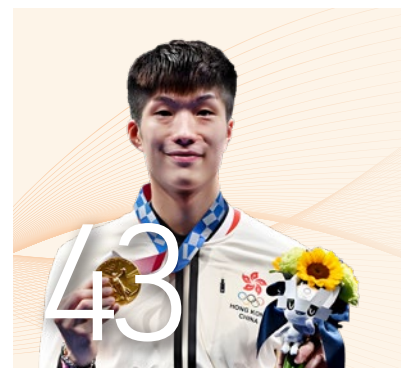
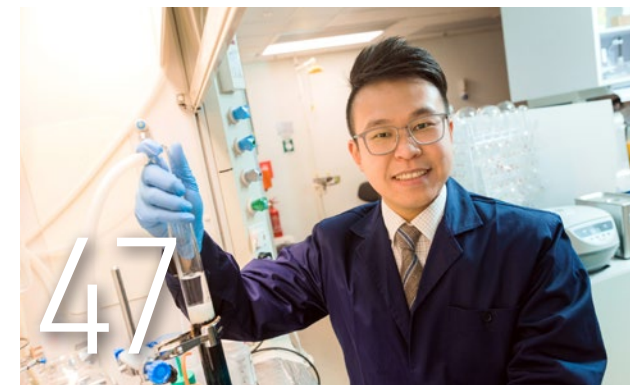


Excel *x* Impact

Spring 2022

Fostering World-class
**INTERDISCIPLINARY
RESEARCH
and INNOVATION**
in Hong Kong



President's Message

Innovation and Technology (I&T) are the keys to driving the competitiveness of industries and the long-term growth and prosperity of Hong Kong. Interdisciplinary research is also of growing importance because of the complexity of global challenges.

At PolyU, we envision an interdisciplinary future and aspire to be a major player in the development of Hong Kong into an international innovation and technology hub. Therefore, we have established the PolyU Academy for Interdisciplinary Research, also known as PAIR. The impactful solutions being developed at PAIR, which draw upon PolyU's research expertise in different disciplines, will not only ensure that PolyU is at the forefront of addressing key societal issues, but will also contribute to Hong Kong's I&T development.

While we are gearing up for the future, we are also joining forces with the community to fight against the pandemic. Over the past several months, PolyU staff, students and alumni have been actively engaged in combating the unprecedented fifth wave of the COVID-19 pandemic in Hong Kong. From pandemic-related research to providing assistance on the frontlines to help those in need, PolyU members have demonstrated their compassion and commitment to social responsibility. Together, we will fight the virus, and help make the world a better place.

Jin-Guang Teng
President

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Fostering World-class INTERDISCIPLINARY RESEARCH and INNOVATION in Hong Kong

We are in the era of the Fourth Industrial Revolution, which is underpinned by emerging technologies that are profoundly changing the way we live and work. The 21st century is also marked by transnational problems, such as the current pandemic, which are reshaping our societies. To effectively respond to the challenges and opportunities of our contemporary times, The Hong Kong Polytechnic University (PolyU), a global top 100 tertiary institution, is accelerating its commitment to impactful interdisciplinary research and innovation through various strategic initiatives. These include establishing the PolyU Academy for Interdisciplinary Research, a pioneering platform in Hong Kong for interdisciplinary collaboration; supporting the Government's InnoHK project with world-renowned universities to foster international research; and joining the Jiangsu-Hong Kong-Macao University Alliance to advance innovation, research and talent exchange in the three regions. Over the following pages, you will learn more about these exciting initiatives by PolyU, which will contribute to the rise of Hong Kong as a leading innovation and technology hub.

POLYU Academy for Interdisciplinary RESEARCH

RIAM • RIAIoT • RiFood • RI-IWEAR
RILS • PRI • RISA • SCRI • RISE • RISUD
RCMI • RCDSE • MHRC • RCRE • RCSV



Solutions to many world challenges can no longer be found within isolated disciplines but call for interdisciplinary efforts. This is where PAIR comes into play.



Professor Jin-Guang Teng,
PolyU President

PolyU Academy for Interdisciplinary Research (PAIR) – A VISIONARY PLATFORM to solve pressing global issues

Today's complex world demands interdisciplinary solutions

The world is facing a plethora of unprecedented challenges. For example, climate change induced by greenhouse gas emissions can have major adverse impacts on our planet. The COVID-19 pandemic has seriously tested the resiliency of healthcare systems and economies worldwide. The population is rapidly ageing, with real implications for wider society. The world is also facing energy shortages.

The solutions to these pressing problems require game-changing research efforts that draw expertise across disciplines. That is why the University has established PAIR (PolyU Academy for Interdisciplinary Research). PAIR is a unique model for Hong Kong, and PolyU is one of the few pioneering institutions in the world taking this visionary approach.

Expanding the frontiers of knowledge

PolyU formed PAIR to steer interdisciplinary research, bringing together resources and knowledge from different technologies and scientific disciplines to deliver practical solutions that address key societal issues. Taking the helm of PAIR is Professor Chen Qingyan, Global STEM Scholar and Chair Professor of Building

Thermal Science, who has extensive experience in interdisciplinary research at world-renowned institutions including the Massachusetts Institute of Technology and Purdue University.

Today, PAIR hosts ten mission-driven interdisciplinary Research Institutes (RIs) and five Research Centres (RCs), whose research teams are drawn from the most distinguished scholars at PolyU. These RIs and RCs focus on frontier research areas including deep space exploration, resources engineering towards carbon neutrality, sustainable urban development, smart cities, smart energy, land and space, photonics, advanced manufacturing, artificial intelligence of things, intelligent wearable systems, future food, smart ageing, Chinese medicine innovation, mental health, sharp vision, and many more (see the full list of RIs and RCs on p.5-6).

PAIR will collaborate with other top institutions, as well as engage with society and industry, in the development of impactful solutions. PAIR will also be a home for world-class scholars visiting PolyU. Indeed, the University is committed to creating a vibrant and diverse research environment that not only nurtures interdisciplinary research but also enhances international collaboration and cross-cultural exchanges.



PolyU Academy for Interdisciplinary Research – Research Institutes and Research Centres

Research Institutes

Otto Poon Charitable Foundation Research Institute for Smart Energy

Director: **Ir Professor Wang Shengwei**, Otto Poon Charitable Foundation Professor in Smart Building and Chair Professor of Building Energy and Automation



Otto Poon Charitable Foundation Smart Cities Research Institute

Director: **Professor John Shi Wen-zhong**, Otto Poon Charitable Foundation Professor in Urban Informatics and Chair Professor of Geographical Information Science and Remote Sensing



Photonics Research Institute

Director: **Professor Lu Chao**, Chair Professor of Fiber Optics



Research Institute for Advanced Manufacturing

Director: **Ir Professor Man Hau-chung**, Dean of Faculty of Engineering, Cheng Yick-chi Chair Professor in Manufacturing Engineering and Chair Professor of Materials Engineering



Research Institute for Artificial Intelligence of Things

Director: **Professor Cao Jiannong**, Dean of Graduate School, Otto Poon Charitable Foundation Professor in Data Science and Chair Professor of Distributed and Mobile Computing



Research Institute for Future Food

Director: **Dr Wong Ka-hing**, Associate Professor, Department of Applied Biology and Chemical Technology



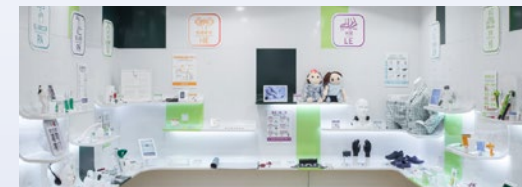
Research Institute for Intelligent Wearable Systems

Director: **Professor Tao Xiaoming**, Vincent and Lily Woo Professor in Textile Technology and Chair Professor of Textile Technology



Research Institute for Land and Space

Director: **Professor Ding Xiaoli**, Chair Professor of Geomatics



Research Institute for Smart Ageing

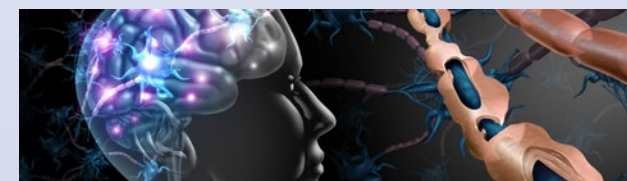
Director: **Ir Professor Zheng Yongping**, Henry G. Leong Professor in Biomedical Engineering and Chair Professor of Biomedical Engineering



Research Institute for Sustainable Urban Development

Director: **Professor Li Xiangdong**, Dean of Faculty of Construction and Environment, Ko Jan Ming Professor in Sustainable Urban Development and Chair Professor of Environmental Science and Technology

Research Centres



Mental Health Research Centre

Director: **Professor David Man Wai-kwong**, Professor, Department of Rehabilitation Science



Research Centre for Chinese Medicine Innovation

Director: **Professor Wong Man-sau**, Professor, Department of Applied Biology and Chemical Technology



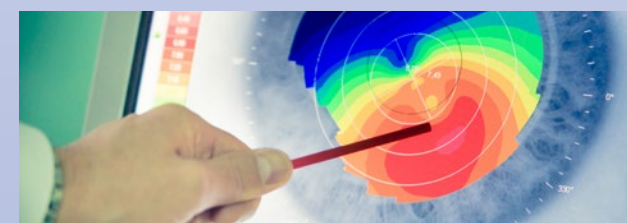
Research Centre for Deep Space Explorations

Director: **Ir Professor Yung Kai-leung**, Sir Sze-yuen Chung Professor in Precision Engineering and Chair Professor of Precision Engineering



Research Centre for Resources Engineering towards Carbon Neutrality

Director: **Ir Professor Poon Chi-sun**, Head of Department of Civil and Environmental Engineering, Michael Anson Professor in Civil Engineering and Chair Professor of Sustainable Construction Materials



Research Centre for SHARP Vision

Director: **Professor To Chi-ho**, Head of School of Optometry, Henry G. Leong Professor in Elderly Vision Health and Chair Professor of Experimental Optometry



In collaboration with first-class universities, the industry and the cream of scientists, PAIR will be able to get ahead of the curve in innovating solutions for world challenges.



Advancing research in smart cities and smart energy with the support of the Otto Poon Charitable Foundation



■ (From left) Dr Lam Tai-fai, PolyU Council Chairman; Dr David Chung, Under Secretary for Innovation and Technology of the HKSAR Government; Ir Dr Otto Poon, Founder of the Otto Poon Charitable Foundation; and Professor Jin-Guang Teng, PolyU President, unveiled a plaque to formally name the two research institutes.

With a generous donation from the Otto Poon Charitable Foundation, PolyU has established two research institutes under the PolyU Academy for Interdisciplinary Research to support its research endeavours on smart cities and sustainable energy.

Ir Dr Otto Poon, the founder of the Foundation, is an Outstanding PolyU Alumnus and successful entrepreneur who has been generously supporting the University's vision in advancing emerging technologies. To recognise his significant contributions, the two institutes are named the Otto Poon Charitable Foundation Smart Cities Research Institute (SCRI), and the Otto Poon Charitable Foundation Research Institute for Smart Energy (RISE).

Officiating at the naming ceremony, Dr Lam Tai-fai, PolyU Council Chairman, and Professor Jin-Guang Teng, PolyU President, extended their heartfelt gratitude to Ir Dr Poon for his long-standing support.

During the ceremony, Dr David Chung, Under Secretary for Innovation and Technology, said that the Government had been collaborating with the two research institutes in a number of smart city projects, ranging from the application of urban informatics to smart and sustainable energy. "PolyU, with its outstanding research institutes and academics, will have a big role to

play in building Hong Kong into an international I&T hub," he said.

Ir Dr Otto Poon also remarked: "The establishment of SCRI will serve as a catalyst to blend the various elements of smart cities together in order to contribute to the success of Hong Kong's Smart City Blue Print 2.0." In addition, he appreciated PolyU researchers' dedicated commitment to advancing the frontiers of technology and knowledge to cope with energy challenges. (See more on p.30)



SCRI aims at being a global centre of excellence in urban informatics and a living smart cities laboratory for Hong Kong and the Greater

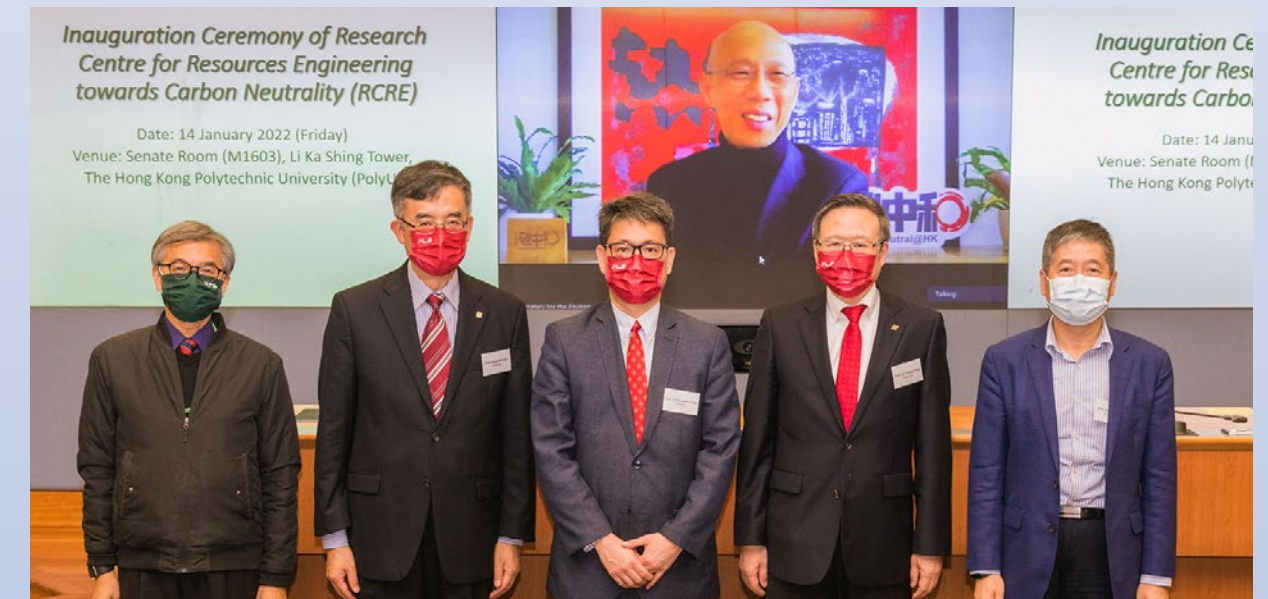
Bay Area. Its research focus areas include Smart Mobility, Smart Living, Smart Environment, Smart People, Smart Government, and Smart Economy.



RISE strives to pursue translational research on innovative solutions for energy-related problems. Its five research focus areas

include District Energy Systems and Smart Grid, Smart Buildings and Smart Energy Systems, Advanced Energy Storage Technologies, Advanced and Renewable Energy Conversion Technologies, and Advanced Energy Materials.

Cutting-edge research to achieve carbon neutrality



■ Secretary for the Environment Mr Wong Kam-sing (on screen) attended the inauguration ceremony of RCRE. Other PolyU participants included (from right) Professor Li Xiang-dong, Dean of Faculty of Construction and Environment; Professor Jin-Guang Teng, PolyU President; Professor Christopher Chao, Vice President (Research and Innovation); Professor Chen Qingyan, Director of PAIR; and Ir Professor Poon Chi-sun, Director of RCRE.

To help Hong Kong achieve its carbon neutrality goal by 2050 and contribute to the Nation's efforts to tackle climate change, PolyU has established the Research Centre for Resources Engineering towards Carbon Neutrality (RCRE) as a constituent unit operating under PAIR. An inauguration ceremony was held in hybrid mode in January 2022, with Mr Wong Kam-sing, Secretary for the Environment of the HKSAR, as the officiating guest.

Mr Wong said, "PolyU has been a leading force in the research of solid waste management and many of its innovations in recycled construction materials and waste valorisation technology have been widely applied. I am pleased to see that PolyU has pooled its interdisciplinary talents and facilities to advance the development of decarbonisation technologies and related policy study."

