

CHINESE  
UNIVERSITY  
BULLETIN

No. 1, 2017

# The Ascent of Machine







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The *Chinese University Bulletin* is  
published biannually by the  
Information Services Office

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english/publications/bulletin/](http://www.iso.cuhk.edu.hk/english/publications/bulletin/)

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Elektro 'conducts' on stage at the 1939 New York World's Fair (Photo by Hulton Archive/Getty Images)

# From Machine-like to Man-like

The history of man has been punctuated with human efforts in employing machines to assist or replace manpower. It is commonly agreed that mechanization is an indispensable catalyst of industrialization since the 18th century.

Attempts to create machines that resemble human forms have never ceased. Fragments detailing different aspects of a humanoid automaton have been discovered in the sketchbook of Leonardo da Vinci (1452–1519). Czech dramatist Karel Čapek (1890–1938) first used the word ‘robota’ to name a factory-made artificial man in his 1920 play *Rossumovi Univerzální Roboti*. The Slavic word which means ‘serf labour, drudgery’ is considered the etymological origin of the English word ‘robot’.

Elektro, the humanoid star of the 1939 New York World’s Fair themed ‘World of Tomorrow’, stunned the crowd with its ability to move its head and arms, to walk by voice command, to ‘speak’ 700 words, smoke cigarettes and blow up balloons. The 2.1 m tall robot weighing about 120 kg with a steel motor skeleton covered by aluminum shell was built by Westinghouse Electric and Manufacturing Corporation.

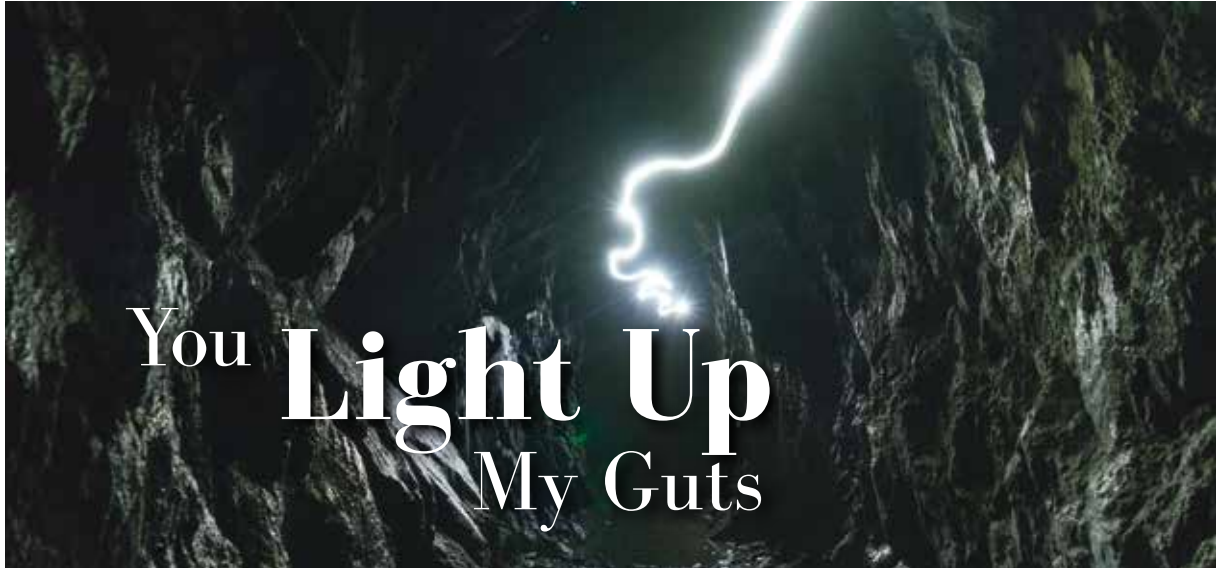
The Robot Institute of America defined ‘robot’ in 1979 as ‘a reprogrammable, multifunctional manipulator designed to move material, parts, tools, or specialized devices through various programmed motions for the performance of a variety of tasks’. In the broad sense, a robot is an automatic mechanical device which imitates the human limb movements, behaviours and part of the senses and thinking. It can resemble the human form in various degrees, be it a humanoid, android or actroid. It can also assume a human appearance partially or none at all.

Robotics today has become an engineering science integrating mechanical, electronic and computer knowledge, and involves cross-disciplinary research for extensive applications in various fields. CUHK, as a comprehensive research university, has combined efforts from its wide spectrum of specialties to engage in robust robotics research with an aim to better serve and contribute to the medical, industrial, educational and security fields.



Actroid DER01 for customer service greets the world in the 2005 Expo Aichi, Japan (Photo by Gnsin)



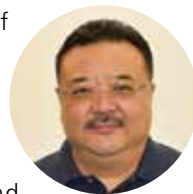


**Microrobots working inside the human body vastly reduce discomfort and pain which accompany invasive endoscopy.**

## Swallowable GI Navigator

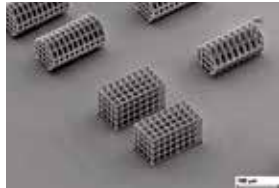


Shortly after the certified use of capsule endoscope in colon inspection in the European Union in 2009, CUHK pioneered in introducing the technology to Hong Kong. In the size and appearance of a capsule pill, the capsule endoscope—after being swallowed by the patient—passes through the gastrointestinal (GI) tract and is excreted with the patient’s feces about 12 hours after ingestion. The camera inside the capsule takes photos of the intestinal conditions, two per second, producing about 50,000 images in one check for health professionals to identify areas with abnormality. Prof. **Joseph J.Y. Sung**, founding director of the CUHK Institute



of Digestive Disease, said, ‘This new tool is accurate, safe, non-invasive and requires no sedation.’

To view all the images manually is a tiring and time-consuming task prone to risk of oversight. Prof. **Meng Qing-hu Max** of the Department of Electronic Engineering and his research team developed in 2009 an Intestinal Polyp Image Recognition System which analyses the hue, saturation and intensity of each photo to sort out images showing polyps with an accuracy reaching 95%. The average time to review images is largely reduced to 30 minutes. The research team is the first to adopt a hybrid actuation mechanism



Porous 3D scaffolds of the cell and drug delivery microrobots

## Cell and Drug Courier

CUHK researchers have been industrious in developing microrobots to perform medical procedures in the human body. Prof. **Zhang Li** of the Department of Mechanical and Automation Engineering, in collaboration with a research team from the Daegu Gyeongbuk Institute of Science and Technology, Korea, and ETH Zurich, Switzerland, successfully developed around 2013 a novel type of magnetically manipulated microrobot capable of accurately transporting cells and therapeutic drugs to targeted areas of the human body.



## Small Bowel Patroller



The magnetic-guided endoscope

Illustration of the operation of the magnetic-guided endoscope

which combines an internal actuator and an external magnetic guidance device to locate the exact position of the wireless capsule endoscope for controlled interactive GI tract examination.

Professor Meng said, 'Controlled by health professionals to take images, the deviation of localization is 1 mm, thereby lowering the chance of oversight and reducing check-up time.' Tests had been carried out since 2010 with the help of doctors from the Prince of Wales Hospital. Modifications and new functions, such as identifying bleeding, ulcer and preneoplastic lesions will be added, as well as enhancement in accuracy and effectiveness. It is hope that the system can be used in clinical practice in the near future.

In early 2017, CUHK's Chow Yuk Ho Technology Centre for Innovative Medicine and the Multi-Scale Robotics Lab, Institute of Robotics and Intelligent Systems at ETH Zurich forged an alliance to develop innovative technologies for GI diseases. One of the key innovations is a magnetic-guided endoscope for small bowel endoscopy.

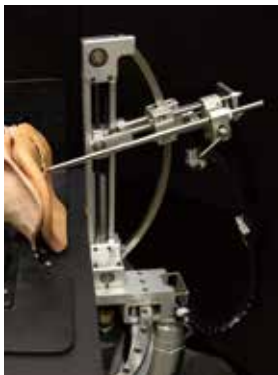
Endoscopic examination in the five metres long winding small bowel is rather difficult as the organ is soft in nature with multiple folds. Prof. **Philip Chiu**, director of Chow Yuk Ho Technology Centre for Innovative Medicine, explained, 'Driven by magnetic force, the 10 mm-diameter endoscope can be precisely steered through the whole small bowel, completing thorough examination with lesser pain and discomfort to patients, and reducing the checkup time from one hour to 30 minutes.'

Prof. Dr. **Bradley Nelson** of ETH Zurich remarked, 'Microrobotics and nanomedicine are the future directions in medical robotics.' CUHK and ETH Zurich will develop a novel magnetic-guided biopsy forceps to be placed at the tip of the endoscope for delivering drugs or conducting biopsy.



**The presence of robotic surgical assistants in the operating theatre gives the chief surgeon spare hands and helps enhance the smooth procedures and precision of the operation.**

## **Robotic Assistant for Laparoscopic Hysterectomy**



In a laparoscopic hysterectomy which may last up to three hours, in order to optimally position the uterus for safe and efficient dissection, an assistant has to manipulate the uterus with a tool to expose the anatomical structures. The tedious task is labour-intensive and requires sustained attention. Unsteady performance of the assistant not only slows down the surgical procedure but also increases the risk of injury to adjacent organ structure, which would lead to deadly consequences.

A compact and low-cost robotic assistant with five degrees of freedom has been developed at CUHK to solve the problem. 'The robot, equipped with its own vision-based controller, can find the necessary tissue and is able to manipulate and retain the uterus in the desired position



for long hours. The hand-busy primary surgeon can directly manipulate the uterus by guiding the robot's movement through a foot-controlled interface.' Prof.

**Liu Yun-hui**, Department of Mechanical and Automation Engineering and director of CUHK T Stone Robotics Institute (CURI), explained. 'The system is also equipped with a remote centre of motion to boost the operations' level of precision by limiting the insertion trajectories of surgical instruments to the target area.'

'Safety is of utmost importance when it comes to the use of robotic systems in surgical operations,' Professor Liu said. 'This robotic system is currently under clinical trial, and I am confident that it could enhance the qualities of future laparoscopic hysterectomy operations and help relieve manpower and workload.'



## Robotic System for Nasal Surgery

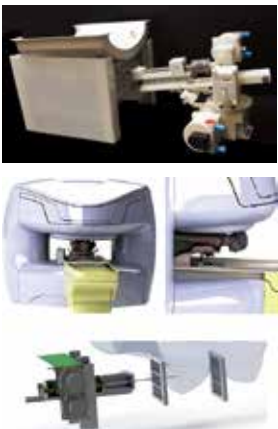


**E**ndoscope holder is another example of robotics providing auxiliary support in surgical operations. During a nasal operation, the surgeon needs to hold an endoscope by one hand, while manipulating surgical tools single-handedly, which is obviously less efficient and not preferable. CURI and the Faculty of Medicine worked together in 2010 to develop a robotic endoscope holder to lend surgeons a capable hand.

