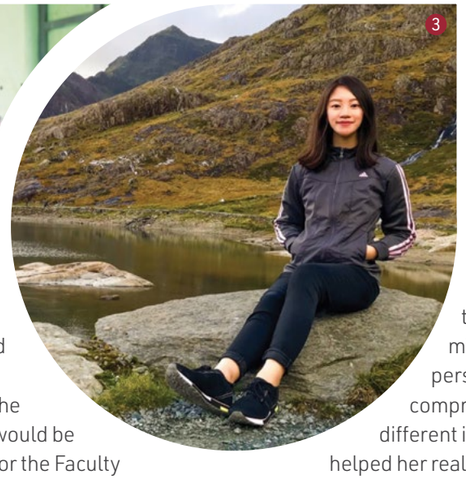
David believes mutual trust is essential for maintaining team spirit.

New Board of Directors to take alumni associations forward

The Federation of The Hong Kong Polytechnic University Alumni Associations elected its new Board of Directors for 2019-2021 earlier this year. Dr David Ng Kin-ching assumes duties as the President, while Ms Susanna Chan Sau-ha and Ir Yau Kwok-fai serve as the First and Second Vice Presidents respectively. They are joined by 17 other alumni association representatives to form the Board, which strives to promote the welfare and common interests of all of the 40 member associations, and to support the further development of the University. Congratulations to all of the new Directors.

Wearing face masks in a photo marks an unusual, yet memorable inauguration.

Kudos to PolyU's outstanding students



When Gloria Ip Ching-tung joined the Department of Civil and Environmental Engineering as an undergraduate in 2016, little did she imagine that four years later she would be named the Outstanding Student for the Faculty of Construction and Environment and even less that she would be awarded the Most Outstanding PolyU Student honour for 2019.

She puts such results down to the on-going support and encouragement she has received from teachers and university friends, and the varied opportunities she has benefited from as a PolyU student.

Right from the start, Gloria decided to take part in activities beyond the curriculum, inspired by her new understanding of work-life balance after joining the PolyU Mental Health Ambassador Programme in Year 1. That summer, she became one of the 20 delegates from PolyU to join the 8th University Scholars Leadership Symposium held by the United Nations on the theme of "Building Life, Giving Hope".

"The symposium allowed me to develop a more dynamic mindset, to think from multiple perspectives, and gain a more comprehensive global view towards different issues," she said, adding that it helped her realise such qualities are essential for those keen to play leadership roles.

In Year 3, Gloria's overseas student exchange to the University of Manchester in the UK introduced her to wider perspectives on different cultures, religions, and political outlooks.

Adding to such insights, she went to Myanmar as an organising committee member of the voluntary programme Engineers Without Borders, along with pro-bono engineers and a group of 15 engineering students. The eight-day Service-Learning trip proved life-changing.

Most Outstanding PolyU Student Award 2019

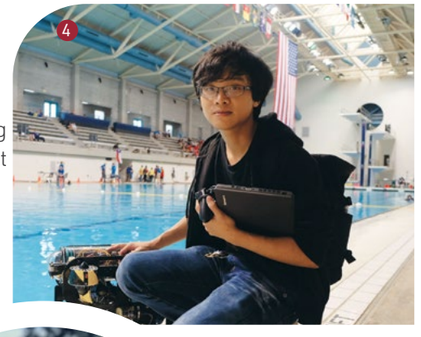
3 Gloria Ip Ching-tung

Outstanding Student Award 2019

1. Ren Zhihao, Faculty of Applied Science and Textiles
2. Tao Shiyu, Faculty of Business
3. Gloria Ip Ching-tung, Faculty of Construction and Environment
4. Chan Kai-sum, Faculty of Engineering
5. Lam Tsz-to, Faculty of Health and Social Sciences
6. Cheuk Wing-tung, Faculty of Humanities
7. Yuen Lau-kwan, School of Design
8. Gerald Chen Cheukchun, School of Hotel and Tourism Management

At times upsetting, as she learned of the hardships faced by people who struggle to earn a living, receive an education, and drink a sip of clean water, it was also highly rewarding to apply the engineering knowledge and design skills developed at PolyU to help. "The time there made me really appreciative of and grateful for my own chances in life," she said.

As such, the recipient of five different scholarships and a member of the Dean's Honours List for two consecutive years has found her student experience at PolyU to be far more than just an academic success story. In addition, it has been a fascinating inner journey and a voyage of discovery as to how to make a positive difference to others.



Students translate AI technologies to industry solutions

A group of PhD students from PolyU's Department of Computing beat more than 3,000 teams from 13 countries and regions to win a First Class Award in the first National Artificial Intelligence Challenge.

The team applied their professional knowledge and internship experience to create an artificial intelligence application in the field of video/vision.

The three students, Zeng Hui, Yang Xi and Liang Jie, who have previously completed internships at the Alibaba DAMO Academy's Artificial Intelligence Centre, explored the performance of the 4K high dynamic range standard in terms of image resolution, details, colour and dynamic range, and designed practical solutions based on their research.

Since winning the competition, the students have been collaborating with the DAMO Academy to implement their research in practical applications with a view to meeting upcoming demand as 4K displays grow in popularity.

Students win gold with education project on personal finance

A team of five students from the BSc (Hons) Scheme in Logistics and Enterprise Engineering of the Department of Industrial and Systems Engineering has won the Gold Award in the "Excellent Financial Education Project", Personal Finance Ambassador Programme 2019/20 co-organised by the Hong Kong Exchanges and Clearing, Investor and Financial Education Council, and St James' Settlement.

Based on the theme of e-payments, the team, comprising Chan Kam-fai, Kwok Chun-yin, Li Tsz-chung, Wong Chun-hoi and Yu Shun-kit, built an online platform of videos and games, which they promoted through social media channels, such as YouTube and Instagram, to educate other students about key concepts in financial management. Their creativity and adaptability were commendable. Alongside winning a trophy and cash prize, the team was also awarded the Personal Finance Ambassador Certificate. Congratulations!

The Hong Kong Polytechnic University Magazine

Excel x Impact

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PolyU Motto

To learn and to apply, for the benefit of mankind