PolyU has the largest research team and facilities among all the universities in Hong Kong focusing on resources engineering towards carbon neutrality. The Centre gathers top researchers from various disciplines to conduct cutting-edge research in solid waste recycling issues, a critical area in achieving carbon neutrality since waste is one of the top three sources of carbon emissions in Hong Kong.

In particular, the Centre will focus on four research directions, namely policy and society, environmental and economic impact, waste-to-resource technology, as well as recycling and sustainable construction. (see more on p.30)





PAIR is the first mover of its kind in the region, developing breakthrough ideas, fostering sustainability, lifting economic outcomes, and improving living conditions.



Professor Christopher Chao,
PolyU Vice President
(Research and Innovation)

Human Health

- Myopia control in children using optical technology
- Neuroscience of cognitive rehabilitation
- Research on probiotics and prebiotics in human health
- Research of new drugs for the treatment of bone diseases with traditional Chinese medicine
- Ageing-related family and social issues and related policies

Technology and Smart Systems

- Space environment and instrument research for national space missions
- Optical fibre sensing systems for railway system monitoring and battery monitoring
- High performance deep learning clusters for big data analytics
- Development of smart energy management technologies for complex building energy systems in high-density cities
- Smart wearable systems for manpower augmentation, health care and personal safety
- Smart monitoring system for urban tree management

Environment

- Environmentally friendly paving blocks that can keep the air clean
- Research of new materials and technologies to reduce emissions in production and transportation, practise energy purification and achieve higher energy efficiency
- The impact of land development on the environment and ecology
- Research on fire prediction, prevention, control and emergency management

Impactful projects at PAIR

PAIR scholars have been engaged in many path-breaking research projects for societal impact across various fields. On the left is just a small sample of the diverse projects led by PAIR researchers:



PAIR's research aspires to advance several important goals for the benefit and prosperity of Hong Kong, the Greater Bay Area, and the world. These include building a globally modern industrial system, taking ecological conservation forward, expanding infrastructural connectivity, developing a quality living circle, building a global technology and innovation hub, and contributing to the Sustainable Development Goals set by the United Nations.

Learn more about PAIR

Website:



Newsletter:



PolyU's world-class research competence leads InnoHK Centres in AI, design and vision science

With the rapid development of the Nation and the Greater Bay Area bringing unprecedented opportunities for innovation and technology, Hong Kong will play an even more important role in the ongoing process of innovation. PolyU will strongly support the Hong Kong Government's important new initiative, InnoHK Clusters, which aims to develop the city into a hub for international research collaboration.

By harnessing its research competence in artificial intelligence, design, and vision science, PolyU has partnered with world-leading institutions to develop three research centres under two research clusters – AIR@InnoHK (focusing on artificial intelligence and robotics technologies) and Health@InnoHK (focusing on healthcare-related technologies). The centres are established in an effort to bring together leading researchers from around the world to conduct collaborative research in Hong Kong.

These three world-class research centres, which have commenced operation at the Hong Kong Science Park are:

- the Laboratory for Artificial Intelligence in Design (AiDLab), established in collaboration with the Royal College of Art, UK;
- the Centre for Advances in Reliability and Safety (CAiRS), established with the University of Maryland, College Park, USA as the key research collaborator; and
- the Centre for Eye and Vision Research (CEVR), established in partnership with the University of Waterloo, Canada.

PolyU has also become the first local collaborating institution of the "Centre for Artificial Intelligence and Robotics, Hong Kong Institute of Science & Innovation, Chinese Academy of Sciences". Established by the Institute of Automation of the Chinese Academy of Sciences, the Centre has been admitted to AIR@InnoHK under InnoHK Clusters.

PolyU Deputy President and Provost Professor Wing-tak Wong says, "PolyU hopes to fully leverage each institution's academic strengths to bring about significant research breakthroughs, and thereby create impactful technology that boosts the economy and brings benefits to society."



Laboratory for Artificial Intelligence in Design (AiDLab)

— the region's first research platform specialising in interdisciplinary AI and design innovations

Partner: Royal College of Art, UK

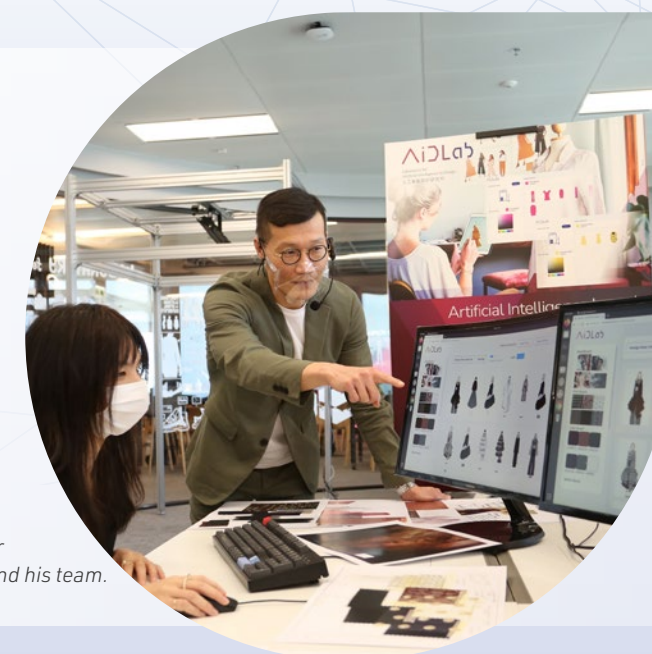
Mission: AiDLab brings together top international academics, designers and engineers to conduct human-centred interdisciplinary research providing multi-faceted solutions for current global issues using AI and distinct innovative designs.

Research focus: Ergonomic and Inclusive Design, Innovation in Product and Service Design, and Intelligent Fashion Design and Quality Control

■ Dr Yick Kit-lun (centre) utilises the "4D Body Scanning Lab" to facilitate ergonomic design of functional apparels and wearables.

"AiDLab utilises novel technology to facilitate intuitive and effective product and service design processes that can enhance human-computer interaction and address society's needs for creativity, efficiency and sustainability," says Professor Calvin Wong, Centre Director of AiDLab and Cheng Yik Hung Professor in Fashion of PolyU.

■ The Artificial Intelligence-based Interactive Design Assistant for Fashion (AiDF) is developed by Professor Calvin Wong (right) and his team.



Centre for Advances in Reliability and Safety (CAiRS)

— focusing on the use of AI to develop new personalised management tools

Key research collaborator: University of Maryland, College Park, USA

Mission: CAiRS gathers top researchers from all over the world, uses the most advanced equipment and leverages innovative artificial intelligence technology in order to conduct various product reliability and system safety research to accurately predict the occurrence of failures and prevent them from occurring.

Research focus: Anomaly Detection and Syndromic Surveillance, Innovative Diagnostics for Product Health Management, Prognostics for Remaining Useful Life Assessment, Safety Assurance to improve Functional Safety, and Data Analytics Platform for Reliability



"CAiRS will build an international brand for the products and systems in Hong Kong, and contribute to the development of smart cities and advanced manufacturing," says Ir Professor Winco Yung, Centre Director and Executive Director of CAiRS.

■ Ir Professor Winco Yung introducing the research projects of CAiRS



Centre for Eye and Vision Research (CEVR)

— tackling the world's biggest challenges in the field of vision science

Partner: University of Waterloo, Canada

Mission: CEVR promotes eye health with clinical, basic and applied research, and develops ground-breaking technologies to prevent vision loss and preserve sight among the ageing population.

Research focus: Myopia and Eye Growth, Ocular Drug Discovery and Delivery, Vision Enhancement, Tear Film and Ocular Surface, and Advanced Optometric Technology

■ Quantum optics technology at CEVR to detect the early signs of macular degeneration

"Research conducted within CEVR has the potential to improve quality of life for millions of people around the world," says Professor Ben Thompson, CEO and Scientific Director of CEVR. He adds that the collaboration between PolyU and Waterloo will "bring together multiple scientific disciplines to tackle the world-wide problem of vision loss."



■ CEVR researchers use non-invasive brain stimulation to improve vision.



■ Mrs Carrie Lam, Chief Executive of the HKSAR (centre), attended the inauguration ceremony of the JHMUA in Hong Kong, along with senior local university management and Government officials.

Jiangsu-Hong Kong-Macao University Alliance inaugurated

– Harnessing the strengths of partner institutions for fruitful collaboration

The Jiangsu-Hong Kong-Macao University Alliance (JHMUA) jointly established by Nanjing University, PolyU and the University of Macau was officially inaugurated in December 2021. The JHMUA aims to leverage the advantages of tertiary institutions in Jiangsu Province, Hong Kong and Macau to strengthen exchange and collaboration in areas including talent cultivation and research in innovation and technology. With the full support of the governments of the three regions, the JHMUA now consists of 33-member institutions, including 21 from Jiangsu Province, nine from Hong Kong and three from Macau. The first term of the Alliance is chaired by Nanjing University while PolyU, the University of Macau and Nanjing Normal University will act as vice-chairs.

Advancing education, innovation and research in the three regions

The inauguration ceremony was held simultaneously in Nanjing and Hong Kong, with Mr Wu Zhenglong, Secretary of the Jiangsu Provincial Committee of the Communist Party of China, officiating at the one in Nanjing. Professor Huai Jinpeng, Minister of Education, joined the ceremony online. He said that Jiangsu is an important province in the Yangtze River Delta, while Hong Kong and Macao are two key cities in the Guangdong-Hong Kong-Macao Greater Bay Area. He hoped that member institutions of the Alliance would deepen collaboration and take tertiary education to an even higher level in the future.

The ceremony in Hong Kong was attended by Mrs Carrie Lam, Chief Executive of the Hong Kong

Special Administrative Region, as well as the senior management of local universities and Government officials. Addressing the ceremony, the Chief Executive noted that the collaboration would help facilitate innovation and technology development and talent exchange, as well as bring more opportunities for scholars and students in the three regions, helping them make contributions to the Nation's development.

PolyU has over the past years partnered with more than 30 institutions and organisations in Jiangsu Province to kick start over 100 teaching and research projects. Professor Jin-Guang Teng, President of PolyU, remarked, "Jiangsu Province has witnessed the rapid development of a number of strategic emerging industries in recent years, such as artificial intelligence, biomedicine, new energy technology and more. Such progress brings about tremendous opportunities in innovation and technology, research and even entrepreneurship for institutions and talents in the three regions."

Interdisciplinary collaborations for research and innovation breakthroughs

By leveraging the expertise of internal departments as well as local, national and international partners across various academic fields, PolyU is taking Hong Kong's research and innovation to the next level to generate even greater societal and economic benefits, contributing to the well-being of mankind.

Together WE MAKE A DIFFERENCE in FIGHTING COVID-19

As Hong Kong battles an unprecedented COVID-19 wave, PolyU staff, students and alumni have made a concerted effort to fight the virus. From pandemic-related research and innovations to joining forces to offer professional assistance to the community, and supplying resources to those in need, the University has been unified in its efforts to make a difference during this challenging time.

Scientific research and innovations to fight the virus

Since the beginning of the COVID-19 pandemic, researchers at PolyU have applied themselves to using their knowledge to help combat the virus. Anti-pandemic contributions from the PolyU community range from devices to detect the virus, anti-virus 3D printing material, modelling platforms to predict how the pandemic will develop, to help for patients recovering from infection.

Portable nucleic acid testing device enables fast and accurate results on-site

Funded by the Health and Medical Research Fund, a PolyU interdisciplinary research team has developed a portable testing device for COVID-19. The clinical sample (purified nucleic acid) test results were in full agreement with the reverse transcription-polymerase chain reaction (RT-PCR) standard.

The entire testing procedure can be performed outside the laboratory, immediately after on-site sample collection. Up to four samples can be tested at the same time; the entire test can be completed in about 40 minutes; and the test results can be recognised with bare eyes.

Both human and environmental samples can be tested in the newly invented device. Besides SARS-CoV-2, other viruses and bacteria can also be detected (primers have to be redesigned). The unit cost of testing is comparatively lower than RT-PCR. The team plans to collaborate with industry players to extend the use of such technology to the wider community (e.g. airports, quarantine facilities, elderly homes, clinics, ports, etc.) so as to reduce the risk of community infection.



■ Professor Yip Shea-ping, Head of the Department of Health Technology and Informatics (right), and Dr Thomas Lee Ming-hung, Associate Head of the Department of Biomedical Engineering (left), led the portable testing device research project.



■ Dr Chris Lo (middle), Associate Professor of the Institute of Textiles and Clothing (ITC), and his research team developed the anti-virus material. Team members include Professor Kan Chi-wai (left) of ITC, and Dr Amber Chiou Jiachi (right), Assistant Professor of the Department of Applied Biology and Chemical Technology.

World's first anti-virus 3D printing material

An interdisciplinary research team has developed the world's first anti-virus 3D printing material that can kill COVID-19. The material is made from resin, with anti-viral agents, such as cationic compounds, added to damage the membrane of the virus and destroy its structure. Laboratory tests have shown the material can kill 70% of COVID-19, as well as other common viruses and bacteria, surviving on a surface within two minutes, while it can eliminate 90% within 10 minutes. It can destroy almost all viruses and bacteria on a surface after 20 minutes.

Using 3D printing, the material can be produced in a variety of different forms, including handles, toilet doorknob covers, lift buttons, braille boards and more. As the disinfecting components of the material are embedded within it, rather than coated on the surface, daily cleaning with fluids such as bleach does not compromise its anti-virus properties.

The research outcome has been commercialised by Immune Materials Limited, a PolyU-supported startup. The company has reached an investment agreement with Hong Kong-based conglomerate LAWSGROUP recently. Under the agreement, LAWSGROUP will widely use the material in one of its local shopping malls cum office complexes before extending the application to other properties, production facilities and retail outlets upon successful trials.



■ The research team has recently installed door handles and other equipment made from this material at the Shek Kip Mei Park Sports Centre. Mr Alfred Sit Wing-hang (second from left), Secretary for Innovation and Technology, and Mr Paul Wong (first from right), District Officer (Sham Shui Po), also paid a visit to the Centre to show their support and learn more about the application of the material.



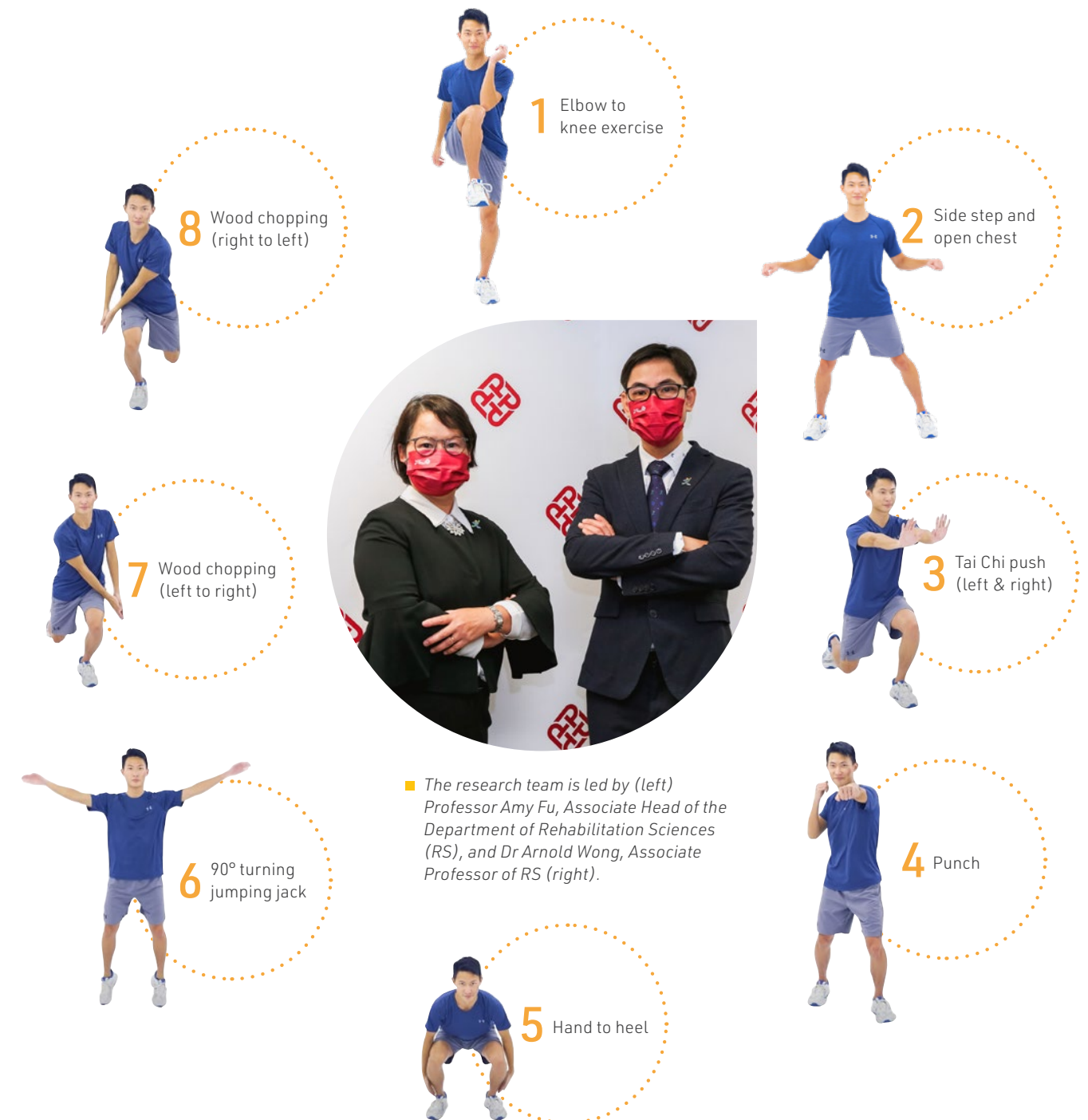
■ The research team has produced doorknob covers and lift buttons. As the disinfection components of the material are embedded in the products rather than coated on the surface, daily cleaning with disinfectants such as bleach does not compromise its anti-virus performance. The team has started a project to replace the door handles in the three-nil buildings in Sham Shui Po District with new ones made from the anti-virus 3D printing material.