The manipulator consists of a positioning device to be manually set up before the operation, and a compact dexterous endoscope. With the endoscopic camera

capturing images of the patient's nasal cavity, the surgeon can handle tools with both hands, and maneuver the endoscope's movements through foot-controlled robotic interfaces. The flexibility of the robotic endoscope also provides better images of the narrow nasal cavity than manual control. 'We have now developed the third generation robotic endoscope holder and are applying for clinical trials,' Professor Liu said. 'Robotic systems perform operations with greater precision and stability, which could increase success rates and the efficiency of operations.'

## MRI-guided Robotic System for Breast Biopsy



**C**onducting breast biopsy is vital to detecting early stages of breast cancer. The operation is mostly performed by inserting a needle manually into the suspicious area of the breast to extract sample tissues for analysis. Physicians would locate the needle's insertion trajectory through images derived from magnetic resonance imaging (MRI). After the needle is inserted, an additional scan will be performed to verify its location. Further scans and repetitive needle positionings will be conducted manually until the needle successfully reached its target, which makes the whole procedure time-consuming, expensive and unpleasant. Moreover, it increases the trauma inflicted to the tissues.

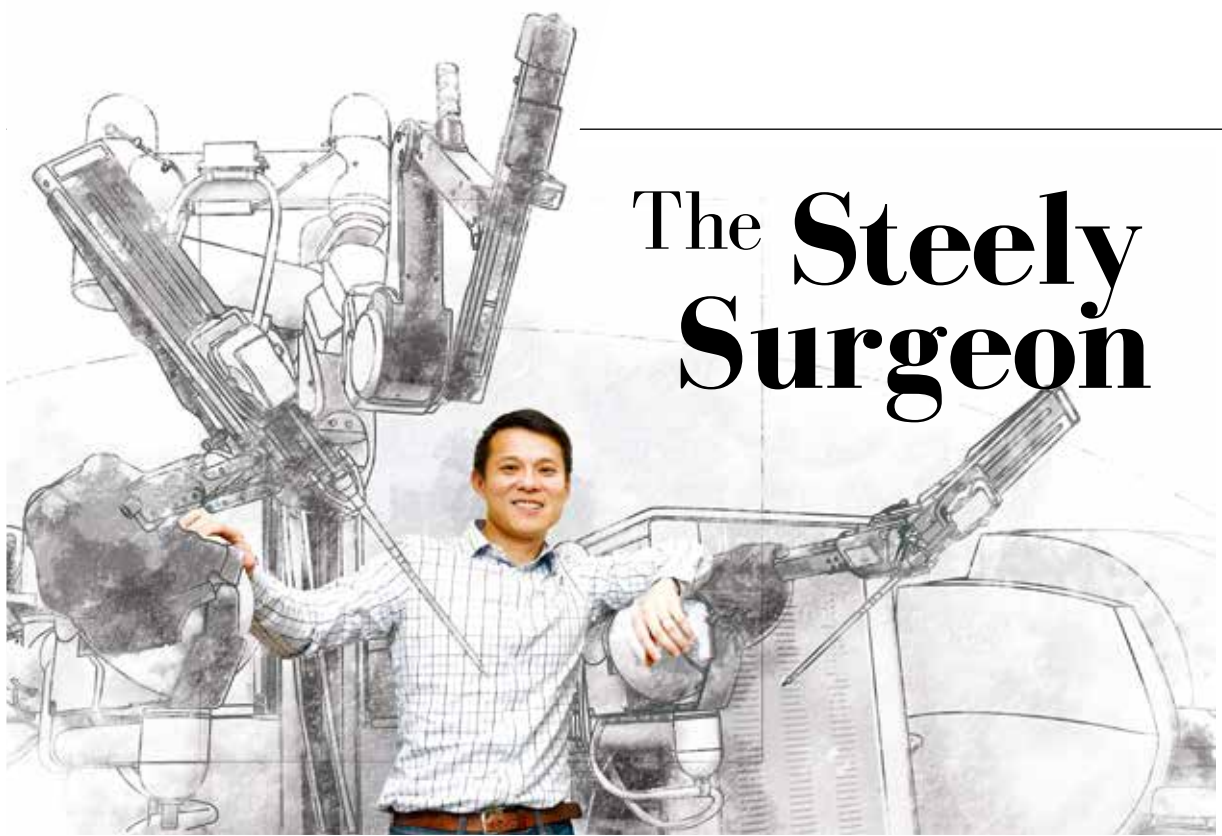
CURI has recently developed a new MRI-guided breast biopsy robot which can insert the needle into the tissues while operating inside the scanner's bore, a

system which can semi-automate the complex insertion process and reduce time and pain caused by repetitive insertions.

Made of non-magnetic material, the robot is able to function safely inside the scanner without disturbing the high magnetic field of the MRI.

Guided by feedback from multiple sensors of the machine, the system's position regulator allows the physicians to control the needle's movements within the scanner's magnetic bore. It also has a compact mechanical structure that enables it to perform both frontal and lateral insertions.

'Our goal is to develop systems that could lead to greater level of automation in surgical procedures, and I believe we have made great progress in this direction.' Professor Liu said.



# The Steely Surgeon

**Robotic arms, with designs similar to the anatomical structure of the human arm and more sophisticated joints to allow a higher flexibility in movements, empower the potential of surgical operations.**

## The da Vinci® Surgical System

The invention of the da Vinci surgical robot helps surgeons perform minimally invasive procedures with smaller, fewer cuts and faster patient recoveries.

In 2005, the Department of Surgery of CUHK introduced the first da Vinci® S Surgical System in Hong Kong. Within two years, a surgical team had been groomed to operate the system. In 2008, the Faculty of Medicine purchased an updated version of the surgical robot that incorporates high definition endoscopic video technology, enabling the surgeon at his/her control console to see a superior 3D high definition image of the operating field. The new system has four robotic arms. While the first three arms control the miniaturized

instruments and the laparoscopic camera, the fourth controls the instruments used to retract adjacent tissues and anatomy. This obviates the need to have a second surgeon in attendance. The incision incurred is merely eight to 12 mm in diameter.

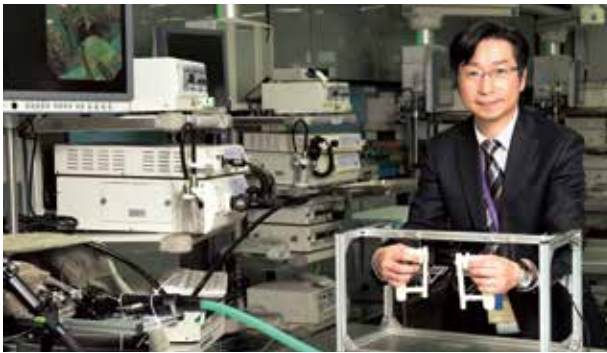
The earlier version of the da Vinci Surgical System was then relocated to the CUHK Jockey Club Minimally Invasive Surgical Skills Centre for the training of surgeons from Hong Kong, the mainland and from other countries in the region, making it the second centre outside North America to be approved for system and procedure training on the da Vinci Surgical System by the manufacturers. During the past decade, it has provided training to more than 15,000 medical professionals, about 70% are from Hong Kong.

**Samuel Au**, one of the first graduates of CUHK's Mechanical

and Automation Engineering (MAE) programme, is currently an associate professor at the MAE Department teaching Advanced Robotics and Mechatronics. In the early 2000s he worked in the California-based company Intuitive Surgical where he co-invented the da Vinci Single-Site surgical platform. It became the first ever FDA-approved robotic platform to support single incision surgery.

Unlike traditional robotic surgeries requiring three to five incisions, da Vinci® Single-Site® Surgery requires only a single, small incision in the umbilicus, through which the robotic arms and camera enter. The end result is virtually scarless surgery. Since the official launch of the system in 2012, over 110,000 patients around the world have received the single incision surgery through this platform.

## Surgical Robotic System for Endoscopic Submucosal Dissection



Prof. Philip Chiu demonstrates the use of the endoscopic surgical robot to perform ESD

The University itself has kept improving the robotic technology. In 2011, in collaboration with National University of Singapore and Nanyang Technological University of Singapore, CUHK developed a novel robotic endoscope platform. In traditional endoscopic submucosal dissection (ESD) surgery, a lot of time

was spent on maintaining a good view of the submucosal plane while moving the endoscope with the ESD instruments for dissection. The newly designed robotic arms attached to the ordinary endoscope can extend the degree of movement and reach the stomach through the mouth. With this new invention, CUHK performed the first two cases of robot-assisted ESD for the treatment of early gastric neoplasia in Hong Kong.

Later, Prof. **Philip Chiu** of the Department of Surgery and Prof. **Yam Yeung** of the MAE led a team of students to devise a Surgical Robotic System for ESD. The robot is only 3.8 mm in diameter and can move in five directions within a tiny space. The robot won the Gold Award and the Technical Challenge Award in the world's first Engineering Medical Innovation Global Competition in 2016.

## The Snaky Extended Arm

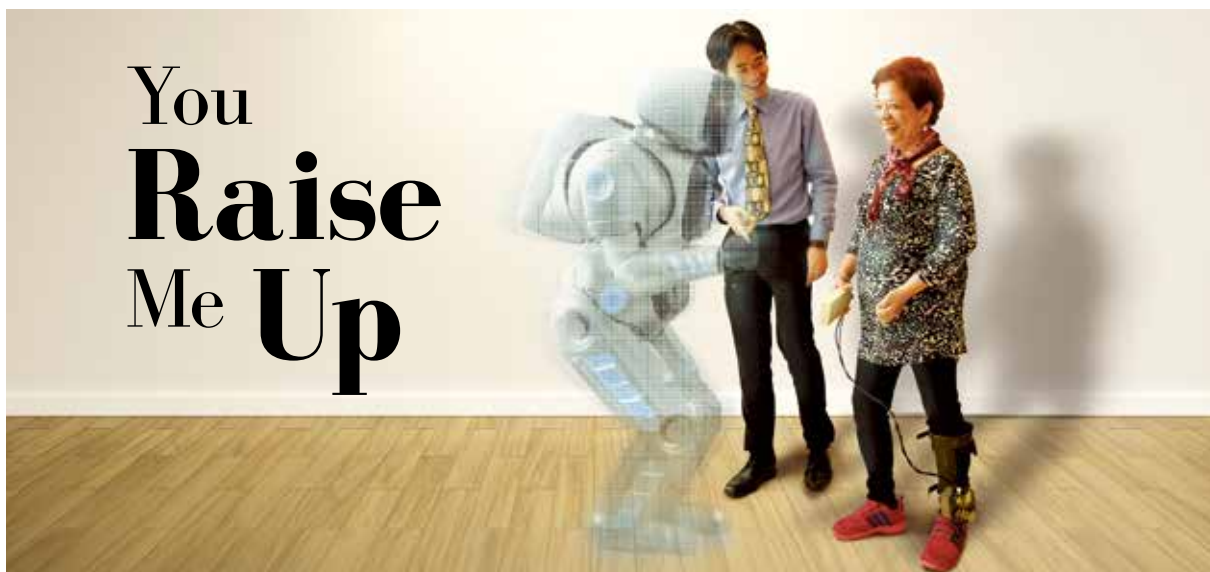
At present, Prof. Samuel Au is working on a new robot that will make scarless surgery possible for the treatment of lung cancer. A remarkably thin, tentacle-like medical device with extreme dexterity can form a multitude of serpentine shapes, allowing it to easily navigate through open cavities into target organs, while also being stiff enough to transmit force from the surgeon's hand to the area of interest to perform surgical tasks.

Will the seemingly omnipotent robots someday take over from the surgeons? Professor Au did not think so.

'On the contrary, robots will become indispensable partners of surgeons to help

them overcome their physical limitations and enhance their performance. Robots assist surgeons with technically demanding, repetitive tasks, but they are incapable of exercising judgement. Surgeons will have to make the kinds of minute-to-minute adjustments that can mean the difference between life and death, which even the most perfectly programmed robot can't do. Doctors can decide why to operate and what to do, while machines can help with the "how". This robot-surgeon partnership will produce better and more consistent surgical outcomes and open up new and complex procedures.'

# You Raise Me Up



**In addition to clinical diagnoses and surgeries, robots also interact with rehabilitees to promote their recovery.**

## **Computational Prediction of Gait Patterns**



**S**troke patients with hemiparesis (paralysis of one side of the body) suffer from foot drop, the neuromuscular disorder which induces an inability to lift their forefoot. They could only drag their toes along the ground, risking themselves at increased possibilities of falling and ankle spraining. In 2015, CUHK's Department of Electronic Engineering joined hands with the Industrial Centre at The Hong Kong Polytechnic University to design an Interactive Exoskeleton Ankle Robot, which helps rehabilitees with foot drop to make a better recovery progress.

The robotic ankle is light and portable. Its carbon fibre structure is flexible enough to be adjusted to different leg lengths. One of the inventors, Prof. **Tong Kai-yu Raymond** (centre) of CUHK's Biomedical Engineering programme, explained, 'The ankle robot can be used daily for intensive

repetitive gait training and programmable walking exercises for the rehabilitees. With the ankle robot fitted on the user's shank, the embedded motion and force sensors will sense the user's gait patterns. The system's algorithm can classify the user's gait intention based on the kinetic and kinematic gait parameters to predict his/her motion. It enables the robot ankle to provide the user's ankle joint movement with powered assistance, and prompts feedback to improve the gait patterns.'

In other words, the exoskeleton ankle robot reminds the user the way to lift the impaired leg, which helps him/her gradually 'remember' how to walk. The embedded sensors can transmit the user's walking data to the computer for the physiotherapist to design custom-made walking exercises, and adjust the exercise in phases.

## Interactive Cycling System Responsive to Voluntary Intention

Professor Tong developed the Functional Electrical Stimulation (FES) cycling system this year for lower-limb disability rehabilitation. He said, 'The mastery of the trike requires patients' postural control, balancing, muscle coordination and so on. FES-cycling will hence provide afferent sensory input to the central nervous system that enhances brain plasticity for better motor recovery.' The system's electrical pulses will stimulate the targeted muscles to evoke muscle contraction in accordance with the rehabilitee's voluntary intention for cycling, facilitating functional recovery of the impaired lower limbs.

The rehabilitation robotics in future will continue its brain-centred robotics approach, with the element of voluntary intention taken into account, which can improve the rehabilitees' motivation and quality of recovery when compared to the conventional treadmill gait training. Professor Tong added, 'The interactive design reinforces the user's voluntary intention to re-learn the connection between the brain and the limbs. After all, rehabilitation robotics aims to help rehabilitees regain self-care and to live with dignity.'





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# Thumbs-up to Autistic Children



**Researchers at CUHK have enabled lifeless robots to teach autistic children lively expressions.**

A thumbs-up signifies praise; a finger on lips signifies quiet. These are gestures people generally comprehend and use for communication since early childhood. But this is not the case with children with autism spectrum disorders (ASD) who are characterized by impairments in communication, especially in the non-verbal aspect. Their command of gestures usually lags behind their ordinary peers.

Prof. **So Wing-chee Catherine** (left photo on p.13) of the Department of Educational Psychology said, 'If autistic children are capable of communicating their needs and feelings via gestures, their challenging behaviours can be reduced.' She formed a research team

with colleagues from the Faculty of Engineering and the Faculty of Arts to develop a programme to use robots as gesture teachers of autistic children, thereby enhancing their social skills.

While scientists work hard to produce robots with the highest degree of human resemblance, both in terms of appearance and intelligence, NAO, the robotic humanoid produced by a French robotics company with distinguishable robotic features proves to be fit for the teaching job. As Professor So explained, children with ASD tend to have low interest in other humans and prefer robotic toys which do not have human facial features and expressions that would cause sensory overstimulation and distractions.



In the first stage of the programme, Professor So and her team produced a training video in which an animated NAO demonstrates 20 gestures to 20 ASD children aged six to 12. It was found that their gestural communication skills have significantly improved after receiving training by viewing the video.

Following the success of the gestural training by animated robot, the team developed programs to personalize four NAOs to teach eight gestures (angry, annoyed, dizzy, scared, hot, hungry, noisy or smelly) to 27 ASD children aged six to 12. NAO would narrate a scenario, e.g., 'John goes to the park and he sees a snake. John is scared and makes a gesture' and demonstrate the respective

gesture, a 'scared' gesture in this case. Each gesture was demonstrated in two scenarios. Upon completion of the training, students not only recognized and produced the eight gestures in the scenarios presented, but were also able to do the same in new scenarios that were not presented during training. Even more promising, these students could recognize and produce the same gestures in human-to-human interactions.

The effectiveness of NAO's teaching is encouraging. Preliminary findings show that ASD children have their gestural recognition and production significantly improved after two weeks of training.



**Changes in human commercial and consumption behaviours have led to changing service and job demands. Robots in human and non-human forms are sharing our work in various areas.**

## **The Visionary Mover**



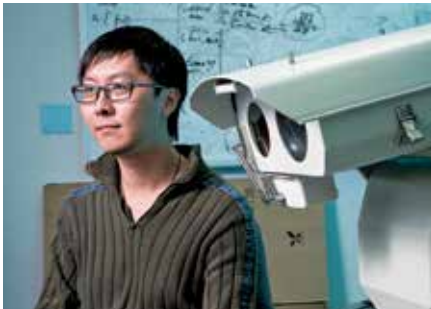
**F**orklift trucks for moving heavy loads are indispensable for most factories and warehouses. A 10,000-square metres warehouse requires about 54 forklift drivers to operate. The demand for forklifts and drivers has been increasing with the booming online purchase and warehousing industries. However, the monotony and routine of forklift driving has deterred young people from the job despite rising wages.

The unpopular work field creates jobs for robots. Prof. **Liu Yun-hui** and his team spent five years to develop the Vision-based Intelligent Forklift Automatic Guided Vehicle (AGV) System to replace manually operated forklift trucks.

Ordinary robots are incapable of interpreting the environment. One typical example is iRobot's Roomba vacuum cleaner which moves around a room randomly, changing course when they bump into a wall or object. This is inefficient and makes it likely to miss a spot. When it comes to perform transportation tasks, precise positioning is required.

Professor Liu explained, 'Humans assess depth naturally and instantaneously, whereas robots have trouble with depth perception. It is very hard for a robot to judge quickly and accurately how far apart objects are. To overcome the defect, we developed a vision-based 3D motion control which allows robots to position

## The Telescopic Ranger



themselves.' This intelligent system uses an industrial camera as the primary sensor which enables the forklift to navigate, control its motion and avoid obstacles independently, allowing the automation of transportation tasks in factories and warehouses.

The system will operate automatically upon inputting instructions to the computer. No change will be necessary in the current settings of the workplace. It provides an innovative and cost-effective solution to automation in logistics industry, thereby increasing the overall productivity. Launched to the market in 2016, the system has been used by warehouses in Foshan and Nanhai in mainland China, and in Hong Kong.

Forest fires cause 20–30% of the world's annual carbon emissions. Traditionally, forest fire watch has been performed by people stationed at watchtowers or through closed-circuit television surveillance. Such methods tend to lead to erroneous reporting or alert delays. To compound the problem, forest fire watch is a sunset industry. Besides the monotonous job nature which requires sustained vigilance, being stationed deep in the mountains with weak or even no wireless communication network is an insufferable bore to the younger generation.

**Rex Sham**, a graduate of CUHK's Department of Computer Science and Engineering, founded Insight Robotics Ltd in 2009. The fire detection robot he developed has made forays into the US, Malaysian and Indonesian markets.

Looking like WALL-E from the movie of the same title, the robot ranger is equipped with thermal imaging sensors and could spot a fire despite all barriers. It can accurately detect a small fire of 2 m x 1 m in size within a 5-km radius, and send real-time images and the fire outbreak location to control centres, allowing local fire services to stop the flames from spreading.

Pilot tests carried out in a Canadian forest have shown that the robot can spot a wildfire 13 km away, which turned out to be a world record. Rex said that in the same situation, the human eye could not see clearly within a 500-m radius. Even a satellite could not accomplish what the robot does.

Although robots can resolve the problems of efficiency and manpower shortage, there are inevitable concerns of them displacing people from their livelihoods. Rex insisted that robots will only take over jobs that people are unwilling to do, or work that is too hazardous for humans to undertake, such as disaster relief in dangerous areas.

While robots should be deployed for work that is unsuitable for humans, jobs requiring a human touch should be done by people only. 'Nurses are least suitable to be superseded by robots. Smart systems for elderly care is something I do not agree with. The reason why humans are humans is that we all have a sense of dignity, crave for interaction with others and hope that someone will take care of us with heartfelt commitment, instead of by robots sent in to accomplish a mission. Robots are devoid of love,' he opined.



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# From Machine to Mate

Robots have undergone numerous phases of transformation since the mid-20th century, from mechanical devices with simple movements for designated work procedures to revised models with sensory functions, and further developed into those with artificial intelligence for learning and thinking, plus enhanced autonomy and flexibility to fulfill complex tasks, or even capable of identifying and responding to changes in the surrounding environment. With increasing sophistication, robots infiltrate deeper into practically all sectors of human activities—industrial, agricultural, commercial, medical, communication, entertainment, military, underground and space explorations, and even nuclear disaster cleanup.

The International Federation of Robotics predicted last September that by the end of 2016, the number of newly installed industrial robots would have increased by 14% to 290,000 units. Continued growth averaging at least 13% per year was forecast for 2017 to 2019, and the number of industrial robots deployed worldwide was projected at around 2.6 million units by 2019.