PolyU develops "Rehab 8 Forms" to help COVID-19 survivors regain wellbeing

Funded by the Health and Medical Research Fund of the HKSAR Government, a PolyU team has conducted research on the physical and psychosocial functions of patients who have recovered from COVID-19. It found that more than 40% of the research subjects were still suffering from "long COVID" six and 12 months after first being diagnosed with COVID-19. To help COVID-19 survivors regain their health, the team has developed a "Rehab 8 Forms" programme (see QR code) to improve their lung capacity and muscle strength. It consists of eight exercises to train different muscle groups, with each set taking eight to 10 minutes to complete. It forms part of the University's 3R rehabilitation programme to help patients Rebuild fitness, Regain confidence and Resume normal life.



■ "Rehab 8 Forms" consists of eight different movements to train various muscle groups and improve cardiorespiratory and muscle performance.



■ The research team is led by (left) Professor Amy Fu, Associate Head of the Department of Rehabilitation Sciences (RS), and Dr Arnold Wong, Associate Professor of RS (right).



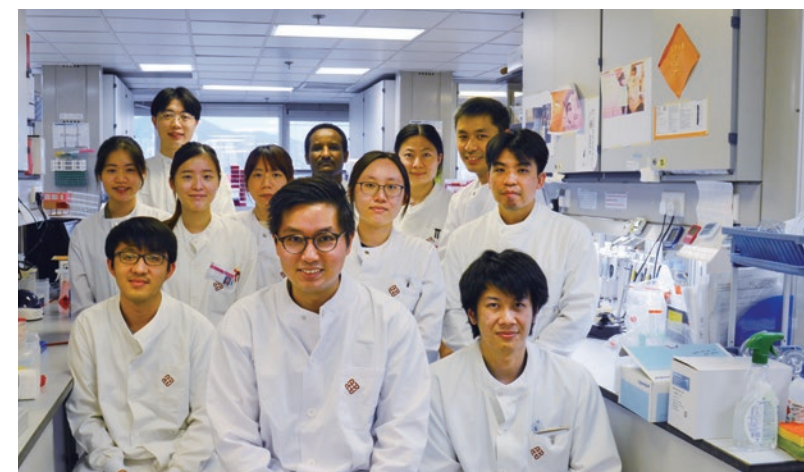
■ Scientists from the Department of Land Surveying and Geo-Informatics (LSGI) have developed a mobile app with a contact tracing feature for use by inbound travellers. (From left) Professor Charles Wong; Professor Chen Wu, Head of LSGI; and Dr Zhu Xiaolin, Assistant Professor of LSGI.

Genome sequencing helps limit spread of COVID-19

The rapid sequencing of COVID-19 cases conducted by PolyU researchers has played an important role in identifying and stopping transmission chains in Hong Kong. The research team used whole viral genome sequencing in the early days of the pandemic to identify the source of a super-spreader event and demonstrate that asymptomatic carriers of SARS-CoV-2 could trigger community outbreaks. In later waves, the team's sequencing work highlighted flaws with hotel quarantine arrangements, under which people were allowed to receive visitors, and quarantine exemptions for aircrew and sailors. The work by the research team has provided scientific support for the Government's anti-pandemic measures and helped to close loopholes.

Contact tracing effective at pandemic control

A PolyU study has found that contact tracing is as important as social distancing measures and vaccination in controlling the spread of COVID-19 when borders reopen. The study, which employed a computational approach, found that digital contact tracing could reduce the infectious population by 84.7%, based on an epidemic model with 50% vaccination coverage. The research team has also developed a mobile app with a contact tracing feature, targeting inbound travellers when borders reopen, to help identify where users have had close contact with a positive COVID-19 case.

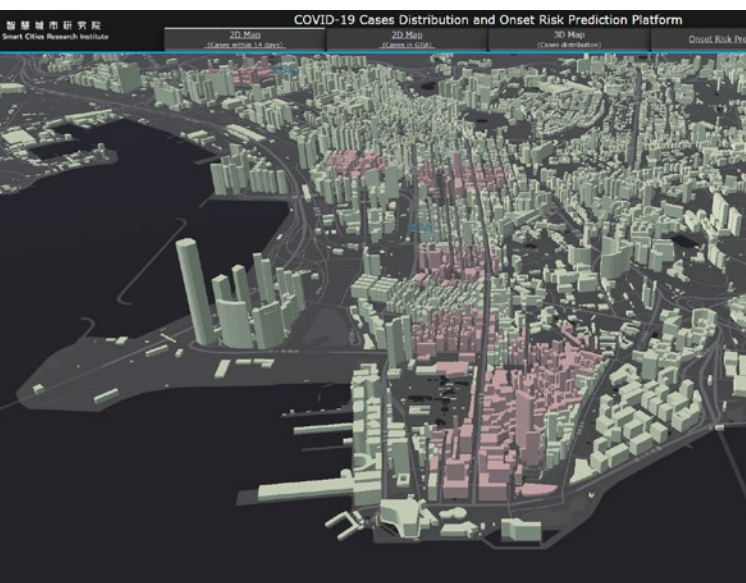


■ Dr Gilman Siu (front row, middle), Associate Professor of the Department of Health Technology and Informatics, and team members conducted genome sequencing to identify COVID-19 transmission links.

Spatiotemporal Big Data Platform supports the formulation of control strategies

PolyU experts have developed an extended Weighted Kernel Density Model and Spatiotemporal Big Data Platform that can show the latest developments and short-term forecasts for COVID-19 symptom onset. The platform has a prediction accuracy of more than 85% for the next three days. By predicting the development trend of the epidemic in a timelier manner, the platform enables the public health department to formulate more precise prevention and control strategies.

■ Professor Shi Wenzhong, Director of the Otto Poon Charitable Foundation Smart Cities Research Institute, and his team have developed technologies to predict pandemic trends.



■ Professor Yan Feng of the Department of Applied Physics has led a team to develop a non-invasive and portable antibody detection platform for rapid and accurate results.

Mobile-controlled COVID-19 antibody detection platform

Antibody testing is an important part of COVID-19 detection, vaccine evaluation, and analysing a population's immunity rate. A PolyU team has developed a non-invasive, ultrafast, low-cost, label-free, portable SARS-CoV-2 immunoglobulin G detection platform. The platform uses organic electrochemical transistors (OECTs), which can be controlled remotely through a mobile phone. OECTs can convert biological signals into electrical signals. By optimising the test conditions, including ion concentrations, pH values and voltage signals, the test is able to identify COVID-19 antibodies within minutes. The test is sensitive enough to detect antibody levels in saliva. It is anticipated that the platform could also be used to detect other disease antibodies.

COVID-19 projects receive funding

Three PolyU COVID-19 research projects were recently awarded a total of over HK\$14 million in the second-round one-off Collaborative Research Fund (CRF) COVID-19 and Novel Infectious Diseases (NID) Research Exercise. These innovative studies examine the prediction and control of COVID-19, the relationship between social distancing and airborne infection, and the impact of COVID-19 on design collaboration. The funded projects are as follows:



Lead Researcher:

Professor John Shi Wenzhong, Chair Professor of Geographical Information Science and Remote Sensing, Department of Land Surveying and Geo-Informatics

Project: Spatiotemporal Prediction and Real-time Early Warning of COVID-19 Onset Risk (Funding amount: HK\$6.96 million)

Description:

The project is expected to support lower-cost and more effective long-term control of COVID-19 and potential future epidemics. A mobile application system will be developed to deliver risk predictions and send active real-time early warning of high-risk areas or routes to the public.



Lead Researcher:

Ir Professor Guo Hai, Professor, Department of Civil and Environmental Engineering

Project: Is the Usual Social Distance Sufficient to Avoid Airborne Infection of Expiratory Droplets in Indoor Environments? (Funding amount: HK\$4.7 million)

Description:

The project will use systematic, multidisciplinary experimental, theoretical and modelling approaches to explore the detailed mechanism of virus spread through airborne expiratory droplets, and thus to enrich scientific evidence on social distancing for public health policies.



Lead Researcher:

Dr Shih Yi-teng, Assistant Professor, School of Design

Project: The Effect of Distance Design Collaboration Necessitated by COVID-19 on Brain Synchronicity in Teams Compared to Co-Located Design Collaboration (Funding amount: HK\$2.78 million)

Description:

This study will examine the changes in design behaviour, including body language, thinking patterns, etc. of design teams working remotely during COVID-19. The project outcomes are expected to contribute to academia and industry in the field of design.

PolyU stands united with the Hong Kong community

The COVID-19 pandemic has posed unprecedented challenges to Hong Kong in recent months. During these critical times, PolyU has been devoted to collaborating with the Hong Kong community and the Government to fight the virus. Hundreds of students, staff and alumni with a professional healthcare background have drawn on their expertise and provided assistance on the frontlines to those in need.



Supporting the operation of a community vaccination centre

A team of 300 students, teaching staff and alumni from the School of Nursing is supporting the operation of the Caroline Hill Road Pop-up Community Vaccination Centre in a non-profit making mode. The School's final year students are assisting in the administration of vaccines under the supervision and support of the teaching staff and alumni who are experienced registered nurses.



It is estimated that the Centre can serve 800 to 1,000 people each day with a daily capacity of up to 3,000 people as the need arises.

Accompanied by PolyU's Council Chairman Dr Lam Tai-fai and President Professor Jin-Guang Teng, Mrs Carrie Lam Cheng Yuet-ngor, Chief Executive, and Mr Patrick Nip, Secretary for the Civil Service of the HKSAR Government, visited the Centre to understand its operation and expressed their gratitude towards PolyU for its strong support of the Government's vaccination programme. Professor Wing-tak Wong, Deputy President and Provost, and Dr Miranda Lou, Executive Vice President, also cheered for the team.

New call centre on campus supports Hospital Authority's hotline

Motivated nursing students and teachers from the School of Nursing have set up a new call centre on the PolyU campus to support the Hospital Authority's hotline service for COVID-19 patients. The centre initially provides 10 hotlines for 14 hours each day, handling nearly 600 calls daily. Professor Sophia Chan, Secretary for Food and Health, accompanied by Professor David Shum, Dean of the Faculty of Health and Social Sciences, and Professor Alex Molasiotis, Head of the School of Nursing, visited the centre to understand its operation.



Donating a patented disinfectant coating to a community isolation facility

An academic-led startup, Grand Rise Technology Limited, established by Professor Li Pei, Department of Applied Biology and Chemical Technology, and alumnus Tenny Lam donated its patented innovation, the CareCoatex™ disinfectant coating, to the San Tin community isolation facility.

The coating can be applied to various equipment to disinfect and control microbial infection and contamination on surfaces that are touched frequently, providing a safer isolation environment for the staff and patients in the facility.



PolyU-nurtured startup provides an online platform for medical and healthcare services

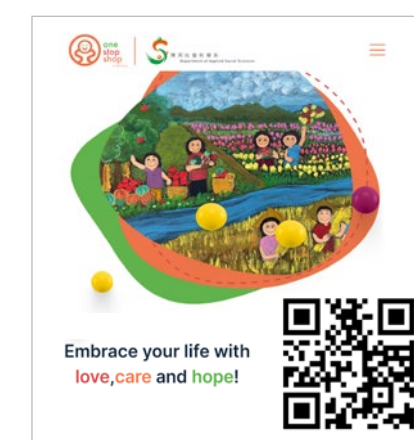
A PolyU-nurtured startup, iMeddy, founded by alumni Mr Alex Cheuk Ka-hou and Mr Stephen Tsoi Kwok-chun, is providing a free video medical consultation service on its online healthcare platform to more than 3,000 COVID-19 patients. iMeddy collaborates with more than 300 private medical practitioners in Hong Kong. The service is targeted at low-income families, as well as singleton elderly and those living in nursing homes.



Anti-epidemic platform co-created to provide useful resources

In partnership with social services organisations and professional bodies, the Department of Applied Social Sciences has mobilised its students, staff and alumni to provide a range of valuable resources to the community on an online anti-epidemic platform, "One Stop Shop", including professional talks, physical-and-mental health workshops, and advice from COVID-19 patients.

There will also be online workshops on play therapy and healing for wellness and a "Learn from Home" video series.



Gathering donations and assistance to battle the epidemic

During the severe fifth wave of the COVID-19 pandemic in Hong Kong, PolyU alumni, staff and students have shown concern and support for the community. They have actively contributed ideas, raised funds and donated anti-epidemic gear, demonstrating their commitment in standing united with Hong Kong and PolyU in this challenging time.

RS students do their bit for persons with disabilities and the elderly

Fifty PolyU fourth-year students from the Occupational Therapy and Physiotherapy programmes, Department of Rehabilitation Sciences, have joined a scheme to support frontline healthcare services for the residents in hostels for the disabled and elderly homes. Backed by online support from 20 teachers in the Department, the students will serve those in need with professional rehabilitation services, assessing their health conditions and formulating suitable trainings to enhance the mobility of residents to prevent complications caused by prolonged inactivity.

Under Secretary for Labour and Welfare Mr Ho Kai-ming visited one of the beneficiaries, and encouraged the students to leverage their professional skills to make contributions to society. ①-③



Anti-epidemic supplies for staff and elderly in nursing homes

The School of Nursing has partnered with enthusiastic local and Mainland donors and partners to donate a series of anti-epidemic supplies to more than 200 elderly residential care homes. These supplies include 44,000 rapid antigen test kits, 200,000 sets of personal protective equipment consisting of face shields and N95 respirators, and 100 pulse oximeters. ④-⑥



Alumnus provides expertise in handling large-scale emergency work

Alumnus Yang Ou, Executive Director and Chief Executive Officer of China Overseas Property Holdings Limited, is supporting Hong Kong's anti-epidemic initiatives. With solid experience in handling large-scale emergency work, Dr Yang is participating in the management and operation of mobile field community isolation facilities, providing guidance on patient admissions, infection control measures, pain point assessments and more. ⑦



Joining hands with Anti-Coronavirus Link to distribute anti-epidemic packages

Mr Alfred Sit, Secretary for Innovation and Technology; Mr Kenneth Leung, Convenor of the Youth Anti-Coronavirus Link; Dr Johnny Ng, LegCo Member and alumnus of PolyU; Prof. Jin-Guang Teng, PolyU President; and a group of Hong Kong United Youth Association members and PolyU student volunteers distributed anti-epidemic packages at the campus to students in need.