American sci-fi writer Issac Asimov (1920–1992) spelled out in his 1942 novel *Runaround* the Three Laws of Robotics which are generally regarded as the earliest documented robotethics:



- 1 A robot may not injure a human being or, through inaction, allow a human being to come to harm.
- 2 A robot must obey the orders given it by human beings except where such orders would conflict with the First Law.
- 3 A robot must protect its own existence as long as such protection does not conflict with the First or Second Laws.





With the advancement of A.I. robots, Asimov's hierarchical laws may prove inadequate regarding the values or design principles that researchers and tech companies should articulate. **Satya Nadella**, Chief Executive of Microsoft, in his article published in June 2016, gave his view about future human-machine relationship, one which is not mutually exclusive, but collaborative. He laid out six rules for the development of artificial intelligence:

- ① A.I. must be designed to assist humanity.
- ② A.I. must be transparent.
- ③ A.I. must maximize efficiencies without destroying the dignity of people.
- ④ A.I. must be designed for intelligent privacy.
- ⑤ A.I. must have algorithmic accountability so that humans can undo unintended harm.
- ⑥ A.I. must guard against bias, ensuring proper and representative research so that the wrong heuristics cannot be used to discriminate.

Nadella also assigns four 'musts' for humans, that our future generations will need empathy, education, creativity, and judgement and accountability in order to live a harmonious life with artificial intelligence.

Humans have invented the most powerful tool for themselves. It is our responsibility to master this double-edge knife with sense and wisdom for the genuine benefits of the humankind. 🤖

# Sixteenth Honorary

The University held its Sixteenth Honorary Fellowship Conferment Ceremony on 22 May. Officiating at the ceremony, Dr. **Norman N.P. Leung**, Council Chairman, conferred honorary fellowships on the following six distinguished persons in recognition of their remarkable contributions to the University and the community.



**DR. CHU  
KA-LOK  
PETER**



**PROF. KAO  
MAYCHING**



**MR. KWOK  
CHI-LEUNG  
KARL**



Dr. Chu is chairman of the Alpha General (Holdings) Ltd and president of the Alpha Appliances Ltd. Dedicated to charity and community service, Dr. Chu is currently a member of the Board of Directors of The Community Chest of Hong Kong. He was awarded the Bronze Bauhinia Star by the HKSAR Government and the World Outstanding Chinese Award in 2006 in recognition of his contributions to society. Dr. Chu is a staunch supporter of CUHK and especially Shaw College. Apart from making generous donations to the College in support of its development, he has served as a Trustee of the College since 2004.

Professor Kao is an alumna of the Department of Fine Arts, CUHK and an expert in art history and Chinese art. She returned to her alma mater in 1972, served twice as chairperson of the Department of Fine Arts, and served concurrently as director of the Art Museum. In 1999, she retired from the University as a chair professor. She was a pioneering leader in developing the discipline of art history as an educational specialization at CUHK, and setting up its MPhil and PhD programmes. She also initiated a series of exchanges with museums, university scholars and artists in mainland China during her tenure. Professor Kao is currently Honorary Fellow of New Asia College, CUHK.

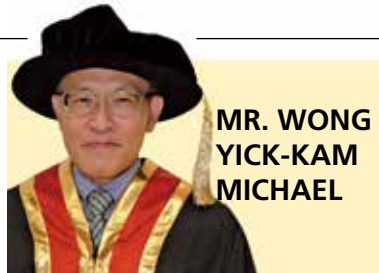
With over 30 years' experience in senior management positions in banking and finance, Mr. Kwok is chairman of Wing On Company International Limited. He has actively promoted the development of sports in Hong Kong and has served as Chef de Mission or Deputy Chef de Mission of the Hong Kong delegation at a number of Asian Games and Olympic Games. Mr. Kwok was awarded the Medal of Honour by the HKSAR Government in 2011. As early as 1982, he was appointed a member of the Board of Trustees of Chung Chi College, and became chairman of the College's Board of Trustees and a Council Member of CUHK from 2002 to 2015, providing much valuable advice to CUHK and Chung Chi College.

# Fellowship Conferment Ceremony



**MR. KENNETH  
BENJAMIN LI**

Currently managing director of the Carlton City Hotel Singapore, Mr. Li has carried on the commitment to community service of his grandfather, Dr. Li Dak-sum, and actively contributed to society, as well as to industrial development which has helped boost the economic and social development of Hong Kong. In 2015, Dr. Li Dak-sum and Mr. Kenneth Benjamin Li made a magnificent donation for the establishment of the 'Li Dak Sum Yip Yio Chin Kenneth Li Scholarship', which aims to make it possible for graduates from Ning Po College and Ning Po No. 2 College, who have outstanding academic performance, good conduct and financial needs, to pursue tertiary education in CUHK and two other local institutions.



**MR. WONG  
YICK-KAM  
MICHAEL**

Mr. Wong is Council Chairman of the Open University of Hong Kong and non-executive director of the Urban Renewal Authority. Having substantial leadership and management experience, Mr. Wong is very active in community service and has served on a number of government advisory committees. Mr. Wong obtained his BBA and MBA degrees at CUHK and is an outstanding alumnus of New Asia College. He is currently a Trustee of New Asia College. Over the years, Mr. Wong has made important contributions to CUHK and New Asia College through generous donations for setting up scholarships for undergraduate students, and participation in the College's and the MBA Programme's mentorship programmes.



**PROF.  
KENNETH  
YOUNG**

Currently Emeritus Professor of Physics, CUHK and a member of the Governing Board, CUHK (Shenzhen), Professor Young joined CUHK in 1973, and has been chairman of the Department of Physics, Dean of the Faculty of Science and the Graduate School, Pro-Vice-Chancellor, and the founding Master of C.W. Chu College. He has made significant contributions to CUHK, including leadership in the preparation for the new curriculum for the 4-year academic structure. Professor Young was elected a Fellow of the American Physical Society in 1999. He also serves in many positions in public service including chairperson of the Hong Kong Curriculum Development Council and a member of the Education Commission, as well as council member and vice chairman of the Board of Adjudicators for the Shaw Prize. 🏆



Pioneering Solutions in Healthcare

# Ground Breaking Ceremony of the CUHK Medical Centre



6 The mission of the hospital is to provide 'Pioneering Solutions in Healthcare'. Its continuous striving for innovation will mean that local citizens can enjoy the advanced, high-quality medical services of the hospital. 9

Prof. Joseph J.Y. Sung  
Vice-Chancellor, CUHK

The ground breaking ceremony of the CUHK Medical Centre—the territory's first not-for-profit and self-financed teaching hospital—was held on 8 December 2016. Officiating guests at the ceremony included Dr. **Norman N.P. Leung** (5th right), Chairman of the Council, CUHK; Mr. **Chien Lee** (6th left), Chairman, Board of Directors, CUHK Medical Centre; Dr. **Simon S.O. Ip** (7th left), Chairman, the Hong Kong Jockey Club; Prof. **Joseph J.Y. Sung** (3rd right), Vice-Chancellor, CUHK; Dr. **Cheng Wai-kin Edgar** (4th left), Member, Board of Directors, CUHK Medical Centre; Prof. **Francis K.L. Chan** (1st right), Dean of

Medicine, CUHK; and Dr. **Fung Hong** (2nd left), Executive Director, CUHK Medical Centre. About 200 guests and members of the University attended the event.

The CUHK Medical Centre is made possible by a generous donation of HK\$1.3 billion from the Hong Kong Jockey Club Charities Trust. This is the largest single donation ever made by the Trust to medical services. Wholly-owned by CUHK, the Centre will provide innovative and patient-centred healthcare services. There will be 16 medical centres and 70% of inpatient services will be offered with package prices, which will bridge the



## Medical Centres

- 24-Hour Clinic
- Allied Health Services
- Assisted Reproductive Technology Centre
- Cardiac Intervention Centre
- Day Cancer Therapy Centre
- Day Surgery Centre
- Diagnostic & Interventional Radiology Centre
- Digestive Medicine & Endoscopy Centre
- Eye Centre
- Haemodialysis Centre
- Integrative Care Centre for Older People
- Integrated Outpatient Clinic
- Radiotherapy Centre
- Sports Medicine & Rehabilitation Centre
- Urology Centre
- Wellness Centre

## Clinical Services

- Anaesthesiology
- Cardiology
- Chinese Medicine
- Emergency Medicine
- Family Medicine
- Geriatrics
- General Medicine
- General Surgery
- Obstetrics & Gynaecology
- Oncology (Radiation & Chemotherapy)
- Ophthalmology (EYE)
- Otorhinolaryngology (ENT)
- Orthopaedics and Traumatology
- Paediatrics
- Pharmacy
- Psychiatry & Mental Health
- Renal Medicine
- Urology

service gap between private and public healthcare sectors and provide more choices to the public. It also serves as a key base for clinical research, healthcare education and training.

Situated next to the MTR University Station and the public transport exchange, the Centre will cover a total construction floor area of 100,000 m<sup>2</sup> and will provide around 600 beds. Green designs, including courtyards, gardens and balconies, are incorporated in the hospital. It is expected to be completed by the first quarter of 2020 and start operation in the second quarter. 🏗️



“ This partnership arrangement will have the benefit of shortening waiting times for public services and help ensure a comprehensive and diverse case mix and the quality of training offered by the Centre. ”

.....  
 Dr. Ko Wing-man, then  
 Secretary for Food  
 and Health, HKSAR  
 Government  
 .....



# Keeping Abreast of the Latest Global Development— New Programmes at CUHK

Students at CUHK are encouraged to not only acquire academic and professional knowledge, but also cultivate creativity and develop excellent communication skills with an international perspective. In the 2017–18 academic year, CUHK is launching two new programmes, which aim at offering a comprehensive training to nurture undergraduate students' global horizon and innovation.

## Global Communication Programme

The new Global Communication programme, jointly developed by the School of Journalism and Communication of CUHK and the School of Media, Film and Music of the University of Sussex in the UK, features professional training in Communication and Media Studies as well as unique overseas exchange opportunities.

The four-year programme has a student intake quota of 40, equally shared between CUHK and the University of Sussex. In the second year, CUHK students are required to participate in a one-year compulsory resident study in the UK with the students of the School of Media, Film and Music at the University of Sussex. During their third year, students of the University of Sussex will come to Hong Kong to study with their counterparts. It is hoped that this special arrangement would enable students of both universities to have a comprehensive understanding on the development of media industry in both Hong Kong and the UK.

'In addition to providing professional trainings in journalism and communication, the new programme



also encourages students to put what they have learnt into practice. The students will be given the opportunities to participate in overseas study trips, visit media agencies in Asia and Europe, as well as taking part in summer internships,' remarked Prof. **Anthony Fung** (above left), director of the School of Journalism and Communication.

'The students would also have to select a global issue to complete a research project. They can conduct interviews or gather information for their assignments during

their local or overseas field trips,' Prof. **Francis Lee** (above right), programme director of the Global Communication Programme added.

With solid academic training and overseas experiences, the graduates will be readily equipped to pursue a broad range of careers in multinational corporations, transnational news organizations, global advertising and public relations agencies, global news media organizations, as well as government and non-profit organizations.



## Minor Programme in Entrepreneurship and Innovation (EPIN)

With the upward trend in new business formation worldwide, many students decide to be self-employed or even start their own business right after graduation, making the basic knowledge of business management an indispensable element of graduate attributes. To equip this group of creative young talents with the skills and knowledge to establish their own startups, CUHK is offering a minor programme in Entrepreneurship and Innovation (EPIN)—the first of its kind in Hong Kong which employs an interdisciplinary approach in its curriculum design.

Open to all CUHK undergraduates from different Faculties and departments, the new minor programme encourages collaborative efforts among students of various specializations. They are required to complete the courses in three key areas, namely, 'Mindset and Values', 'Knowledge and Skills', and 'Practices'. The programme will line up alumni and companies that excel in entrepreneurial innovation to provide students with hands-on experience. Students will also enjoy various experiential learning opportunities, including mentorship, internship, international competitions and overseas exchange to Israel, Silicon Valley in the US and mainland China.

Prof. **Kam-fai Wong** (2nd right), co-director of EPIN and associate dean of the Faculty of Engineering, said, 'Having a strong alumni network, with a proven track record in advancing entrepreneurship and innovation, CUHK is resourceful in providing valuable opportunities to students who aspire to develop an entrepreneurial career, fostering their entrepreneurial mindset to succeed in this vibrant, ever-changing world.'

Dr. **Andy Wong** (2nd left), co-director of EPIN and assistant dean of the Faculty of Business Administration, said, 'Creativity can be taught and learned. In today's highly digitized world, being creative is not optional. We must adapt to changes and be able to innovate and produce new solutions.'

In addition to three new courses offered by EPIN, namely, 'Anatomy of an Entrepreneur', 'Design Thinking and Practice', and 'The Psychology of Creativity and Innovation', there will also be 'Hong Kong Enterprises and Entrepreneurs' from the History Department and 'Mission-driven Social Enterprise' from the Department of Social work. More new courses will be available within the next few years. 📖

# How Can You Mend a Broken Heart?

Croucher Innovation Award Recipient Explores the Mend

To mend a broken heart is no easy task because the heart is unable to regenerate itself following injuries due to diseases or ageing. But recent scientific advances have been made by using pluripotent stems cells.



**P**rof. **Kathy Oi-lan Lui**, assistant professor at the Department of Chemical Pathology and the Li Ka Shing Institute of Health Sciences of the Faculty of Medicine, CUHK, received the Croucher Foundation's Croucher Innovation Award 2017 for 'distinguished accomplishment in the international scientific community' through her work in cardiovascular development and regeneration. Professor Lui has derived methods for generating human heart progenitors, cardiac muscle and blood vessels from human pluripotent stem cells.

Born and raised in Hong Kong, Professor Lui completed her undergraduate and master's degrees at the Department of Biochemistry, CUHK, with a determination to

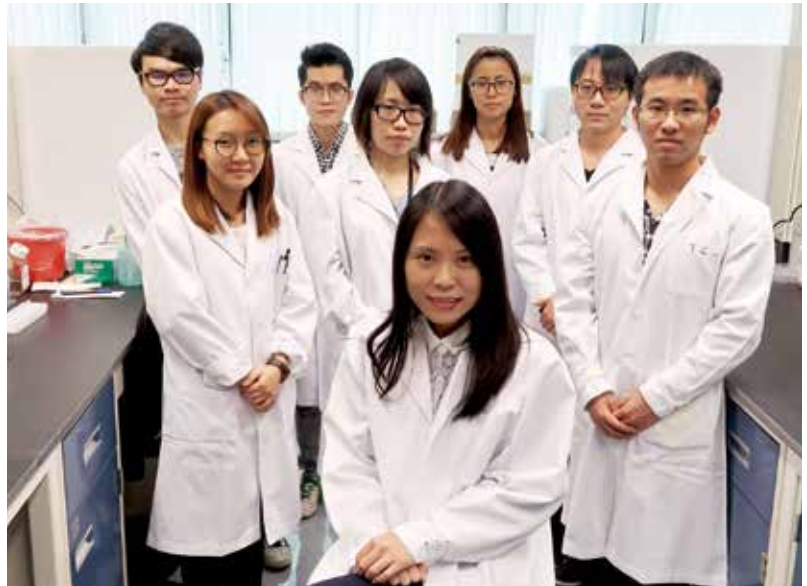
study human pluripotent stem cells to explore how heart disease develops. Pluripotent stem cells, including embryonic stem cells (ESCs) and induced pluripotent stem cells (iPSCs), are 'master' cells that give rise to almost all types of body cells and tissues.

Professor Lui first studied mouse pluripotent stem cells and earned a DPhil at the University of Oxford. She started working with human pluripotent stems cells while receiving postdoctoral training at Harvard University. She chose to return to her home town to work and joined CUHK in 2014.

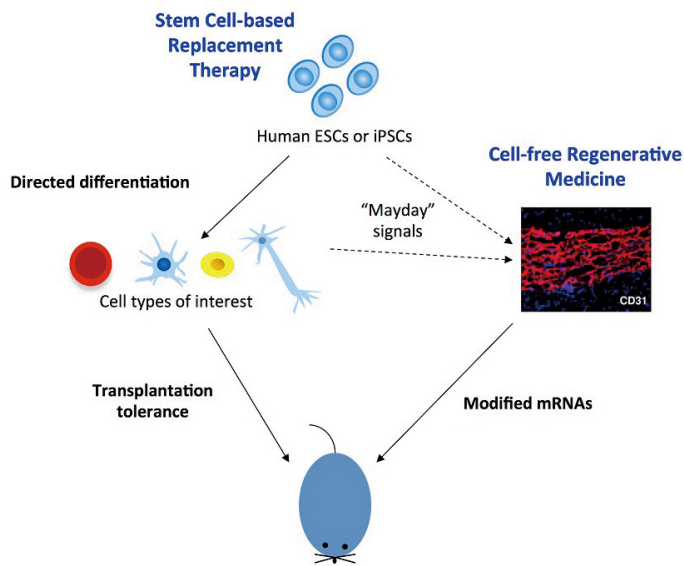
Cells are terrible to work with according to Professor Lui. 'You have to feed them every day from

Monday to Sunday. You don't have much rest.' Her hard work paid off and she succeeded in identifying factors that initiate the creation of progenitor cells, the 'grandparents' of all cells in heart muscles and blood vessels. She also began to understand how these cells form incorrectly or malfunction in heart disease patients.

She discovered that ribonucleic acid (RNA) acts as a messenger in the process of creating vascular endothelial growth factor (VEGF), a protein that causes blood-vessel formation in an embryo, thus making it possible the creation of extra blood vessels after injury to the heart, and the formation of new vessels that help bypass blocked heart vessels



### Summary of Lui's Research Directions



in pathological conditions. To avoid eliciting any immune response which will reject transplantation in the mammal body, she modified the RNA. Her studies formed a solid foundation for a recently filed clinical trial with the hope of treating human patients with heart disease,

the world's number one killer and the leading cause of death for aged patients suffering from diabetes. After publishing her results of transferring VEGF modified mRNA into mice in the journal *Nature Biotechnology*, her work became part of an application to conduct

trials in humans in conjunction with the drug maker AstrazZeneca. She is holder of three patents on her work, including one on how to modify RNA.

The Croucher award of HK\$5 million (US\$640,000), to be offered over a period of five years, will be used for Professor Lui's next research on the basic pathogenesis as to why diabetic mothers have a five-fold increased risk of giving birth to babies with malformation and dysfunction of the heart, and are more susceptible to developing cardiovascular diseases in later life.

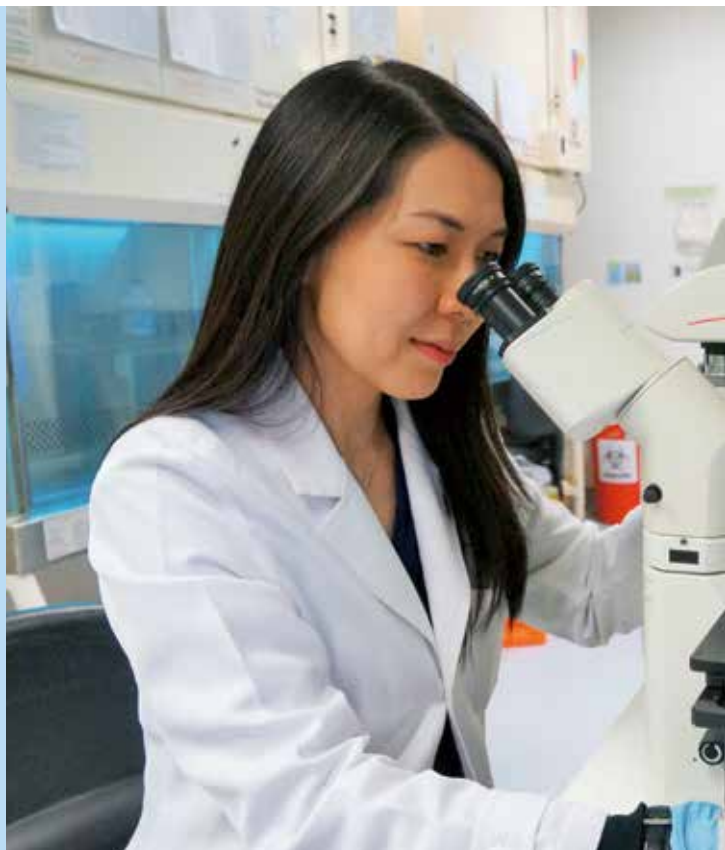
With the rising prevalence of type-2 diabetes due to the obesity epidemic, it is anticipated that the number of pregestational diabetic mothers will increase, thus the prevalence of congenital heart diseases for their newborns. Professor Lui's effort in extending knowledge of human heart development to model and treat human congenital heart diseases, using human pluripotent stem cells, may offer some solutions. 📄

(A slightly different version of this article was published on the CUHK website in February 2017)



# Searching for the Cause of Crohn's Disease

CUHK and research centres in mainland China and Australia are searching for the cause and cure of Crohn's disease through cross-boundary collaboration.



In March 2017, CUHK received a US\$1.8 million grant from The Leona M. and Harry B. Helmsley Charitable Trust in New York for a three-year research project on inflammatory bowel disease (IBD).