The packages include masks, COVID-19 rapid antigen test kits, SIM cards, etc. Donated by some local and



mainland organisations, the HK\$150 million worth of anti-epidemic supplies were gathered and further distributed by the Link to young people, children and their families. ⑧-⑨



Students raise funds and donate anti-epidemic gear

Mainland students from the Class of 2020, Master of Arts in Fashion and Textiles (Fashion Merchandising), raised funds to donate 600 sets of medical protective clothing to PolyU. The supplies were delivered to Hong Kong with the support of the Shenzhen Charity Federation. ⑩



Alumni donate medical protection coveralls

To support Hong Kong and PolyU to fight against the pandemic, the PolyU Pearl River Delta Alumni Network has donated 1,000 medical protection coveralls to the University, exemplifying the power of unity across geographies. ⑪

Graduates from the 2013 cohort of the Master in Occupational Therapy programme (China) have provided scented sachets for the Department of Rehabilitation Sciences, helping them improve their working environment and protecting them from COVID-19. ⑫

Additionally, the Shanghai Alumni Network and the School of Hotel and Tourism Management Mainland Alumni Network have donated rapid antigen test kits, and alumnus Jack Chan has donated Chinese medicine "Lianhua Qingwen Jiaonang" to his alma mater. ⑬-⑭



The care and support we have shown to each other in these challenging times are how we will beat COVID-19.



Interdisciplinary research has become a must to solve emerging societal problems and to meet future challenges.



Taking RESEARCH and INNOVATION to the next level

**A conversation with Vice President (Research and Innovation)
Professor Christopher Chao**

With extensive leadership experience in the higher education sector and an outstanding track record in research publications and grants, Professor Christopher Chao was appointed Vice President (Research and Innovation) of PolyU in September 2021. He will help the University formulate and implement forward-looking research strategies to capture the opportunities offered by the Fourth Industrial Revolution and the development of the Greater Bay Area. Professor Chao is also Chair Professor of Thermal and Environmental Engineering.

You joined PolyU as an Assistant Professor from 1995 to 1997, after obtaining a PhD degree in Mechanical Engineering from the University of California, Berkeley. You then re-joined PolyU 24 years later. How has PolyU changed over the years?

When I first joined PolyU, the research environment was not as active as nowadays. Since then, the research landscape at PolyU has improved substantially. We are now in a leading position in certain fields, providing real solutions to some very challenging problems. Some of our research projects have also been in a few cutting-edge frontier areas.

Could you share your views about elevating PolyU's research development to the next level?

Interdisciplinary research has become a must to solve emerging societal problems and to meet future challenges. The University has established the PolyU Academy for Interdisciplinary Research, also known as PAIR, which currently consists of ten research institutes and five research centres. They undertake research in frontier areas where PolyU has significant advantages or strategic interests, including artificial intelligence (AI), carbon neutrality, deep space exploration, smart cities, smart energy, smart ageing and more.

Furthermore, disciplines other than science and technology have a significant role to play. It is important to integrate STEM elements into non-STEM areas. For instance, research

in smart ageing is not

just about technology

but also involves

many aspects of

social sciences.

Furthermore,

we have a very

unique School

of Design at

PolyU. By linking

up designers,

engineers, and

people involved in

the humanities, we can

make a big contribution

and impact.



How will you foster innovative research at PolyU to facilitate knowledge creation?

Having an ecosystem conducive to an innovative mindset is crucial. We are working with different stakeholders of the University, including our researchers, institutional collaborators, industry partners and the Government, to build a robust ecosystem to support innovation.

Promoting a strong research culture and encouraging intellectual exchange is also a priority. In addition, the University has stepped up its efforts in developing collaborative research in targeted discipline areas with top-notch universities and research groups worldwide.

How can the University enhance the innovative mindset of students?

We should encourage undergraduates to view research and innovation as something they would potentially like to pursue in life.

We should put forward initiatives to cultivate their interest in research from the very start of their university studies. For example, the University launched the Undergraduate Research and Innovation Scheme last year, providing the opportunity for undergraduate students to conduct research projects under the supervision of our scholars.

The Graduate School is also investing much effort to cultivate innovative mindsets among our research graduate students. The overseas attachment scheme can be an important platform in this regard.

In your view, what will be some of the major frontier research areas in the next couple of decades?

There will be a lot of exciting knowledge breakthroughs that will advance research in the next generation. Bioinspired technology is one example. We can learn a lot from nature to address complex issues.

For example, the Saharan silver ant, an insect that lives deep in the North African desert, is considered to be one of the fastest bugs on the planet. But how can it survive in the desert? It has a lot to do with the surface structure of its body, enabling it to dissipate energy very effectively using thermal radiation. These sorts of observations from nature can generate new technological insights and applications.

Neuroscience is also a significant field. In chip manufacturing and computer development, we are moving into neuromorphic computing, seeking to mimic the way that our brain is operating into computing, so that we can make a computer faster and more effective in generating the wisdom we need.

Everybody is talking about AI and Big Data. Industries are now engaged heavily in these areas with different levels of maturity.

Do you have a motto that you live by?

Nothing is really easy in life but there is no need to give up easily.

How do you spend your free time?

Seeing movies, reading books, running, and travelling.

PolyU's educational innovations win distinguished global awards

PolyU has won three 'Oscars' of education for innovative teaching methods that enhance students' learning outcomes and employability. Teams from the University brought home a Gold, Silver and Bronze award from the Quacquarelli Symonds (QS) - Wharton Reimagine Education Awards 2021, which

are co-organised by QS and the Wharton School at the University of Pennsylvania.

Their projects, which benefit students from secondary to tertiary level, beat competition from 1,350 contestants from 84 countries and regions.

The three winning projects were:

Gold Award in the "Nurturing Wellbeing and Purpose" category



Project leader: Professor Daniel Shek, Associate Vice President (Undergraduate Programme) (first from right)

Title: Leadership and Intrapersonal Development Programme

Through a suite of subjects, the programme builds up positive attributes and competencies among university students, enabling them to pursue continual self-improvement, enhance their wellbeing, and contribute to society.

Silver Award in the "Science of Learning" category

Project leader: Dr Fridolin Ting, former Senior Teaching Fellow, Department of Applied Mathematics

Title: Innovative PALMS Drawing Pedagogies and Apps to Increase Active Learning in Mathematics and Science

This project aims to increase active learning in science and mathematics education through innovative pedagogies, and mobile writing and drawing applications.

Bronze Award in the "K12" category

Project leader: Dr Fridolin Ting, former Senior Teaching Fellow, Department of Applied Mathematics

Title: Developing Active Learning Pedagogies and Mobile Applications in High School Mathematics Education

This project combines active learning pedagogies with novel writing and drawing apps that are optimal for active learning and convey abstract concepts and ideas to mathematics students.

Enabling sports talents to thrive and fulfil their aspirations

PolyU has a proud tradition of nurturing the development of local sports talent and supporting elite student-athletes to achieve both sports and academic aspirations through the Outstanding Sportsmen Recommendation Scheme (OSRS). Since 1998, PolyU has admitted more than 1,200 remarkable athletes through the OSRS.

and Tinky Ho Nam-wai, have been admitted into the undergraduate programmes of the Faculty of Humanities through the Scheme. PolyU's Vice President (Education) Professor Kwok-yin Wong welcomed the elite athletes in joining the University and said, "We hope students will receive high-quality education from PolyU and continue to unleash their potential and diverse strengths."



I am grateful for this opportunity from PolyU, which will enable me to excel in both academia and sports. I will leverage the qualities I have as an athlete in order to push myself towards my goal of achieving excellent results in my studies.

- Represented Hong Kong in the Women's 4 x 100m Relay at the 2018 Asian Games in Jakarta



Leung Kwan-yi (Sprinter)



To further enhance its support, from the academic year 2022/23 onwards, PolyU will join the Student-Athlete Learning Support and Admission Scheme (SALSA) launched by the University Grants Committee (as a sub-scheme of OSRS). This initiative will provide opportunities for student-athletes who are eligible to represent Hong Kong in significant international competitions with exceptional achievements in sports to pursue their undergraduate studies at PolyU. Two exemplary athletes, Leung Kwan-yi

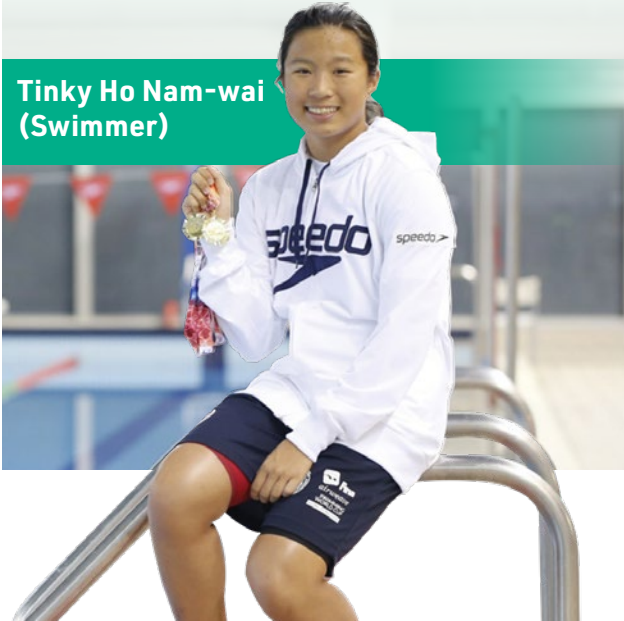


Balancing studies and sports life could be challenging, but that does not undermine my anticipation for university experience. I am confident that with the support of PolyU and my coaches, I will continue to improve my performance and achieve academic and swimming success.

- Hong Kong's record holder in women's 1500m Freestyle and 4 x 100m Freestyle Relay
- Represented Hong Kong in the women's 4 x 100m Freestyle Relay at the 2020 Tokyo Olympics



Tinky Ho Nam-wai (Swimmer)



PolyU partners with C-MER Eye Care to nurture young optometrists in the GBA

PolyU has signed an agreement with C-MER Eye Care Holdings Limited (C-MER) to advance research and talent development in optometry in Hong Kong and Mainland China. The five-year memorandum of understanding (MoU) will also focus on eye and vision health.

Under the MoU, around 60 students from the School of Optometry (SO) will receive clinical training in C-MER's network of hospitals, clinics and optical centres in Hong Kong and other Greater Bay Area (GBA) cities each year. The training will include attachment programmes to learn how ophthalmologists diagnose and treat eye diseases, including medication and surgical treatment. The experience will be particularly valuable for students who choose to develop their careers in the GBA in the future.

In addition, world-class researchers and specialists from the SO and C-MER will collaborate on scientific studies relating to myopia and ageing eyes - the main eye health challenges faced by Hong Kong and the Nation.



■ Professor Wing-tak Wong (centre), Deputy President and Provost of PolyU, witnessed the signing of the MoU by Professor David Shum (left), Dean of the Faculty of Health and Social Sciences of PolyU, and Dr Dennis Lam, President and CEO of C-MER Eye Care Holdings Limited.

As part of its commitment to optometric education, the SO has been collaborating with ophthalmologists and other counterparts internationally to equip students with the skills and hands-on experience required for their professional development.

PolyU offers new online Master of Science in Hospitality Business Innovation

As the hospitality sector embraces innovation and technology, the School of Hotel and Tourism Management is launching a new online Master of Science in Hospitality Business Innovation in September 2022 to help hospitality professionals adapt, thrive and lead the industry in the digital age. The programme, which is aimed at hospitality

executives, offers modules on artificial intelligence and data analytics in the hospitality sector, hospitality asset management and business strategies, hospitality leadership and human capital development, and innovation and technology management. It will have an international focus, while also recognising the characteristics of an Asian context.

Offered entirely online, the programme has a flexible delivery pattern to enable hospitality executives to study at their own pace while remaining in the workforce. It is designed to be taken over three years, but can be fast-tracked in two years. Learning and teaching is participant-centred, and includes experiential exercises, seminars, lectures and group work to meet the training needs of practitioners in this increasingly competitive industry.



Twenty cutting-edge healthcare projects awarded HMRF Funding



PolyU researchers are constantly striving to improve the health and well-being of the population through ground-breaking research. The University was awarded HK\$21.5 million for 20 healthcare-related projects at the start of this year in the latest round of the Health and Medical Research Fund (HMRF). This affirmation of PolyU's research and innovation competence in the field of healthcare follows the Fund's recent support to the University's COVID-19 related studies (see Feature Story).

In the latest round of the HMRF, researchers from the School of Nursing, Department of Health Technology and Informatics, Department of Rehabilitation Sciences, School of Optometry, Department of Biomedical Engineering, Department of Applied Biology and Chemical Technology, and Department of Applied Social Sciences were among those awarded.

Their exciting new research addresses a wide range of healthcare topics, including cancer, children's well-being, immunology, glaucoma, treatment of bone fracture, Ribonucleic acid (RNA)-based diagnostics and therapeutics, diabetes, bacterial infection, older adults' health, maternal postnatal depression, and Tai Chi.

PolyU enjoys strong support from HMRF

Over the past several months, PolyU has in fact been awarded nearly HK\$79.5 million by the HMRF. This amount encompasses the 20 research projects mentioned above, two HMRF Research Fellowship Scheme Projects, and two multi-disciplinary COVID-19 projects. The two multi-disciplinary COVID-19 projects account for HK\$55.9 million of the total.

The HMRF was established by the Food and Health Bureau of the Hong Kong SAR Government. The Fund aims to build research capacity and to encourage, facilitate and support health and medical research to inform health policies, improve population health, strengthen the health system, enhance healthcare practices, advance standard and quality of care, and promote clinical excellence, through the generation and application of evidence-based scientific knowledge in health and medicine. It also provides funding support to evidence-based health promotion projects that help people adopt healthier lifestyles by enhancing awareness, changing adverse health behaviours or creating a conducive environment that supports good health practices.

PolyU will continue to produce leading healthcare-related research, living up to its motto, "To learn and to apply, for the benefit of mankind".



Striving towards CARBON

NEUTRALITY

on campus and beyond



Climate change and high carbon emissions are among the world's most pressing problems. To help achieve carbon neutrality on campus and support Hong Kong's goal of reaching carbon neutrality by 2050, PolyU has established a Task Force on Campus Carbon Neutrality.

The Task Force is under the chairmanship of Professor Christopher Chao, Vice President (Research and Innovation), with expert members from different Faculties of PolyU as well as from various Research Institutes and Centres under the PolyU Academy for Interdisciplinary Research (PAIR). The Campus Facilities and Sustainability Office and the Campus Development Office are also key players. The Task Force will work out a roadmap in fostering a greener and more sustainable campus. PolyU is also the Convenor of the Hong Kong Sustainable Campus Consortium this year.

Interdisciplinary efforts – from carbon-related research to applications

PolyU researchers, leveraging their multidisciplinary expertise, have been engaged in path-breaking research projects geared towards achieving carbon neutrality. There are a number of Research Institutes and Centres under PAIR that aim to strengthen the University's leading role in the research of sustainable urban development, smart energy and waste management.

For example, the Research Institute for Sustainable Urban Development has been developing innovative solutions for sustainable high-density cities by capitalising on the living laboratory of Hong Kong's urban environment. The strategic focus areas related to carbon neutrality include offshore wind power generation, smart energy efficient and grid-responsive buildings, smart utilities, urban air pollution and health, urban ecology, and urban water management.

The Otto Poon Charitable Foundation Research Institute for Smart Energy is dedicated to developing innovative and sustainable energy technologies and solutions. Its research focus areas include district energy systems and smart grid, smart buildings and smart energy systems, advanced energy storage technologies, advanced and renewable energy conversion technologies, and advanced energy materials.

The Research Centre for Resources Engineering towards Carbon Neutrality is an interdisciplinary solid waste recycling research centre. It focuses on advanced technology and policy research in solid waste recycling issues which is a critical area in achieving carbon neutrality to tackle climate change.

Meanwhile, the Otto Poon Charitable Foundation Smart Cities Research Institute has proposed a carbon neutrality analysis and visualisation system for PolyU using a smart city platform, while the Research Institute for Artificial Intelligence of Things plans to develop an AI-empowered digital twin system to provide a digital replica of the actual campus environment and a command centre with a visualisation interface for simulations and decision-making.

These projects, among others, can lead to powerful applications in moving towards carbon neutrality.