Once viewed as a 'Western disease' that only affected Caucasians, IBD has started to take roots in Asia over the past two decades. In Hong Kong, there has been a 30-fold increase in IBD in the past 20 years. By 2025, it is expected that mainland China will have more than 1.5 million IBD cases, which would likely equal or exceed the total in the Western world.

The two main forms of IBD are Crohn's disease and ulcerative colitis. To identify their causes, especially that of the Crohn's, CUHK is collaborating with research centres in Australia

and mainland China on a research project entitled 'The ENIGMA Studies—Eastern Inflammatory Bowel Disease Gut Microbiota'. The project aims to study the association between Crohn's disease and the patients' gut microbiota and dietary habits. Through cross-boundary collaboration, the team hopes to find measures and cures that would prevent and even treat the disease effectively.

Crohn's disease is a non-infectious chronic inflammatory disease of the intestine. It can affect any part of the patients' digestive tract from the mouth to the anus. The digestive tract can be affected by inflammation, ulceration or even bleeding. Frequent intestinal inflammation will lead to fibrosis,

resulting in intestinal obstruction. The presence of leakage and abscesses along the intestine can also lead to the formation of an abnormal channel called 'fistula', which links the intestine to the adjacent organs. Severe cases may be associated with intestinal perforation, which can lead to sepsis and peritonitis. The onset of the disease frequently occurs in childhood or early adult life. Besides suffering from internal bleeding and pain, patients' daily lives are disrupted by frequent hospitalization and multiple operations.

Prof. **Siew C. Ng** of the Department of Medicine & Therapeutics at CUHK's Faculty of Medicine has been conducting research on Crohn's and found that people who were breast-fed as babies have at





Prof. Joseph J.Y. Sung (right), Vice-Chancellor of CUHK and Mok Hing Yiu Professor of Medicine and Prof. Siew C. Ng (centre) from the Department of Medicine and Therapeutics, Faculty of Medicine at CUHK, talk about the incidence of Crohn's disease in Hong Kong and Australia with Prof. Michael Kamm, Professor of Gastroenterology from St. Vincent Hospital and the University of Melbourne, during an online video conference

least a 90% lower chance of having the disease. Another interesting finding in Asia is that exposure to pets can be a protective factor, as exposure to parasites boosts the immune system. Professor Ng is currently working on introducing fecal microbiota from the faeces of a healthy person into an affected patient, aiming to introduce 'healthy' bacteria that can fight the disease.

Crohn's disease is closely connected with the patient's living environment and diets. Australia has one of the highest incidences of Crohn's disease worldwide, but the disease is still relatively rare in other parts of the world, such as Latin America and Eastern Europe. Professor Ng's research team, the Asia Pacific Crohn's and Colitis Epidemiology


Study Group, which covers 15 countries in the Asia-Pacific region, has tracked more than 3,000 new cases in the area. The research data have indicated that within mainland China, the north has lower incidence, while Guangzhou in the south has the highest.

'Urbanization and the Westernization of diets may both play a part,' said Professor Ng. High levels of fat, meat, sugar, food additives, fast food and carbohydrates may trigger the condition. The use of antibiotics early in life can raise the chances of contracting Crohn's, depending on the type and dose. Even though the cause of Crohn's remains unknown, for Professor Ng's team, when the disease is still climbing, it means

(A slightly different version of this article was published on the CUHK website in April 2017)

that something in the environment is causing it, 'and that you can do something about it.'

With the generous support from the Helmsley Charitable Trust, Professor Ng looks forward to collaborating with key laboratories and leading IBD clinical centres in Beijing, Shanghai, Guangzhou and Xi'an. The team wishes to compare the case-studies of mainland China and Australia to identify the environmental triggers of Crohn's.

'Understanding the mechanisms underlying Crohn's disease pathogenesis will enable us to develop optimal dietary and bacterial modification therapies, which will eventually bring us closer to finding cures,' Professor Ng concluded. 

# The Best and the Brightest



## Graduate of Master in Architecture Receives RIBA President's Silver Medal

Chee King-hei Thomas, a 2016 master's graduate of the School of Architecture won the 2016 RIBA President's Silver Medal for his design project entitled 'Crafts Vault: The V&A Academy of Artisanal Crafts'. The project proposes to transform an abandoned power plant, which is situated at a strategically chosen brownfield site in North Kensington, into a museum and an academy for the preservation and revitalization of traditional British craftsmanship.



## CUHK-MIT Team Wins Seed Award at SODA Game 2016

StreeTalk, a team formed by students from the Institute of Space and Earth Information Science at CUHK and Massachusetts Institute of Technology (MIT), excelled at the Shanghai Open Data Apps (SODA) Game 2016 with 'City Safety' as the theme. Its project entitled 'Urban Imagery Analysis with Deep Learning' distinguished itself from over 200 projects by internationally renowned enterprises and institutions, and became one of the 10 finalists to receive the SODA Seed Award.

## MAE Students Win Champion at 6th Greater China Design Competition 2017



Yip Kwan-yi (3rd right), Yip Ka-chun (5th right), Yip Chi-yiu (5th left), Chiu Sin-hang (2nd left), Ho Wing-hang (4th left), Leung Chun-hei (3rd left), Chow Ka-chung (4th right) and Yue Yun-fei Felix from the Department of Mechanical and Automation Engineering designed a prototype for energy conversion and won the champion at the 6th Greater China Design Competition hosted by the Institution of Mechanical Engineers (Hong Kong Branch) in March, 2017.

The theme is to design, build, and perform test runs for an energy conversion system to utilize the gravitational potential energy stored in two litres of water to lift as much simulated ore as possible out of the simulated mine and deposit it into a receiving bin.

The CUHK team was led by Dr. Li Yiyang (2nd right), Prof. Xu Dongyan (1st right) and the assessor Leung Yun-ye (1st left).

## CUHK Students Sweep the Board at Sustainability Awards



CUHK became the big winner reaping four of the five Proposal Awards conferred at the prize presentation ceremony of the Sustainable Development Promotion Award for Students of Higher Education Institutions (SDPA) held on 26 February. SDPA was launched in 2016 by the Environment Bureau's Council for Sustainable Development.

Three out of the four winning proposals by CUHK went on to garner the Implementation Award with their projects respectively entitled 'Second-handed Exchange Platform', 'The Two-generation Bouquet', and 'Knowledge Vending'. The 'Second-handed Exchange Platform' project also won the Outstanding Project Award.

'Second-handed Exchange Platform' is managed by a student co-op CU Happy Corner. It encourages students to donate more and use more of their spare items. The aims are to develop a more responsible attitude towards managing personal belongings and incorporate resource sharing into daily lives.

'Two-generation Bouquet' was launched by the Agricultural Development Society of the Chinese University Students Union. It promotes to substitute cut-flower bouquets by edible vegetable bouquets at festive and celebratory seasons. The highlight of the project was a visit to a kindergarten to construct a Christmas tree with the kids using vegetable bouquets, and to conduct a series of learning activities.

'Knowledge Vending' is a machine designed by four Business School students who believe that sustainability should be the shared value among tertiary students, and knowledge is the foundation of action which leads to changes. The machine placed at a hostel lift lobby helps students to know more about global issues like global warming, gender equality and fair trade during the short waiting time. 📖

# NEWS IN BRIEF

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## APPOINTMENTS

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### Re-elected Council Vice-Chairman

Mr. Chien Lee has been re-elected by the Council as Vice-Chairman of the Council for a further period of two years from 2 March 2017.

### New Treasurer of the University

Dr. Anthony Neoh has been appointed as Treasurer of the University for a period of three years with effect from 2 March 2017 upon the expiry of the current term of office of Mr. Roger K.H. Luk, as recommended by the Council.

### New/Reappointed Council Members

- Dr. Kenneth T.K. Chu has been nominated by the Chancellor as a Member of the Council for a period of three years with effect from 1 January 2017.
- Mr. Roger K.H. Luk has been elected by the Council as a Member of the Council, succeeding Dr. Anthony Neoh, for a period of three years with effect from 2 March 2017.
- Mr. Charles Y.W. Leung has been re-elected by the Board of Trustees of New Asia College as a member of the Council for a further period of three years from 30 November 2016.
- Prof. Chan Sun-on has been re-elected by the Assembly of Fellows of New Asia College as a member of the Council for a further period of three years from 21 January 2017.
- Ms. Lina H.Y. Yan has been re-elected by the Board of Trustees of the United College as a Member of the Council for a further period of three years with effect from 25 August 2017.



### New/Reappointed Vice-President and Pro-Vice-Chancellors

- University Secretary Mr. Eric S.P. Ng has been appointed as Vice-President (Administration) of the University on a concurrent basis for a period of three years with effect from 1 April 2017.





- Prof. Dennis K.P. Ng has been appointed as Pro-Vice-Chancellor of the University for a period of three years with effect from 1 August 2017.
- Prof. Poon Wai-yin has been reappointed as Pro-Vice-Chancellor of the University for a further period of three years with effect from 1 May 2017.



### **New Associate Vice-President and University Dean of Students**

Prof. Edwin H.Y. Chan has been appointed as Associate Vice-President. He has also been appointed as University Dean of Students. Both appointments are on a concurrent basis for a period of three years with effect from 1 August 2017.



### **New/Reappointed College Masters/Head**

- Prof. Anthony T.C. Chan, Associate Dean (External Affairs) and Li Shu Fan Medical Foundation Professor of Clinical Oncology of the Faculty of Medicine, has been appointed as Master of Wu Yee Sun College for a period of four years with effect from 1 August 2017, to succeed Prof. Rance P.L. Lee.
- Prof. Andrew C.F. Chan, Director of EMBA Programme, has been reappointed as Head of Shaw College for a further period of three years from 1 July 2017.
- Prof. Sun Sai-ming Samuel, Emeritus Professor of Biology, has been reappointed as Master of S.H. Ho College for a further period of one year from 1 August 2017.
- Prof. Lau Wan-ye Joseph, Research Professor in the Faculty of Medicine, has been reappointed as Master of Lee Woo Sing College for a further period of three years from 1 January 2018.



### **Reappointed Dean of Graduate School**

Prof. Lutz-Christian Wolff, Wei Lun Professor of Law has been reappointed as Dean of the Graduate School on a concurrent basis for a further period of three years with effect from 1 September 2017.