PolyU wins the largest share from Environment and Conservation Fund

PolyU has achieved excellent results in the HKSAR Government’s Environment and Conservation Fund (ECF) 2021-22 funding exercise. In the category “Environmental Research, Technology Demonstration and Conference Projects”, 13 research projects of the University have received more than HK\$10 million in funding. Among the 41 awarded projects from local universities funded by the University Grants Committee, PolyU has the largest share in terms of the number of projects awarded and the funding amount.

PolyU’s projects range from the study of how high purity oxygen could enhance sewage treatment, using remote sensing technology and AI for monitoring oil spills in the sea, producing hydrogen while purifying wastewater simultaneously by solar power, to the development of a smart robot that can pick up and sort litter in difficult terrain automatically.

Project	Lead Researcher	Funding Amount (HK\$)
Study of High Purity Oxygen Aeration for Biological Polishing of Chemical Enhanced Primary Treated Sewage Effluent and Cellulase Production from Sludge	Dr Leu Shao-yuan, Associate Professor, Department of Civil and Environmental Engineering	1,999,800
A multi-source remote sensing based technique for monitoring oil spills	Professor Charles Wong Man-sing, Professor, Department of Land Surveying and Geo-Informatics	1,920,520
Recycling yard waste into new-generation biochar adsorbents for CO2 and VOCs removal	Professor Dan Tsang, Professor, Department of Civil and Environmental Engineering	1,179,557
Development of Novel Photocatalytic Technology for Solar-driven Simultaneous Hydrogen Production and Pollutant Degradation from Wastewater	Dr Ho Cheuk-lam, Assistant Professor, Department of Applied Biology and Chemical Technology	500,000
World Meteorological Organization (WMO) - Global Atmosphere Watch (GAW) VOC Expert Workshop	Ir Professor Guo Hai, Professor, Department of Civil and Environmental Engineering	500,000
GPS-assisted Smart Robot with Self-exploration Ability for Litter Pick-up and Sorting on Curved Hillsides	Dr Henry Chu Kar-hang, Assistant Professor, Department of Mechanical Engineering	499,400
Engineering a microbial biosensor for monitoring microplastics pollution	Dr Chua Song-lin, Assistant Professor, Department of Applied Biology and Chemical Technology	499,000
Intelligent monitoring and diagnosis platform for second-life battery energy storage systems based on artificial intelligence and internet of things technologies	Dr Wang Minghao, Research Assistant Professor, Department of Electrical Engineering	499,000
Green Conversion of Microalgal Biomass into High Value Products	Dr Yung Ka-fu, Associate Professor, Department of Applied Biology and Chemical Technology	498,000
Innovative Bifacial Solar Photovoltaic: from theoretical model to its practical application in Hong Kong	Ir Professor Vivien Lu Lin, Professor, Department of Building Environment and Energy Engineering	494,000
Climate-Resilient Planning and Design for Coastal Stormwater Drainage Systems	Dr Wang Shuo, Assistant Professor, Department of Land Surveying and Geo-Informatics	490,600
Optimal design of high performance textile-based solar steam generator by tunable capillary evaporation	Dr Shou Dahua, Assistant Professor, Institute of Textiles and Clothing	485,300
Developing high power electric vehicle (EV) chargers using waste graphite and separators derived from end-of-life EV batteries	Dr Xu Zhenglong, Assistant Professor, Department of Industrial and Systems Engineering	464,400
Total		10,029,577



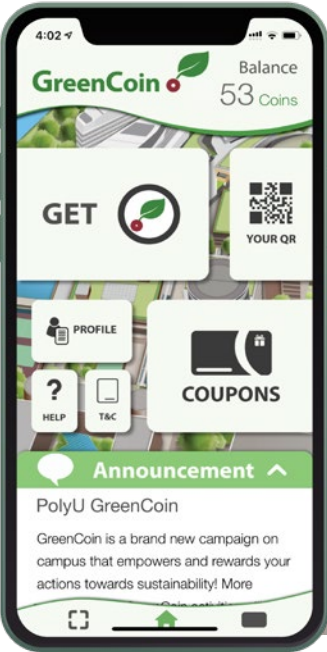
Solar photovoltaic (PV) systems are installed at various locations across campus to generate clean energy.



Replacement and optimisation of HVAC equipment to improve efficiency and reduce electricity consumption associated with air-conditioning

Implementing green initiatives
PolyU has implemented various green initiatives on campus in many areas, including carbon emissions, energy consumption and waste management. These include the implementation of a pilot scheme to install smart energy meters to enable the University to apply big data analytics for future energy optimisation; and installation of solar photovoltaic systems at various locations across the main campus to generate clean energy. The University has also replaced and optimised HVAC equipment to improve efficiency and reduce electricity consumption associated with air-conditioning. There are also incentive programmes and campaigns to raise awareness for sustainability across the University community.

PolyU will continue to strive hard in achieving carbon neutrality, aspiring to set a strong example for other universities and institutions to follow, by turning cutting-edge research into real-world solutions for the benefit of Hong Kong, the Nation and the world.



The Green Coin initiative encourages staff and students to engage in sustainable behaviours.



PolyU projects awarded GREEN TECH FUND to help build a LOW-CARBON CITY

Three PolyU research projects have received grants totaling more than HK\$14 million from the HKSAR Government's Green Tech Fund. The projects, which have a duration of two to three years, aim to assist Hong Kong in its transition to a low-carbon economy, focusing on the areas of decarbonisation, green transport, and energy saving and efficiency.

The University was among four local universities and three private enterprises that received grants totaling around HK\$70 million for 14 projects.



Project:
Biochar-enhanced Construction Materials for Sustainable Waste Management and Decarbonisation

Project Coordinator:
Professor Dan Tsang, Department of Civil and Environmental Engineering

Professor Tsang received a grant of around HK\$8.8 million for his three-year project to develop carbon-negative building materials that assist with long-term decarbonisation. Through the project, Professor Tsang's team will develop innovative designs and science-informed manufacturing technologies for the cutting-edge production of "biochar-enhanced construction materials".

Biochar is a material converted from yard waste after processing, and it can help reduce carbon emissions with its carbon sequestration feature. It has diverse applications, ranging from improving soil fertility, securing food safety, to being added to construction materials to reduce the carbon footprint of the construction industry.

By enhancing construction materials with biochar, the research team aims to pioneer novel and low-carbon products, such as biochar partition blocks and porous pavers, for the construction industry. The team anticipates that widespread adoption of the new products would help to reduce the burden on landfill sites and contribute to Hong Kong and the Greater Bay Area's goal of being carbon-neutral.



Project:
A safe, efficient and facile approach for hydrogen storage and generation: catalytic hydrolysis of solid-state hydrogen storage materials

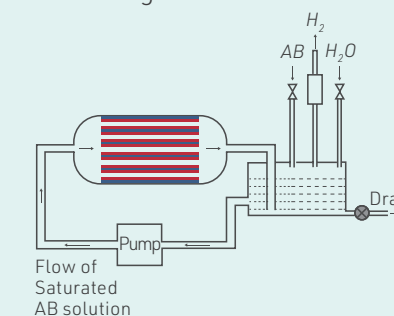
Project Coordinator:
Dr Zheng Guangping, Department of Mechanical Engineering

Dr Zheng received a grant of around HK\$3.3million for his 30-month project in the area of energy saving and efficiency.

Hydrogen is an important source of green energy, particularly as countries pursue net-zero carbon emissions. But there are challenges associated with hydrogen storage, delivery and its efficient release for energy generation. Dr Zheng's team is working to overcome these challenges.

The team is using a solid-state hydrogen storage material called ammonia borane, which is both safe and energy efficient. The chemical compound is rich in hydrogen, soluble and highly stable in its solid state. To efficiently release hydrogen from ammonia borane (AB), the team is using another material, multicomponent transition-metal phosphide, as a catalyst to trigger hydrolysis of ammonia borane.

The techniques developed through the project can enhance the safety of hydrogen storage and its efficiency for energy generation, paving the way for more widespread use of hydrogen as a fuel, such as in hydrogen fuel cell vehicles.

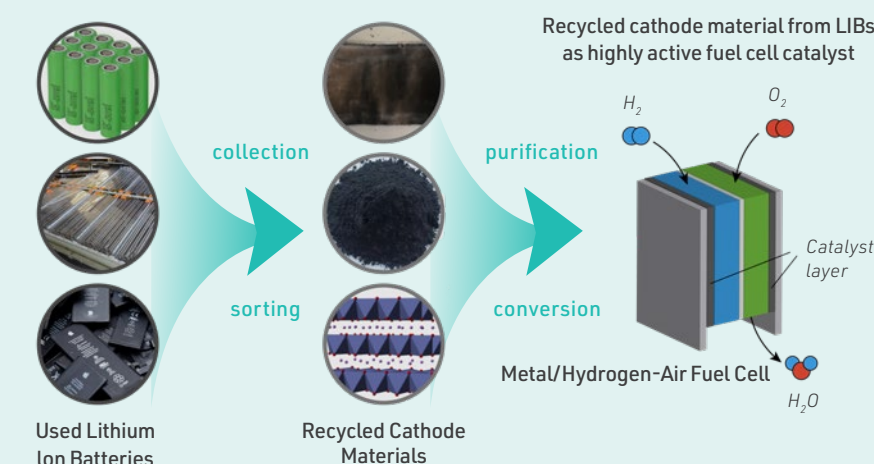


Project:
Recycling of waste lithium-ion batteries as highly active fuel cell catalysts

Project Coordinator:
Dr Lawrence Lee, Department of Applied Biology and Chemical Technology

Dr Lee received a grant of around HK\$2.8 million for his two-year project in the area of green transport. To tackle the rise in waste lithium-ion batteries, Dr Lee's team is researching an innovative approach to recycling the used batteries.

The team is exploring using the used lithium-ion batteries (LIBs) to fabricate active catalysts for fuel cells – another promising energy-generating device. Using a new thermo(electro)chemical method to collect cathode materials from the used batteries, it expects to not only simplify the current procedure but also reduce the use and leaking of hazardous chemicals. If successful, the method will lower the cost of recycling lithium-ion batteries and manufacturing fuel cells, as well as reducing adverse impacts on the environment.



PolyU-supported startups and researchers

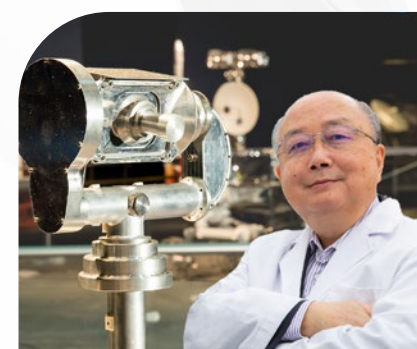
WIN SIX AWARDS at 2022 INVENTIONS GENEVA EVALUATION DAYS

PolyU excelled in this year's special edition of the International Exhibition of Inventions of Geneva – Special Edition 2022 Inventions Geneva Evaluation Days – Virtual Event. PolyU garnered a total of six awards, including one Gold Medal with Congratulations of the Jury, one Gold Medal, three Silver Medals and one Bronze Medal.

Four of the six participating projects are operated by PolyU-supported startups and they have already commercialised their research outputs. The awards received by the PolyU teams are a testament to their determination and unique capabilities in their areas of expertise, which have earned them international recognition. PolyU researchers will continue their good work by developing more innovative solutions for the benefit of Hong Kong, the Nation and the world.

Awards won by PolyU academics

Camera Pointing System for China's Lunar Exploration Missions (Chang'e 3 and 4)



**Gold Medal with
Congratulations of
the Jury**

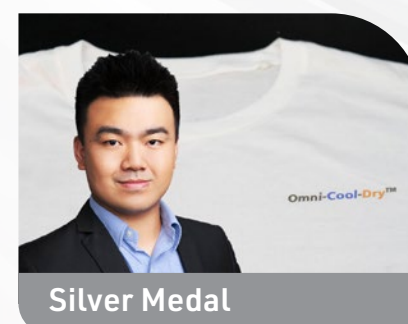
Principal Investigator: Professor Yung Kai-leung, Sir Sze-yuen Chung Professor in Precision Engineering, Director of Research Centre for Deep Space Explorations, Chair Professor of Precision Engineering and Associate Head, Department of Industrial and Systems Engineering

Installed on top of the lunar lander, the Camera Pointing System facilitates panoramic image capturing and rover movement observation on the Moon, and helps the national aerospace team construct a precision 3D model of the landscape for safe roving. With a complex design and a weight of only 2.8 kg, it is sturdy enough to protect the camera against shock and vibration during space missions and ensure its proper functioning under the extreme lunar environment. The invention was successfully deployed on the Moon's front surface during the Chang'e 3 mission and the Moon's far side during the Chang'e 4 mission of China's Lunar Exploration Programme. PolyU is the only university in Hong Kong taking part in the Nation's space missions.

Omni-Cool-Dry™: a Desert Beetle Inspired Skin-like Fabric for Dynamic Thermal and Moisture Management

Principal Investigator: Dr Shou Dahua, Assistant Professor, Institute of Textiles and Clothing

Compared to normal fabrics, this fabric weighs 75% less, dissipates sweat three times faster, and is 50% less clingy during heavy perspiration. The wearer's skin temperature is also 5°C lower. The skin-like fabric aims to keep wearers cool, dry and comfortable by dissipating sweat as water droplets, and by reflecting solar radiation and emitting body heat to the cold universe.



Silver Medal

Awards won by PolyU-supported startups

Umicool: an Eco-friendly Smart Sub-ambient Radiative Cooling (SSRC) Coating



Gold Medal

Principal Investigator: Professor Dai Jianguo, Professor and Associate Head, Department of Civil and Environmental Engineering | Founder of Pro-Infra Science & Technology Limited (a PolyU academic-led startup)

This eco-friendly, long-lasting, self-cleaning, low-cost polymeric radiative cooling coating can reduce the surface temperature of buildings/infrastructure by 6°C as compared to the ambient temperature under direct sunlight without electricity consumption. Umicool can scatter sunlight, convert absorbed UV light to fluorescence emissions and re-emit infrared radiation to the cold universe.

Carbon-negative Climate-smart Biochar Partition Block

Principal Investigator: Professor Daniel Tsang Chiu-wa, Professor, Department of Civil and Environmental Engineering | Founder of NeutralCrete Limited (a PolyU academic-led startup)

The world's first biochar partition block for indoor use that is lightweight, climate-smart, carbon-negative, thermal-insulating, noise-reducing, moisture-regulating and air-purifying. With tailored biochar synthesis, cement formula and mixture design, this low-cost building material boasts high performance, high carbon sequestration and value-added environmental functions.



Silver Medal

AkkMore™: a Fungus and Plant Based Supplement Against Obesity or Prediabetes



Silver Medal

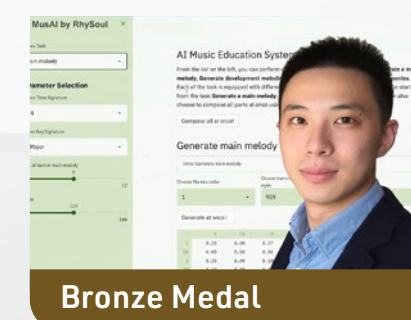
Principal Investigator: Dr Gail Chang Jinhui, Research Assistant Professor, Department of Applied Biology and Chemical Technology | Co-founder of Bo InnoHealth Biotechnology Company Limited (a PolyU GBA Startup PostDoc and PolyU academic-led startup)

AkkMore™ boosts Akkermansia muciniphila in the human gut. It aims to improve users' body conditions by building a healthy microbiome. The fungus and plant based drink helps to reduce metabolic disorders and facilitates losing weight. The research team has completed three phases of animal testing and a phase one clinical trial in humans.

Algorithmic Music Composition Software for Popularising AI Education

Principal Investigator: Dr Chen Gong, PhD alumni of the Department of Computing | Founder of RhySoul Technology (Shenzhen) Company Limited (a PolyU GBA Startup PostDoc)

An interdisciplinary course that combines art and science, and teaches basic AI algorithms through experiential learning of AI-powered musical composition. It aims to popularise AI education by enabling effective teaching at schools and self-learning, allowing beginners to learn basic AI algorithms easily in an interesting way.



Bronze Medal

Smart anti-heat coating: a novel way to **KEEP BUILDINGS COOL**

It seems impossible for people in Hong Kong to endure the heat in the humid summers without air conditioning. However, air conditioning, which consumes a massive amount of electricity and can leak potent greenhouse gases into the atmosphere, contributes significantly to thermal pollution and global warming. This creates a vicious cycle.

What if we could keep indoor temperatures low enough such that air conditioners become unnecessary? This is now achievable – keeping the interior temperature of buildings at least 6°C cooler than the ambient temperature with zero electricity consumption – with a novel method developed by a team of PolyU researchers to cool buildings smartly.

Low-cost anti-heat coating for buildings with zero electricity consumption

Professor Dai Jian-Guo, Associate Head (Academic Development), Department of Civil and Environmental Engineering of PolyU, together with his research team, have invented a method to make advanced coating materials for “smart” sub-ambient radiative cooling (SSRC) to cool buildings off while consuming zero electricity.

PolyU’s SSRC coating, called “Umicool”, is a multifunctional aqueous polymer coating that can be painted on the exterior surface of buildings and infrastructure. It works by scattering sunlight, converting absorbed UV light to fluorescence

emissions and re-emitting infrared radiation to outer space.

The PolyU invention is able to reduce the temperature of buildings by 6°C as compared to the ambient temperature in the daytime under direct sunlight and by 4°C at night without electricity consumption. The team conducted model room tests in Beijing and Zhuhai during the sweltering summers. Results revealed that Umicool is capable of maintaining the interior temperature at around 26°C despite an ambient temperature of up to 40°C, saving as much as 80% of energy consumption in air conditioning.

Compared to a similar mechanism adopted in the industry, “Umicool uses the sky as a temperature

Temperature reduction in buildings as compared to the ambient temperature

-6°C **-4°C**
daytime **at night**
with electricity consumption 0 kWh

■ Professor Dai Jian-Guo has developed “Umicool”, an eco-friendly, anti-heat coating for infrastructure and buildings.

regulator for the dynamic exchange of heat, enhancing daytime cooling while suppressing overcooling at night,” Professor Dai explained. Thus, the huge temperature difference between day and night that may compromise the durability of buildings and infrastructure can be avoided.

Umicool is also a low-cost alternative, as the building materials comprising the coating, including titanium dioxide nanoparticles, fluorescent microparticles, and glass microspheres, are all conventional ones.

Further applications

In addition to applications on the exterior surfaces of buildings, Umicool also works on vehicles and infrastructure such as bridges and paved roads.

Meanwhile, modern office and residential towers in Hong Kong seem to favour the use of glass curtain walling and full-length panoramic windows that let in the sun and the heat. Professor Dai said the team has considered making a semi-transparent version of Umicool for windows, but they need to find a balance between the cost and market demand.

“There is low-emissivity (low-E) glass in the market that blocks off much of the heat from the sun, yet without blocking visible light. Thus, we need to consider whether the cooling effect of semi-transparent Umicool justifies its cost,” he explained.

That said, he believes that the formulation of Umicool can be used to make polymer materials with thermal radiative functions. That means, theoretically, window shades and blinds could be made using Umicool in the future, minimising the heat gain from sunlight through windows.

The team is also looking into the possibility of applying the coating to asphalt roads, oil tanks, outdoor pipes, cars and ships besides buildings.

In summary, Umicool provides unlimited opportunities for energy conservation in buildings and infrastructure, alleviating the urban heat island effect.

Pro-infra: a PolyU academic-led startup

Umicool was developed with the support of the Environment and Conservation Fund of the Hong Kong SAR Government and the PolyU Postdoctoral Fellowship Scheme. In the Inventions Geneva Evaluation Days – Virtual Event 2022, the PolyU innovation won a Gold Medal.

To commercialise Umicool, Professor Dai founded Pro-Infra Science & Technology Limited. The PolyU academic-led startup is currently working with the HKSAR government, major property developers in Hong Kong and construction material companies for field-scale demonstrations.



PolyVentures: GBA Startup Postdoc Programme nurtures technopreneurs

"Mushroom Spaceship" to escort probiotics

Besides being a nutritious food, mushrooms can also be used as furniture and packaging materials – and even more. In fact, PolyU researchers have discovered that by utilising mushroom cells, "mushroom spaceships" with super-hard outer walls can be created, with an ability to protect fragile probiotics from damage and preserve them in food products, providing more health benefits when people consume them, and even helping with weight loss and obesity control.

Turning research outcomes into innovations with impact

In 2019, Dr Gail Chang, Research Assistant Professor of PolyU's Department of Applied Biology and Chemical Technology, was admitted to the PolyU GBA Startup Postdoc Programme (Postdoc Programme) with her project about mushrooms.

With an expertise in food and nutrition, Gail developed her interest in studying the use of mushroom cells as shells to protect fragile probiotics, after noting that

mushroom cells, as an external wall material, are so strong that they are even able to withstand the harsh environment of outer space. With perseverance and diligence, she has succeeded in developing an innovative technology. "Our technology can protect probiotics against damage from heat or pressure and enables different types of probiotics to be included in snacks, hot drinks and pet food to provide health benefits," Gail said.

Her team has also discovered a new way to provide an environment that increases the percentage of a potential probiotic, namely Akkermansia, in the gut, helping people to lose weight and reduce obesity. She hopes this novel technology can make an impact in benefitting mankind. With the help of the Postdoc Programme, her dream has been realised by turning her research outcomes into innovations with real-world impact through technology ventures.

PolyU GBA Startup Postdoc Programme

- First of its kind in Asia
- Nurtures doctoral graduates to pursue their ambition as "technopreneurs"
- Offers dual career prospects for doctoral graduates to commercialise their research technologies while exploring startup opportunities
 - Provides a competitive salary and benefits, entrepreneurship training, dual mentorship by academia and industrialists
 - Provides preferential IP licensing terms

■ The project "Development of micro-encapsulated probiotic products with fungal mycelia" led by Dr Gail Chang was admitted to the GBA Startup Postdoc Programme in 2019.

Dual guidance on academic and entrepreneurial skills

Through the Postdoc Programme, Gail received dual mentorship with guidance from both industrial and academic supervisors. They provided her with technical support in doing experiments, offered her professional advice from an industry perspective, helped her formulate entrepreneurial strategies, guided her in building industry networks, helped her participate in startup competitions, and brought collaboration opportunities with firms. Gail's team was supervised by Dr Jimmy Jin, Assistant Professor, School of Accounting and Finance; Professor Wing-tak Wong, Deputy President and Provost and Chair Professor of Chemical Technology at the Department of Applied Biology and Chemical Technology; Dr Amber Chiou Jiachi, Assistant Professor, Department of Applied Biology and Chemical Technology; and also Dr Li Qiang, an alumnus from the Faculty of Business.



■ Gail has received numerous awards in entrepreneurial competitions.

A good start brings a more promising future

Under the guidance of her mentorship team, Gail successfully established Bo InnoHealth Biotechnology Company Limited, a research-based, deep tech academic-led startup. She was subsequently granted support by the PolyU Micro Fund and admitted into the Incu-Tech Programme of the Hong Kong Science and Technology Parks Corporation, furthering her motivation to embark on an entrepreneurial journey. Gail has also received numerous awards in entrepreneurial competitions, including the Gold Award of the China International College Students "Internet +" Innovation and Entrepreneurship Competition, and the Silver Award of the "Challenge Cup" China College Students Entrepreneurship Competition. Earlier this year, she was also awarded



PolyU's GBA Startup Postdoc Programme features dual guidance from academic and industry mentors, who have assisted me in participating in various innovation and entrepreneurship competitions and arranged meetings with investors and industry partners. They also offered me technical support so that I can continue to pursue excellence in research and entrepreneurship.



Dr Gail Chang,
PolyU's Department of Applied
Biology and Chemical Technology

a Silver Medal at the International Exhibition of Inventions of Geneva – Special Edition 2022 Inventions Geneva Evaluation Days – Virtual Event.

Recently, Gail has applied her technology in AkkMore™, a fungus- and plant-based meal replacement powder against obesity or prediabetes, which has been tested on animals with promising results. Though her company and its technology are still in their infancy, she envisages a bright future for her research and entrepreneurial endeavours.

Nurturing doctoral students to become technopreneurs

Gail is one of the entrepreneurs supported by PolyU. Over the years, the University has adopted a multi-pronged approach to nurturing and supporting aspiring entrepreneurs. Through putting in place a variety of initiatives such as the GBA Startup Postdoc Programme – the first of its kind in Asia – PolyU provides candidates with diversified entrepreneurial and academic training, preferential IP licensing terms, as well as competitive benefits.

Expediting entrepreneurial success

With the assistance of PolyU, Dr Gail Chang has received several government grants and startup subsidies in a short time, which include:

- PolyU Micro Fund 2020: HK\$120,000
- HKSTP Incu-Tech Programme: HK\$1.29 million
- Angel round financing: HK\$1.5 million
- PolyU Tech Launchpad Fund: HK\$900,000

Innovations bestowed global awards to benefit industry

Three PolyU breakthrough technologies have been honoured with the TechConnect Global Innovation Awards at the TechConnect World Innovation Conference and Expo 2021. The Award is given based on the potential positive impact the technology will have on a specific industry sector.

PolyU is the only higher education institution in Hong Kong that received the honours in 2021, and the University has been bestowed the prestigious Awards for the fifth consecutive year. This year, the University's award-winning innovations promise great potential for tackling environmental and public health challenges as well as shaping smart city development. They are:



A novel moisture wicking textile

Researchers: Dr Shou Dahua (pictured), Professor Fan Jintu and Dr Wei Xin from the Institute of Textiles and Clothing

Innovation: Sweatextile – a nature-inspired textile of unidirectional water transport and dissipation for moisture management, comfort and protection

Novelty: The textile mimics the perspiration action of human skin to quickly dissipate excessive sweat as water droplets to the outer surface.

Benefits: Kept dry and comfortable, the wearer is able to maintain a high level of energy and endurance. The textile also protects wearers from external liquids such as rain and contaminated water.



Toxic-free method to produce MXenes

Researchers: Professor Hao Jianhua and Ms Pang Sin-yi from the Department of Applied Physics

Innovation: A hydrofluoric (HF)-free, facile and rapid electrochemical method to synthesise MXenes (MXenes are efficient and economical nanomaterials with strong potential for energy conversion and storage applications.)

Novelty: The method eliminates the traditional use of the highly toxic HF acid.

Benefits: The resulting MXenes have stable and highly efficient energy storage and hydrogen gas synthesis capabilities, offering promising applications to address the pressing energy crisis and increasing energy demand.



Highly precise global positioning for autonomous driving

Researchers: Dr Hsu Li-ta (pictured) and Dr Wen Weisong from the Department of Aeronautical and Aviation Engineering

Innovation: 3D LiDAR-Aided GNSS Precise Positioning Technology for level-4 autonomous driving

Novelty: The innovation couples its environmental perception capability with high-precision satellite positioning technology to achieve intelligent self-adjusting satellite ranging measurement modelling and correction.

Benefits: It makes centimetre-level high-precision global positioning in urban environments possible for level-4 autonomous driving in which the car can handle most driving situations independently.

PolyU ranked among the top five young universities in the world



PolyU was ranked 5th in the Times Higher Education Young University Rankings 2022, rising seven places from last year's index. The impressive achievement is a testament to the efforts of the PolyU community to achieve excellence in the areas of education, research and knowledge transfer.

The league table ranks universities from across the world that are up to 50 years old. A total of 539 institutions were evaluated across a range of different areas, including teaching, research, citations, industry income and international outlook.

PolyU was also ranked highly in the QS World University Rankings by Subject 2022, which

analysed 51 subjects, grouped into five broad subject areas, from over 1,500 institutions worldwide. PolyU had five disciplines and one broad subject area ranked among the top 50 in the world (for details, please refer to back cover), with three disciplines ranked first in Hong Kong. Various Engineering-related disciplines also demonstrated a significant leap from last year.

The University will reference the ranking information and other evaluation criteria to identify areas for further improvement. PolyU will continue to provide top-quality education to students and strive for excellence in research, in order to contribute to the development of Hong Kong, the Nation and the world.

First local business school to win the prestigious WRDS-SSRN Innovation Award

PolyU's Faculty of Business is the Asia Pacific region winner of the 2021 Wharton Research Data Services – Social Science Research Network (WRDS-SSRN) Innovation Award. The Faculty is the first business school in Hong Kong to receive this Award, which recognises emerging business schools in North America, Europe, and the Asia Pacific that

demonstrate innovation and research excellence. The Award also aims to elevate the visibility of impact-focused research and the institutions that conduct such research.

"As a key source of knowledge, research underpins our innovation-driven education and expert consultancy," said Professor Edwin Cheng, Dean of PolyU's Faculty of Business. "We are delighted to receive the Award and are grateful for the recognition. Through our various research and specialist centres for Belt and Road development, branding and marketing, fintech, leadership and innovation, maritime studies, shipping and logistics, sustainability, and entrepreneurial finance, we are open to numerous opportunities for collaboration that advance research and scholarship".

The Award was presented to Professor Edwin Cheng, Dean of the Faculty of Business.



PolyU confers honorary doctorates on two distinguished persons

PolyU is delighted to have awarded honorary doctorates to Mr Cheung Ka-long and Professor Yang Mengfei in recognition of their outstanding achievements in their respective professions.

Olympic fencing champion

Mr Cheung Ka-long is a renowned Hong Kong foil fencer who represented the Hong Kong fencing team at the Tokyo 2020 Olympic Games. He won an Olympic gold medal in Men's Foil Fencing (Individual) for Hong Kong, making him the city's first Olympic champion after Hong Kong's return to China. Over the years, Cheung has achieved many accolades and participated in numerous international competitions. He was the winner of the Asian Junior and Cadet Fencing championships (individual and team foil) in 2014, Asian Fencing championship (individual foil) in 2016 and Junior World championship (individual foil) in 2017. He also claimed a silver medal for a team event, and a bronze medal for an individual event at the Asian Games in 2018.



Mr Cheung Ka-long

Eminent space scientist

Professor Yang Mengfei is an accomplished expert in space technology, a Researcher at the China Academy of Space Technology, an Academician of the Chinese Academy of Sciences, and a Life Fellow of the International Academy of Astronautics. As chief commander and chief designer of the Chang'e 5 lunar probe, Professor Yang led the team

to overcome many complex technical issues and successfully completed China's first extraterrestrial sample return mission, laying a solid foundation for future space missions. PolyU researchers have worked closely with Professor Yang and his team in contributing to the Chang'e 5 and Chang'e 6 projects.

Fine examples for the younger generation

PolyU's Council Chairman Dr Lam Tai-fai said, "Professor Yang's achievements in the field of aerospace are remarkable and highly admired, and we look forward to enhancing our future collaboration so as to make significant contributions to our Nation." He added, "Cheung Ka-long's accomplishments in fencing have not only brought glory to Hong Kong, but also raised the interest of the general public in sports and helped generate immense positive energy all around the community."

PolyU's President Professor Jin-Guang Teng said, "Both Honorary Doctors possess an indomitable spirit. They are courageous in setting big goals and seeking breakthroughs. In the pursuit of excellence, they have demonstrated outstanding qualities of perseverance and persistence."

Professor Yang Mengfei



Over 200 POLYU ACADEMICS ranked as world's TOP-CITED SCHOLARS

PolyU strives to create an environment that supports academics in undertaking cutting-edge basic and translational research. This has naturally led to the publication of research work by our scholars in top journals that has attracted many citations. Last year, the world-class research produced by PolyU scholars across a wide range of disciplines was recognised in different global citation rankings, including the rankings by Stanford and Clarivate, reflecting the University's exceptional research excellence.

World's Top 2% Most-cited Scientists by Stanford University

In the latest "Updated science-wide author databases of standardised citation indicators" of over 100,000 top scientists compiled by Stanford University, more than 190 PolyU academics were ranked among the world's top 2% most-cited scholars. Among them, around 20 academics (see below list) made it to the top 50 scholars in the world in their respective fields, the highest number among universities in Hong Kong. PolyU also has the most top 2% scientists in Hong Kong and globally in the fields of Building and Construction (18 academics) and Civil Engineering (13 academics).