### CUHK Researchers Receive Six State Science and Technology Awards

CUHK received six awards in the 2016 State Science and Technology Awards ceremony, marking the highest number of awards received among all tertiary institutions in Hong Kong. The research team formed by Prof. Joseph J.Y. Sung (centre), Vice-Chancellor of CUHK and Mok Hing Yiu Professor of Medicine; Prof. Yu Jun (2nd right) of the Department of Medicine and Therapeutics; Prof. Francis K.L. Chan (2nd left), Dean of the Faculty of Medicine; Prof. Simon S.M. Ng (1st left) of the Department of Surgery and Dr. William K.K. Wu (1st right) of the Department of Anaesthesia and Intensive Care and the Institute of Digestive Diseases was honoured with the State Natural Science Award (second-class) for the project entitled ‘Integrative Research on Molecular Pathogenesis, Diagnostic Biomarkers and Prevention for Colorectal Cancer’. (Five other award-winning projects by CUHK are listed in the left table)

Academic and Research Staff	Participating Project/ Team	Award
Prof. Joseph J.Y. Sung, Prof. Yu Jun, and Dr. Liang Qiaoyi (research assistant professor at the Department of Medicine and Therapeutics)	The State Key Laboratory of Cancer Biology at Fourth Military Medical University	The State Scientific and Technological Progress Award (Innovation Team)
Prof. Szeto Cheuk-chun from the Division of Nephrology, Department of Medicine and Therapeutics	The Research and Application of Combining Traditional Chinese Medicine and Western Medicine for the Treatment of IgA Nephropathy	The State Scientific and Technological Progress Award first-class award
Prof. Wang Yixiang, associate professor of the Department of Imaging and Interventional Radiology	Exploration and Application of Magnetic Resonance Based Multimodality Molecular and Functional Imaging	The State Scientific and Technological Progress Award second-class award
Prof. Lan Huiyao, Assistant Dean of the Faculty of Medicine (Research), Choh-Ming Li Professor of Biomedical Sciences	Mechanisms, Prevention and Treatment for Progressive Chronic Kidney Disease	The State Scientific and Technological Progress Award second-class award
Prof. Pang Chi-pui, S.H. Ho Professor of Visual Sciences and professor of Ophthalmology and Visual Sciences	Investigation of the Pathogenicity of Retinal Disease Genes and Promotion of Its Application in Disease Treatment and Prevention	The State Scientific and Technological Progress Award second-class award

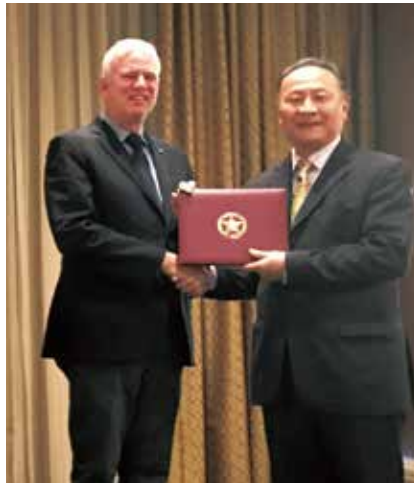
## Prof. Ma Wing-kin Elected IEEE Fellow



Prof. Ma Wing-kin from the Department of Electronic Engineering has been elected a Fellow of the Institute of Electrical and Electronics Engineers (IEEE) in 2017 for his contributions to optimization in signal processing and communications. Professor Ma has received the prestigious *IEEE Signal Processing Magazine Best Paper Award* in 2015 and *IEEE Signal Processing Letters Best Paper Award* in 2016.

## AAG Award for Geoinformation Science Professor

Prof. Lin Hui (right), Chen Shupeng Professor of Geoinformation Science at the Department of Geography and Resource Management, was awarded the 2017 E. Willard and Ruby S. Miller Award by the American Association of Geographers (AAG) for his scholarly work 'which represents a grand synthesis of human and physical geography, using cutting-edge geospatial technologies'. Professor Lin's research interests include virtual geographic environments, remote sensing in tropical and sub-tropical areas and spatially integrated humanities and social science.



## Vice-Chancellor Receives International Medal

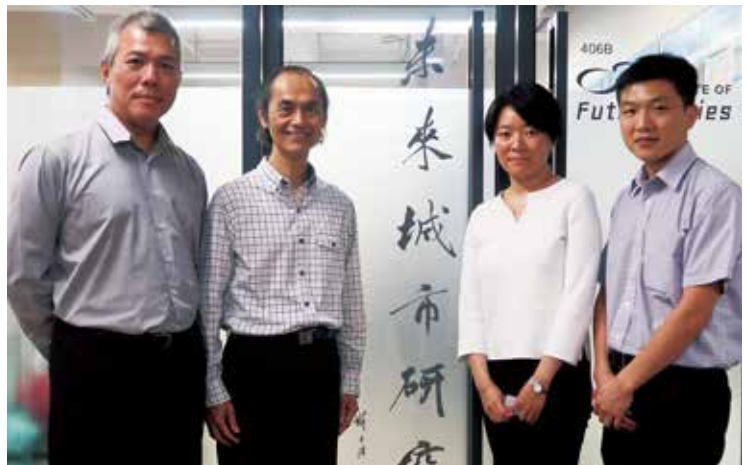


Prof. Joseph J.Y. Sung, CUHK's Vice-Chancellor and President, received the International Medal of Utrecht University on 13 April from Utrecht University Board President Marjan Oudeman (left) for his contributions in strengthening cooperation between the two universities. The institutional partnership began in 2003. Research collaborations among members of the faculty and students have been robust in recent years, including musculoskeletal research and regenerative medicine, law, environment and climate change, and the humanities.

## CUHK—Xi'an Jiaotong Team Wins Data Integration Award

A joint research team consisting members from CUHK and Xi'an Jiaotong University stood out from over 800 worldwide submissions, and got fourth place in the 2017 IEEE GRSS Data Fusion Contest.

The team developed an enhanced big data fusion and image processing method to speed up data collection in the urban morphological mapping process, and reduce the manpower needed in climate-sensitive urban planning. The method is part of the World Urban Database and Access Portal Tools (WUDAPT) initiative.



From left to right: Prof. Edward Ng (Associate Director), Prof. Leung Yee (Director), Prof. Ren Chao (Fellow) and Dr. Xu Yong (Postdoctoral Fellow) of the Institute of Future Cities

## Study Reveals Novel Mechanism for Atherosclerosis Development

A transregional research led by Prof. Huang Yu (right) of the School of Biomedical Sciences in collaboration with Tianjin Medical University in China and the Institute of Cellular and System Medicine in Taiwan has revealed that YAP/TAZ, a transcriptional regulator in vascular endothelial cells, has close links to vascular inflammation and the formation of atherosclerosis.



Atherosclerosis is a disease in which plaque builds up inside the arteries and is one of the major causes of stroke and heart diseases. YAP/TAZ is expressed in 'vascular endothelial cells' that form the inner lining of blood vessels. It functions as a downstream effector of the Hippo signalling pathway, which controls organ size and suppresses tumour growth. Activation of the Hippo pathway leads to the inhibition of YAP/TAZ activity, while the derangement of this signalling pathway has the opposite effect, resulting in uncontrolled cell proliferation and increased incidence of cancer. Therefore, YAP/TAZ can also be regarded as a 'cancer gene'.

The study has important implications for repurposing the existing drugs and opening the possibility of identifying drugs against cardiovascular diseases, which may have the potential of treating cancer, while certain anti-cancer drugs could also be useful for the amelioration of cardiovascular complications.

## New Treatment Paradigm for Mutated Lung Cancer



A multinational study led by Prof. Mok Shu-kam Tony, Li Shu Fan Medical Foundation Professor of Clinical Oncology and chairman of the Department of Clinical Oncology has developed a new treatment paradigm for epidermal growth factor receptor (EGFR) mutated lung cancer. Compared with standard chemotherapy, the new molecular targeted therapy can double the progression-free survival for patients whose cancer genes mutate and develop resistance after first-line EGFR targeted therapy. By understanding the molecular profile of lung cancer, physicians could customize the treatment for each patient according to the genetic information of their tumour. The study marks a new milestone for the development of personalized medicine for cancer patients. Its findings have been published in *The New England Journal of Medicine*.



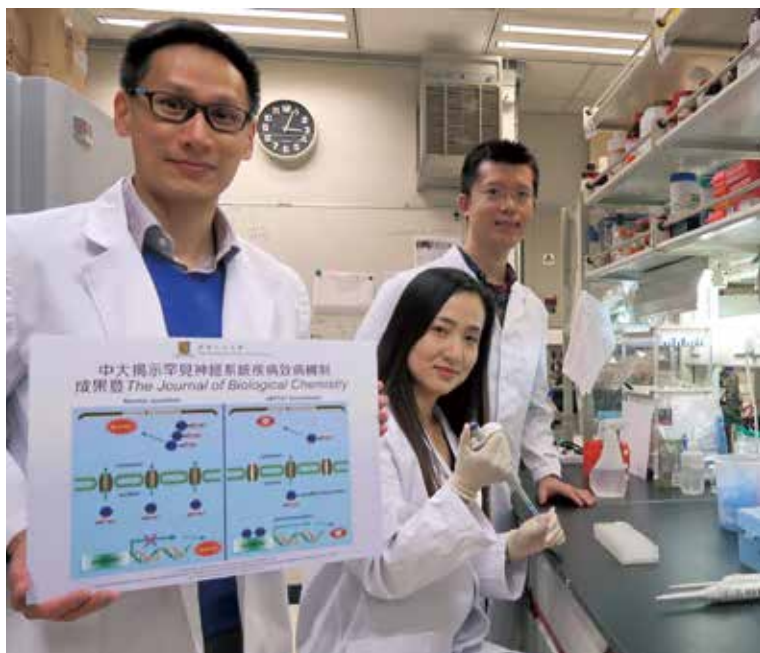
## Major Progress Made in Plant Autophagy Research

A team of researchers led by Prof. Jiang Liwen, Choh-Ming Li Professor of Life Sciences, has made a major breakthrough in revealing the mechanism of plant autophagy pathway. The research team uncovered a unique role of ATG9 (Autophagy 9) protein in mediating autophagosome progression from the ER (endoplasmic reticulum) membrane, providing a direct evidence for the ER as the site of autophagosome initiation in plants.

Since ATG9 is conserved among higher eukaryotic cells, such as rice, maize and soybean, further research on the molecular mechanism of plant autophagy pathway will provide new insight into crop quality enhancement. The research has been published in *Proceedings of the National Academy of Sciences*.



## Pathogenic Mechanism for Polyalanine Diseases Unveiled



Prof. Edwin H.Y. Chan (left) from the School of Life Sciences and his research team have elucidated a novel pathogenic mechanism for a group of rare neuronal disorders, known as the polyalanine (polyA) diseases. The study shows that the expanded polyA tract possesses nuclear export activity. The team have also found that the disruption of the eukaryotic translation elongation factor 1 alpha 1 (eEF1A1) protein perturbs the nuclear export of expanded polyA protein and restores the transcriptional function of expanded polyA proteins. The report provides insights into new therapeutic approaches to combat polyA diseases. Its findings have been published recently in *The Journal of Biological Chemistry*.