Subject field
Rank in field (field size)

	Building & Construction 2 (30,244) Ir Professor Poon Chi-sun Chair Professor of Sustainable Construction Materials, Department of Civil and Environmental Engineering		Sport, Leisure & Tourism 4 (7,065) Professor Rob Law Honorary Professor, School of Hotel and Tourism Management
	Operations Research 5 (26,063) Ir Professor Edwin Cheng Chair Professor of Management, Department of Logistics and Maritime Studies		Civil Engineering 9 (47,647) Professor Jin-Guang Teng Chair Professor of Structural Engineering, Department of Civil and Environmental Engineering
	Geological & Geomatics Engineering 9 (52,403) Professor Weng Qihao Chair Professor of Geomatics and Artificial Intelligence, Department of Land Surveying and Geo-Informatics		Operations Research 10 (26,063) Professor Felix Chan Professor, Department of Industrial and Systems Engineering
	Building & Construction 12 (30,244) Professor Chen Qingyan Chair Professor of Building Thermal Science, Department of Building Environment and Energy Engineering		Chemical Engineering 13 (66,189) Professor Chen Guohua Chair Professor of Energy Conversion and Storage, Department of Mechanical Engineering



Environmental Engineering
14 (51,126)
Professor Chau Kwok-wing
Professor, Department of Civil and Environmental Engineering



Operations Research
16 (26,063)
Professor Qi Liqu
Emeritus Professor of Applied Mathematics, Department of Applied Mathematics



Strategic, Defence & Security Studies
19 (18,114)
Professor Chow Wan-ki
Emeritus Professor of Architectural Science and Fire Engineering, Department of Building Environment and Energy Engineering



Information Systems
20 (17,971)
Professor Eric Ngai
Professor, Department of Management and Marketing



Building & Construction
20 (30,244)
Ir Professor Wang Shengwei
Chair Professor of Building Energy and Automation, Department of Building Environment and Energy Engineering



Building & Construction
23 (30,244)
Ir Professor Albert Chan
Chair Professor of Construction Engineering and Management, Department of Building and Real Estate



Accounting
23 (5,114)
Professor James Ohlson
Visiting Chair Professor of Accounting, School of Accounting and Finance



Inorganic & Nuclear Chemistry
26 (72,062)
Professor Wong Wai-yeung
Chair Professor of Chemical Technology, Department of Applied Biology and Chemical Technology



Building & Construction
29 (30,244)
Professor Li Heng
Chair Professor of Construction Informatics, Department of Building and Real Estate



Civil Engineering
30 (47,647)
Professor Xu You-lin
Emeritus Professor (Structural Engineering), Department of Civil and Environmental Engineering



Civil Engineering
38 (47,647)
Ir Professor Ben Young
Chair Professor of Steel Structures, Department of Civil and Environmental Engineering



Sport, Leisure & Tourism
47 (7,065)
Professor Cathy Hsu
Chair Professor, School of Hotel and Tourism Management



Logistics & Transportation
50 (23,751)
Ir Professor William Lam
Chair Professor of Civil and Transportation Engineering, Department of Civil and Environmental Engineering

Highly Cited Researchers 2021 by Clarivate



Professor Guo Song



Professor Lee Shun-cheng



Professor Li Gang



Professor Yan Feng



Dr Zhang Xiao



Professor Chau Kwok-wing



Professor Zhang Lei



Professor Daniel Tsang

In addition, eight PolyU academics (see above and below list) were named in the Highly Cited Researchers 2021 list by Clarivate, which identifies the most influential scholars around the world during the past decade, as demonstrated by their publication of multiple highly-cited papers that rank in the top 1% by citations for field and publication year in the Web of Science index between 2010 and 2020. Approximately 6,600 researchers from more than 70 countries and regions were recognised in the 2021 list.

Computer Science	
Professor Guo Song	Professor, Department of Computing
Cross-Field	
Professor Lee Shun-cheng	Professor, Department of Civil and Environmental Engineering
Professor Li Gang	Professor, Department of Electronic and Information Engineering
Professor Yan Feng	Professor, Department of Applied Physics
Dr Zhang Xiao	Assistant Professor, Department of Mechanical Engineering
Engineering	
Professor Chau Kwok-wing	Professor, Department of Civil and Environmental Engineering
Professor Zhang Lei	Chair Professor of Computer Vision and Image Analysis, Department of Computing
Engineering & Environment and Ecology	
Professor Daniel Tsang	Professor, Department of Civil and Environmental Engineering

Gifted PolyU researcher in supramolecular chemistry wins **CROUCHER INNOVATION AWARD**

"I have been obsessed with chemistry since secondary school," said Dr Franco Leung, a PolyU-trained academic who is one of the two winners of the Croucher Innovation Award 2021. This prestigious accolade recognises a small number of exceptionally talented scientists, offering substantial support to these "rising stars" at a formative stage in their careers. Award recipients each receive research funding of up to HK\$5 million from the Croucher Foundation over five years.

Franco was bestowed the honour in recognition of his outstanding achievements in supramolecular and material science research. The 33-year-old scientist is currently an Assistant Professor of PolyU's Department of Applied Biology and Chemical Technology. His main research interests include dynamic supramolecular polymers,

functional molecular assembly, and biocompatible functional materials.

Franco's aspiration in research is to design novel supramolecular functional systems for developing stimuli-responsive functional soft materials. One of his research areas is Life-like Supramolecular Soft Actuators. These highly dynamic, reversible and biocompatible supramolecular soft actuators are expected to be applicable in the field of soft robotics, which involves the use of materials with mechanical properties similar to those of living tissues.

The young scholar is honoured to receive the Award, and considers it a strong endorsement of his research. He said, "I am most grateful to the Croucher Foundation for its recognition of my research on a Supramolecular Robotic System of Photo-responsive Molecular Amphiphiles. I hope

this research can facilitate the development of a supramolecular robotic system, which is applicable in the medical field to achieve more precise treatments, as well as in other fields to make a positive impact on society."

One possible application is to deliver tiny drugs to a precise location inside the human body.

A PolyU-grown scholar coming home

Franco is also thankful to his alma mater for laying a solid academic foundation for his scientific research. He graduated from PolyU in 2011 with a Bachelor of Science (First Class Honours) degree in Chemical Technology. After receiving a Master of Philosophy degree in Chemical Technology from his alma mater, he proceeded with his Doctor of Philosophy studies in Electronic Chemistry at the Tokyo Institute of Technology, Japan.

In 2017, Franco joined the group of Professor Ben L. Feringa (2016 Nobel Laureate in Chemistry) at the University of Groningen, the Netherlands, as a postdoc fellow and subsequently a Croucher Foundation Postdoctoral Fellow, to develop photo-responsive soft materials of molecular motors and switches. He then embarked on his academic career at PolyU in June 2019, bringing with him the lessons he had learnt from Professor Feringa.

An innovative mindset to create positive impact

When in the Netherlands, Franco cycled to work every day. At the campus entrance, he would often run into Professor Feringa, who was also on a bike. They would start their incessant discussion on chemistry right away. The professor often brought up new ideas and asked Franco for opinions.

What does supramolecular research entail?

Supramolecular chemistry is an interdisciplinary field of science involving the chemical, physical, and biological features of molecular assemblies that have greater complexity than the individual molecules themselves. As the binding force between the smaller molecules in supramolecular structures is weak, it is often possible to develop larger molecules of a desired shape or functionality.

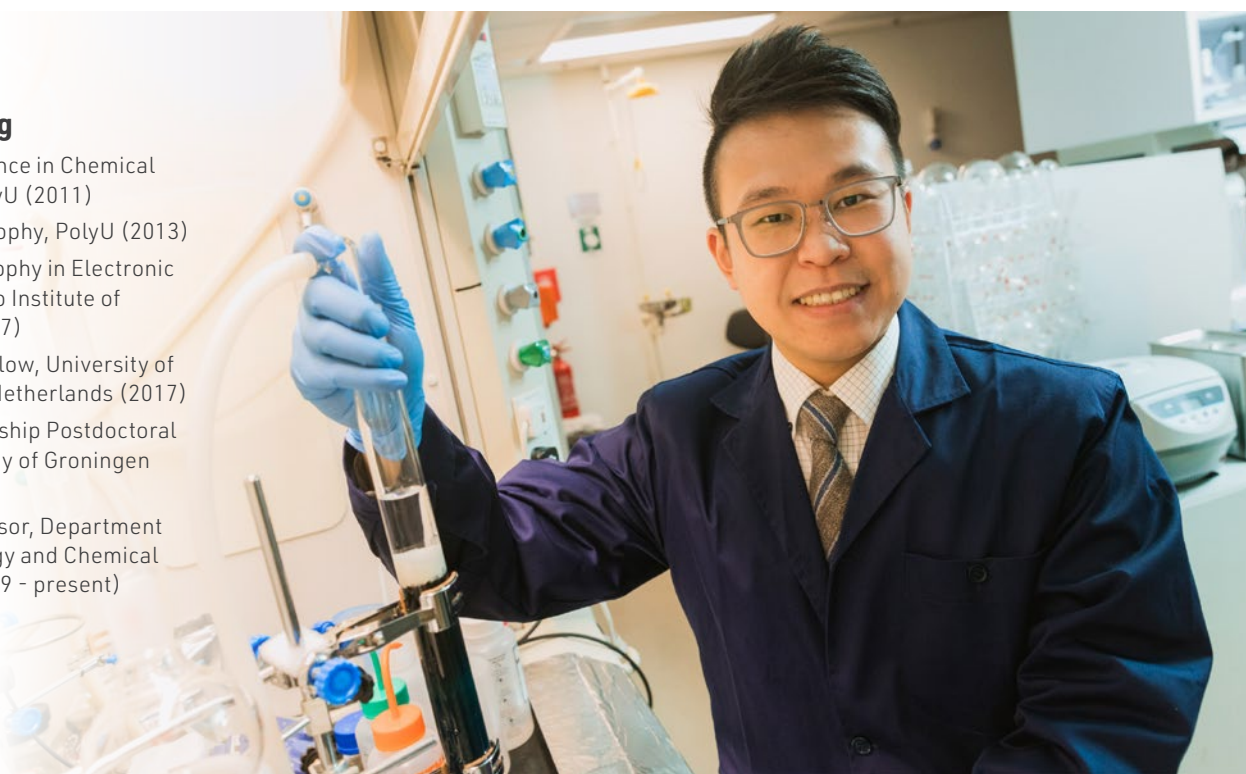
"If I didn't think his idea was viable, I would tell him directly," Franco recalled. "He would not consider my bluntness offensive." The young researcher was impressed not only with how the professor shared his ideas candidly but also how the Nobel Laureate humbled himself by taking note of a junior's comments. "By answering his questions, I was engaged and became appreciative of his innovative thinking," Franco added.

Now at PolyU, Franco is leading a research team with members younger than him. Having adopted Professor Feringa's attitude and method, Franco has been cultivating an innovative mindset in his own students, encouraging them to ask each other challenging questions in regular meetings.

Professor Wing-tak Wong, PolyU's Deputy President and Provost, congratulated Franco on his success and said, "Dr Leung's achievements demonstrate the promising potential of young scientists. PolyU will continue to offer staunch support to interdisciplinary research, and we look forward to the further discoveries of Dr Leung's research."

Dr Franco Leung

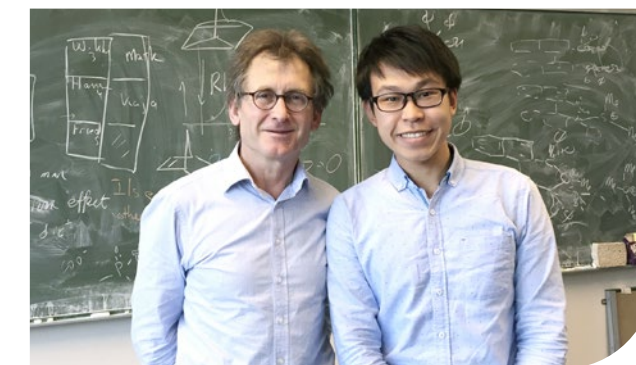
- Bachelor of Science in Chemical Technology, PolyU (2011)
- Master of Philosophy, PolyU (2013)
- Doctor of Philosophy in Electronic Chemistry, Tokyo Institute of Technology (2017)
- Postdoctoral Fellow, University of Groningen, the Netherlands (2017)
- Croucher Fellowship Postdoctoral Fellow, University of Groningen (2017 - 2019)
- Assistant Professor, Department of Applied Biology and Chemical Technology (2019 - present)



■ Dr Franco Leung receives the Croucher Innovation Award from Professor Rosie Young, a world-renowned endocrinologist, at the award presentation ceremony.



■ Franco (right) was greatly inspired by the Nobel Laureate Professor Ben L. Feringa.



Major external appointments and awards of PolyU members

From October 2021 to March 2022, 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.

(listed in alphabetical order)



Professor Cao Jiannong

Otto Poon Charitable Foundation Professor in Data Science & Chair Professor of Distributed and Mobile Computing, Department of Computing
Director of Research Institute for Artificial Intelligence of Things
Dean of Graduate School

Award

- Fellow, China Computer Federation



Professor Eric Cheng Ka-wai

Professor, Department of Electrical Engineering

Appointments

- Chief Editor, Industrial Electronics section, *Frontiers in Electronics*
- Education Chair, IEEE Transportation Electrification Community



Professor Chu Hung-lam

Chair Professor of Chinese Culture & Chang Jiang Scholars Chair Professor of Pre-modern Chinese History, Department of Chinese Culture

Appointment

- Member of the Scholar's Workshop Scheme, the Chinese Academy of History



Professor Fan Jintu

Chair Professor of Fiber Science and Apparel Engineering & Head, Institute of Textiles and Clothing

Award

- TechConnect Global Innovation Award



Professor Hao Jianhua

Chair Professor of Materials Physics and Devices, Department of Applied Physics

Award

- TechConnect Global Innovation Award



Mr Peter Hasdell

Associate Dean (Academic Programmes), School of Design

Awards

- Gold Medal, Taipei International Design Award 2021
- First Prize, The 3rd Human City Design Award
- Award winner, Restoration and Renovation category, Architecture MasterPrize



Dr Hsu Li-ta

Associate Professor & Associate Head, Department of Aeronautical and Aviation Engineering
Limin Endowed Young Scholar in Aerospace Navigation

Award

- TechConnect Global Innovation Award



Professor Kun-Pyo Lee

Swire Chair Professor of Design
Alex Wong Siu Wah Gigi Wong Fook Chi Professor in Product Design Engineering
Dean of School of Design

Appointment

- Member of the Board of Directors, Hong Kong Design Centre



Professor Li Gang

Sir Sze-yuen Chung Endowed Professor in Renewable Energy, Department of Electronic and Information Engineering

Award

- Optica Fellow, Optica



Professor Li Ping

Chair Professor of Neurolinguistics and Bilingual Studies
Dean, Faculty of Humanities
Associate Director, University Research Facility in Behavioral and Systems Neuroscience

Award

- Fellow, American Association for the Advancement of Science



Professor Li Qing

Chair Professor of Data Science & Head, Department of Computing

Award

- Fellow, Institute of Electrical and Electronics Engineers



Professor Li Xiangdong

Chair Professor of Environmental Science and Technology
Ko Jan Ming Professor in Sustainable Urban Development
Dean, Faculty of Construction and Environment
Director of Research Institute for Sustainable Urban Development

Award

- Clair C. Patterson Award



Dr Tulio Maximo

Assistant Professor, School of Design

Award

- Red Dot Award: Product Design



Professor Daniel T. L. Shek

Chair Professor, Department of Applied Social Sciences; Li & Fung Professor in Service Leadership Education; Associate Vice President (Undergraduate Programme)

Award

- Gold Award, QS-Wharton Reimagine Education Awards



Dr Shou Dahua

Assistant Professor, Institute of Textiles and Clothing
Limin Endowed Young Scholar in Advanced Textiles Technologies

Award

- TechConnect Global Innovation Award



Dr Eric Tsui

Associate Director, Knowledge Management and Innovation Research Centre

Awards

- Knowledge Management Award by Knowledge Management Austria
- Platinum Winner, Best Pandemic Training Response, LearnX Live! Awards



Professor Stephen J. Wang

Professor, School of Design

Appointment

- Distinguished Visiting Professor, Tsinghua University (The Future Lab)



Dr Wen Weisong

Research Assistant Professor, Department of Aeronautical and Aviation Engineering

Award

- TechConnect Global Innovation Award



Professor Weng Qihao

Chair Professor of Geomatics and Artificial Intelligence, Department of Land Surveying and Geo-Informatics

Award

- Fellow, American Association of Geographers



Dr Zhang Shuowen

Assistant Professor, Department of Electronic and Information Engineering

Award

- Paul Baran Young Scholar Award, the Marconi Society



Professor Zheng Zijian

Professor, Institute of Textiles and Clothing

Award

- Fellow, Royal Society of Chemistry

Senior staff appointments and promotions

(between 1 January and 31 March 2022)

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

Promotion



Mr Ben Lau Man-piu

as Director of Campus Development on 10 January 2022

Appointments



Professor Chung Chi-nien

as Chair Professor of Strategic and Organization Management on 2 March 2022



Ms Priscilla Hung Yu-mei

as Director of Communications and Public Affairs on 7 March 2022



Dr Vincent Keng Wee-keong

as Director of Centralised Animal Facilities on 1 January 2022



Mr Robert Voyle

as Chief Executive Officer of the Aviation Services Research Centre on 30 March 2022

ENGINEERING INNOVATION

to ease the public health crisis

Ir Dr Yuen Pak-leung

- Higher Diploma in Mechanical Engineering, Hong Kong Polytechnic (1979)
- Bachelor of Science in Mechanical Engineering, University of Hong Kong (1981)
- Executive Master of Business Administration, The Chinese University of Hong Kong (1999)
- Engineering Doctorate (Engineering Management), City University of Hong Kong (2012)
- President, Hong Kong Institution of Engineers (2020-2021)
- Vice President, Chartered Institution of Building Services Engineers UK
- Adjunct Professor, Department of Building Environment and Energy Engineering, PolyU

Veteran hospital engineer Ir Dr Yuen Pak-leung has battled both SARS in 2003 and the recent waves of COVID-19. His experience has convinced him that his profession is not just about problem-solving, but instead its main purpose is serving people.

Dr Yuen had worked in the HKSAR Government's Electrical and Mechanical Services Department for more than 10 years focusing on public hospital construction and maintenance, before he joined the Hospital Authority (HA) in 1993. Drawing on his significant expertise in hospital engineering systems and on specialized ventilation, he is currently a member of the HA's senior management, overseeing the design, construction and maintenance operation of the engineering infrastructure of all public hospitals in Hong Kong.

Innovative solutions to combat SARS

The fight against SARS reshaped Dr Yuen's professional outlook. One night during the outbreak, he received an urgent call from Dr Ko Wing-man, the then Acting Chief Executive of the HA, asking him to urgently try to deliver more than

100 isolation beds for SARS patients within one day, as all the existing isolation rooms were occupied.

"I felt an enormous sense of responsibility to help, as doctors and nursing staff had lost their lives treating SARS patients during the epidemic," Dr Yuen recalls.

Dr Yuen solved the problem by coming up with the idea of installing exhaust fans in general wards to create negative pressure and an isolation effect, preventing contaminated air within the wards from flowing outside them.

Subsequently, in response to the unexpected surge of SARS patients, he quickly applied his innovative thinking again to come up with a design which enabled isolation wards, during periods they were not needed, to be easily converted back into general wards. This invention, being the world's first convertible design of its kind, has greatly enhanced the flexibility of how hospitals are able to use their wards. As a result, the total number of isolation beds in Hong Kong hospitals increased from 177 to more than a thousand in a short period.

The experience changed Dr Yuen's attitude towards his job. While he had previously considered his main

focus to be technical projects, he now saw himself as part of the hospital system, breathing the same air as staff working there.

Once SARS had subsided, he devoted several years up to 2012 to researching how to improve the ventilation design of hospital general wards to enhance their isolation capability to cater for hidden disease spreaders. The design has already been widely adopted by local public hospitals. Also, he has set down fast-track means to convert existing general wards into makeshift isolation wards with negative pressure function facilities to meet patient isolation requirements in the event of a possible pandemic surge in the future. Due to his unique expertise, he was invited by the World Health Organisation and United Nations Office for Project Services as expert advisor for constructing isolation wards in public hospitals across Indonesia.

A rapid response to COVID-19

When COVID-19 hit Hong Kong in early 2020, there was an immediate need to increase the supply of isolation wards. Leveraging his SARS experience and earlier research findings, Dr Yuen invented and later collaborated with an engineering team to develop a pioneering mobile fan filter unit equipped with high efficiency air filters that could create a negative pressure system, preventing the coronavirus from being circulated outside of a ward. By installing over 150 of such units, they converted 16 general wards in public hospitals into isolation wards, adding 400 isolation beds in just a couple of weeks. Later on, he continued to spearhead the ventilation transformation of Asia World Expo Halls 1 and 2, changing these two venues into a large-scale community treatment facility equipped with 900 isolation beds within a week. The fan filter unit was recently awarded a Silver Medal at the Geneva Invention Exhibition 2022.

In addition, Dr Yuen teamed up with several fellow PolyU alumni, who were also top engineers, including Mr Thomas Chan of WSP, Mr Gilbert Tsang and Mr Thomas Ho of Gammon Construction Limited, to adopt the modular integrated construction (MiC) approach invented by Dr Yuen to swiftly build high-standard negative pressure airborne isolation wards for use in the community treatment facility.

Dr Yuen not only helped relieve the pressure created by the shortage of isolation facilities, but he also

took up chairmanship of the Working Group on Implementing the Requirement on Air Change or Air Purifiers in Dine-in Restaurants to help more than 18,000 eateries in Hong Kong improve their ventilation in a few months, further contributing to pandemic control in the community.

For his contributions to combating COVID-19, Dr Yuen was awarded the Chief Executive's Commendation for Community Service in 2020.

A deep concern for people

Dr Yuen is always conscious of the life and death consequences a facility incident or emergency can have in a hospital. As a result, he is committed to being the first to respond to such incidents, so that he can personally provide help and find a resolution.

Dr Yuen attributes his professionalism and desire to serve to the education he received from the Hong Kong Polytechnic, a predecessor of PolyU. Two professors in particular inspired him. He was one of the top students of Professor Wang Shan-kuo, a world-renowned scholar and a pioneer in the air-conditioning industry. Dr Yuen was also deeply influenced by Professor Leung Tin-pui, a former Vice President of the University, to practise the PolyU motto "To learn and to apply, for the benefit of mankind".

Today, Dr Yuen is an adjunct professor at PolyU's Department of Building Environment and Energy Engineering. To aspiring young engineers, he says: "Excellent problem solving skills, innovation, attention to detail, staying curious, as well as being constantly observant and prepared, are all among the qualities that make a great engineer." To that list, he adds having deep concern for people, which he has demonstrated throughout his career.

■ With his rich engineering knowledge and experiences, Dr Yuen led a team to improve the ventilation system in the Asia World Expo Halls to allow the venue to transform into a large-scale community treatment facility during the early phase of the COVID-19 outbreak.





STUDENTS SHINE

in innovation and entrepreneurship competition

The winning team of the Grand Prize in the Innovation Stream presents their project to Mrs Carrie Lam, Chief Executive of the HKSAR (middle).

Innovation and entrepreneurship training is a hallmark of the holistic education PolyU offers to enable students to excel in today's dynamic environment and make a difference to society. In the 7th Hong Kong University Student Innovation and Entrepreneurship Competition, PolyU student teams scooped 12 awards, including the Grand Prize, for advancing technology development in areas ranging from mathematics and physics, to social enterprises.

Out of more than 70 winning projects, the PolyU submission "High Performance Solution-Processed Perovskite Solar Cell Towards Sustainable Development" not only won First Prize in the Energy, Environmental and Chemical Engineering Category, but it was also selected as the only Grand Prize winner from the Innovation Stream of the competition.

The project was praised for the potential of its new approach in the further development of producing

high-quality, high-efficiency perovskite solar cells. Solar energy is an important source of renewable energy for industrial production and domestic consumption. Perovskite solar cells are the most promising type of photovoltaic technology and are a game changer for converting sunlight into electrical energy due to their low fabrication cost, high power conversion efficiency, and the flexibility offered by tunable bandgaps, and a facile manufacturing process. As a result, the novel method developed to produce high performance perovskite solar cells has the potential to make a significant contribution to sustainable development globally.

Organised by the Hong Kong New Generation Cultural Association, and co-organised by Hong Kong Science and Technology Parks Corporation with funding support from the Innovation and Technology Commission, the competition aims to inspire outstanding students with the potential to become future innovation and entrepreneurship leaders.



The winning team of the Grand Prize in the Innovation Stream (from left: Dr Ren Zhiwei, Dr Zhang Heng-kai and Dr Liu Kuan) and their project "High Performance Solution-Processed Perovskite Solar Cell Towards Sustainable Development"



Professor Christopher Chao (fifth from left), PolyU Vice President (Research and Innovation), celebrates with the winning teams.

Innovation Stream		
Award	Project	Awardees
Grand Prize	High Performance Solution-Processed Perovskite Solar Cell Towards Sustainable Development	Zhang Heng-kai, Ren Zhiwei and Liu Kuan
Energy, Environmental and Chemical Engineering		
First Prize	High Performance Solution-Processed Perovskite Solar Cell Towards Sustainable Development	Zhang Heng-kai, Ren Zhiwei and Liu Kuan
Merit Prize	Construction Noise Permit Application System Based on Geographic Information System and Noise Control Ordinance	Chiu Kai-yim, Wong Ho-lun, Lee Wing-sze, Chantel Alexandra Lee, Suen Lok-fai, Ivan Jasper Istanto and Kong Yiu-lun
Merit Prize	Performance Analysis of Bifacial Solar PV Module and its Application in Hong Kong	Hung Tak-lam, Nico Lam and Leung Chun-kuen
Information Technology		
Second Prize	Intelligent Driver Health Assessment System Based on the Optical Fiber Interferometer	Yu Jianxun, Chen Shuyang and Qu Jiaqi
Merit Prize	Milky Assistant	Leung Yee-ting
Mathematics and Physics / Mechanics and Control Systems		
Merit Prize	Adopting VR and AR Technology to Minimise Human Casualty in Construction Site	Ho Ho-nam and Wong Kwong-sau

Entrepreneurship Stream		
Award	Project	Awardees
Entrepreneurship Proposal		
Second Prize	Electricity-free Smart Cooling Coating	Yang Ning and Fu Yang
Startup		
Third Prize	FJ005	Max Lee Jwo-lem, Ng Hoi-fung, Wen Weisong, Josua Chan Wing-hei and Hsu Li-ta
Third Prize	Probiotics Protected by Aerospace Material	Gu Yinlin, Yu Xuanjie, Chang Jinhui and Dr Jin Yong
Merit Prize	APRINT-3D Printing for STEM Education	Chui Cheuk-long, Kwong Hing-tim and Tang King-hung
Social Enterprise / Cultural and Creative Services		
Third Prize	Best Value	Ng Hoi-kam, Lam Pui-yi, Yip Pui-sze, Ng Yim-hung, Marcus Pang Chee-tsun, and Karen Ashley Yue

Meet PolyU's OUTSTANDING STUDENTS

PolyU organises the Outstanding Students Award Scheme annually to award full-time final-year students who excel in both academic and non-academic pursuits during their studies. This year, a total of 26 students were selected as outstanding students at the departmental level. Eight outstanding students were also recognised at the faculty/school level.



Awardee of The Most Outstanding PolyU Student Award 2021

Jolin Ho Hiu-man

BA (Hons) in Chinese and Bilingual Studies and Minor in Chinese Culture, Faculty of Humanities

"In the future, I would like to further my studies in linguistics or cultural studies and to do research on topics related to local cultural heritage, especially the relationship between Cantonese opera and language learning in a psycholinguistics approach in order to raise awareness of the benefits brought by the art form."

Hiu-man is thankful to PolyU for providing a learning environment full of opportunities for personal growth and development. The faculty and administrative members have inspired and guided her in many ways. She was named The D. H. Chen Foundation Scholar, and she initiated a service project to promote positive thinking and kindness, demonstrating her aspiration to contribute her efforts to serving the community.

During the COVID-19 pandemic, Hiu-man managed to seize local internship opportunities at "I am... Youth Portal" of the St. James Settlement and the Hong Kong Film Archive. Even though classes and exchange activities were affected by the pandemic, she was still able to learn a lot, gain practical work experience and interact with people from different walks of life.

Beyond academic pursuits, Hiu-man is also keen on exploring the cultural heritage of Hong Kong, an interest which she has been developing ever since she was young. Among the many art forms, she is most interested in Cantonese opera. She actively

■ Hiu-man (right) learnt a lot from her internship at the Hong Kong Film Archive.



grasped the chance to learn from Dr Liza Wang Ming-chun, PolyU Artist-in-Residence 2020/21, regarding the basic elements and fundamental techniques of Cantonese opera. Hiu-man recalled that the experience reaffirmed her ambition for preserving and promoting local cultural heritage.

■ Hiu-man (second from right) grasped every opportunity to learn from Dr Liza Wang at the Meet-the-Artist-in-Residence event.



Outstanding Student Awardees of Faculty/School



Gautham Gopinath

BSc (Hons) in Engineering Physics and Minor in Computing
Faculty of Applied Science and Textiles

"In my first year, I attended a summer programme at the University of Cambridge, where I saw the original publications of ground-breaking scientists like Newton. I am now doing theoretical physics research, which will pave the way for my PhD study. My journey at PolyU has had a happy beginning and a wonderful ending."

Jessica Zhang

BBA (Hons) in Management
Faculty of Business

"During the pandemic, I have learned to become more proactive and have always taken the lead to initiate discussions and exchange in online classes. It is not only the capability to absorb and digest knowledge that counts; the determination to adjust one's attitude and thoughts to embrace all challenges is even more important."



Jacqueline Mao Hoi-ching

BSc (Hons) in Land Surveying and Geo-Informatics
Faculty of Construction and Environment

"Growth often requires change. I am therefore not afraid of leaving my comfort zone and accepting all sorts of changes and challenges. I do not want to miss any opportunities for learning and development. I am eager to expand my knowledge and improve my abilities as I strive for a fulfilling life."



**Alex Zhang Caiqi**

BSc (Hons) in Computing and Minor in Applied Mathematics
Faculty of Engineering

"PolyU has equipped me with the capabilities to make a difference and provided me with the opportunities to serve the community. During my service trips to underdeveloped areas, I have witnessed poverty and inequality. Therefore, I aspire to use technology to help improve people's lives."

Iris Lim Ching-yi

BSc (Hons) in Nursing
Faculty of Health and Social Sciences

"As a nurse-to-be, I aspire to apply my professional knowledge and skills to provide holistic care to patients and to promote wellness in the community with a genuine heart. Thank you, PolyU, for providing internship opportunities, witnessing my transition, shaping me to become who I am today and giving me wings to soar!"

**Annette Vong Ka-hei**

BA (Hons) in Environment and Interior Design
School of Design

"PolyU has not only imparted professional knowledge, but also provided me with abundant opportunities to broaden my horizons. Through the elective and Service-Learning subjects, I was able to better comprehend different social issues and met people from different cultural backgrounds, inspiring me to incorporate inclusive design into my daily practice."

Cici Yu Chenxi

BSc (Hons) in Hotel Management and Minor in Finance
School of Hotel and Tourism Management

"The beauty of university life lies in its diversity. PolyU provides me with an excellent platform to meet people from different backgrounds and to try different things. Besides applying classroom knowledge in practice, I have had the opportunity to participate in research projects. My university life is highly fulfilling because I can learn something new every day."

**Gymnast Angel wins bronze in major tournament**

Ms Angel Wong Hiu-ying, an alumna of PolyU's Institute of Textiles and Clothing, recently won a bronze medal in the balance beam contest at the Artistic Gymnastics World Cup held in Doha. This is the first time for Hong Kong to clinch a medal in this event. Congratulations!

Taking part in the London Olympics in 2012, Angel was the first local female gymnast to qualify for the Games, and became the first Hong Kong athlete to have a balance beam move named after her.

Angel originally devoted herself to vaulting; however, knee injuries forced her to switch to balance beam competitions. The latest award is a great testament to her perseverance and hard work over the years.

The Hong Kong Polytechnic University Magazine

Excel x Impact

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