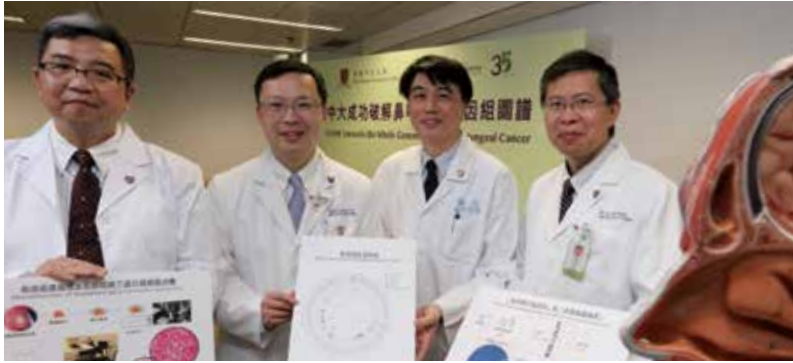
## Aqueous Redox Flow Battery with Record Energy Density

A high-energy-density zinc/iodine-bromide redox flow battery (ZIBB) has recently been developed by Prof. Lu Yi-Chun (2nd right) and her research team of the Department of Mechanical and Automation Engineering. ZIBB achieved the highest reported energy density for aqueous redox flow batteries, which generate electricity by electron transfer between two electrolytes. They are safe, environmentally friendly, with high design flexibility and a lifespan of up to several decades.

ZIBB with high energy density and a stable cycle life has potential in the growing market for electric cars. The breakthrough was published in the journal *Energy & Environmental Science* in early 2017, and was recently featured by the magazine *Chemistry World*, published by The Royal Society of Chemistry, UK.



## Whole Genome of Nasopharyngeal Cancer Unravalled



The Faculty of Medicine at CUHK conducted a systematic study to unravel the whole genome of nasopharyngeal carcinoma (NPC). Members of the research team include Prof. Lo Kwok-wai (1st left), Department of Anatomical and Cellular Pathology; Prof. Anthony Chan (2nd left), Li Shu Fan Medical Foundation Professor of Clinical Oncology; Prof. To Ka-fai (2nd right), chairman of the Department of Anatomical and Cellular Pathology; and Dr. Hui Pun (1st right), clinical

associate professor (honorary), Department of Clinical Oncology. The groundbreaking findings have been published in *Nature Communications*.

NPC is characterized by the infection of Epstein-Barr virus (EBV). Due to its intrinsic invasiveness and asymptomatic nature, 60% to 70% of NPC patients are diagnosed with advanced stage disease. To determine the genomic landscape of EBV-positive NPC, researchers of the Faculty of Medicine analysed

the tumour specimens derived from over 100 NPC patients in 2015 to 2016. The research team performed whole-exome sequencing on the specimens and some cases were subjected to further whole-genome sequencing. They identified a higher degree of somatic mutation and structural variation in NPC than previously recognized and also discovered several novel genomic events that facilitate NPC growth, such as the inactivating mutation in regulatory proteins of the inflammation pathway 'NF- $\kappa$ B'.

Results of the study may help medical practitioners to assess the patient's prognosis after a certain kind of therapy has been performed. The study also highlights the importance of targeting activated NF- $\kappa$ B signalling in NPC patients with somatic defects in NF- $\kappa$ B regulators and confirms the potential of using NF- $\kappa$ B inhibitors as new therapeutics for NPC patients.



## CUHK-led Research Projects on Sustainable Agriculture and Food Security Recognized by UGC as Area of Excellence

A team of plant and agricultural researchers across nations and institutions, led by Prof. Lam Hon-ming (7th right) of the School of Life Sciences, has been awarded funding in excess of HK\$81 million over eight years from the Areas of Excellence (AoE) Scheme under the University Grants Committee (UGC). The subsequent AoE Centre for Genomic Studies on Plant-Environment Interaction for Sustainable Agriculture and Food Security boasts a membership of 15 scientists from CUHK, The University of Hong Kong, Hong Kong Baptist University and Hong Kong University of Science and Technology, and from notable institutions in mainland China, US, UK and Argentina as well. The Centre is committed to developing new plant and agricultural technology with a view to strike a better balance between food security and agricultural sustainability.



## CUHK and Shanghai Jiao Tong University Forge Strategic Partnership in Research

CUHK established its first joint research fund with a mainland institution. On 12 January, Prof. Joseph J.Y. Sung (front row, left), Vice-Chancellor of CUHK and Prof. Zhang Jie (front row, right), President of Shanghai Jiao Tong University (SJTU) signed collaboration agreements on CUHK–SJTU Joint Research Collaboration Fund to build synergies and strengthen the research collaboration between the two institutions in the following areas: diabetes, robotics, digestive disease, reproductive disease and big data.



On the same day, the two presidents officiated at the inauguration ceremony of the CUHK–SJTU Joint Research Centre in Diabetes Genomics

and Precision Medicine, the first of its kind in Asia. They also signed a Letter of Intent to set up a Joint Research Centre on Medical Robotics.

## Alumni Art Exhibition Celebrates 60th Anniversary of Fine Arts Department



To celebrate the 60th Anniversary of the Department of Fine Arts and the 35th Anniversary of its Alumni Association, the Alumni Art Exhibition was held from 16 to 23 February at the Hong Kong Central Library. The exhibits, among which were the works of 18 former and current teachers as well as 92 alumni, showcased the department's

tradition and accomplishments over the past six decades. The diverse collection of works included Chinese paintings, calligraphy, oil paintings, prints, ceramics and sculptures. The opening ceremony was held on 17 February, graced by Prof. Michael Hui (3rd right), Pro-Vice-Chancellor of CUHK; Prof. Henry N.C. Wong (3rd left), Head of New Asia College;

Prof. Tang Hoi-chiu (2nd left), former chief curator of the Hong Kong Museum of Art; Prof. Mok Kar-leung Harold (1st left), chairman of Department of Fine Arts; Prof. Kao Mayching (2nd right), former chair professor of Fine Arts and founding chairman of the Alumni Association; and Mr. Lo Kwan-chi (1st right), chairman of the Alumni Association.

## CUHK—ETH Zurich Alliance on Innovative Technologies for Gastrointestinal Endoscopy



The Chow Yuk Ho Technology Centre for Innovative Medicine at CUHK and The Multi-Scale Robotics Lab, Institute of Robotics and Intelligent Systems at ETH Zurich, Switzerland, forged an alliance earlier this year to develop innovative technologies, in particular nanorobots, for gastrointestinal diseases. The alliance aims to promote academic exchange and research collaboration to achieve medical advances to benefit patients. Prof. Joseph Sung (2nd left), Vice-Chancellor of CUHK, said, 'CUHK has been dedicated to the development of healthcare innovation and biomedical engineering. The collaboration with ETH Zurich will further sharpen our edge in the field.'

## CUHK Entrepreneur Day 2017



CUHK Entrepreneur Day, initiated by the CUHK Alumni Torch Fund, was held on 12 and 13 May this year on campus. It featured a series of talks, seminars and discussions with alumni entrepreneurs, and an exhibition showcasing nearly 70 start-ups by CUHK alumni and students.

Officiating at the opening ceremony were Mr. Eric Ng (3rd right), Vice-President of CUHK; Dr. David Chung (3rd left), Under Secretary for Innovation and Technology of the HKSAR Government; and Mr. Stephen Liang (2nd right), assistant executive director of the Hong Kong Trade Development Council. A keynote speech was delivered by alumnus Wong Wai-kay Ricky (2nd left), co-founder and chairman of Hong Kong Television Network Limited.

## Joint Big-data Laboratory for Integrative Medicine



CUHK signed a Memorandum of Understanding with the University of Sydney in establishing a joint big data laboratory for integrative medicine—'Analytic and Clinical Cooperative Laboratory for Integrative Medicine' (ACCLAIM) on 26 April in Sydney, Australia. The MOU was signed by the two respective Vice-Chancellors, Prof. Joseph J.Y. Sung and Dr. Michael Spence (left).

The first project of ACCLAIM focused on stroke, with the aim of identifying a complementary mechanism of integrative medicine and effective treatment plans to improve patients' quality of life. Preliminary results hinted that stroke patients with integrative medicine treatment have better clinical outcomes. Studies on other diseases such as dementia, cancer and gastrointestinal disease are in the pipeline. ACCLAIM serves as a platform for scientists and clinicians to share the best of information technology, data analysis, and clinical research for the advancement of evidence-based integrative medicine. The joint laboratory focuses on downstream applied clinical research, with translational deliverables and big-data applications in clinical trials.

## Hong Kong and the World under the Belt and Road Initiative

The Hong Kong Institute of Asia-Pacific Studies of CUHK and the Central Policy Unit of the Hong Kong Government co-organized an international conference to explore the opportunities and challenges arising from the Belt and Road Initiative on 15 and 16 December 2016 on CUHK campus. Keynote speakers included Dr. William H. Overholt (front row, 3rd right), Senior Fellow of Harvard University Asia Center; Prof. Jianye Wang (front row, 2nd right), managing director of the Silk Road Fund Co., Ltd. and Professor of Economics, NYU Shanghai; Dr. Victor K. Fung (front row, 5th left), chairman of Fung Group and Prof. Mingkang Liu (front row, 4th left), BCT Distinguished Research Fellow, Lau Chor Tak Institute of Global Economics and Finance, CUHK.



## International Workshop on InSAR Technologies for Urban Infrastructural Health Diagnosis

The Institute of Space and Earth Information Science of CUHK and the German Aerospace Centre (DLR) jointly hosted the International Workshop on InSAR (Interferometric Synthetic Aperture Radar) Technologies for Urban Infrastructural Health Diagnosis from 17 to 19 January 2017, attended by nearly 100 scholars and research students from mainland China, Germany, Italy, England, the Netherlands, Pakistan, the Philippines, and Sri Lanka. Prof. Richard Bamler (photo) from DLR delivered a keynote speech.





## Distinguished Scholars from Chinese Academy of Social Sciences Visit CUHK

CUHK hosted the 6th Chinese Academy of Social Sciences (CASS) Scholars Visit Programme on campus from 6 to 9 March 2017. Three scholars of CASS delivered public lectures to forge academic exchange in social science, law and linguistics. They included Prof. Zhang Yi (2nd right) from the National Institute of Social Development on changes in mainland China since the implementation of the reformation and open door policy, Prof. Chen



Zexian (2nd left) from the Institute of International Law on criminal rule of law and international conventions, and Prof. Gu Yueguo

(1st left) from the Institute of Linguistics on Chinese language construction from the oracle bone script to cyber age.


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## Maritime Silk Road Suite



The T.T. Ng Chinese Language Research Centre at the Institute of Chinese Studies and the Department of Chinese Language and Literature jointly organized the 'Maritime Silk Road Suite'. A series of academic activities focusing on the linguistic properties of Chinese spoken in countries and areas along the 21st Century Maritime Silk Road was held from 27 March to 30 April

2017. As a prelude to the Suite, three lectures on 'Voices of the Maritime Silk Road' were held to introduce the cultural diversity along the Maritime Silk Road. Another highlight of the Suite was the 'The International Symposium on Chinese in the Maritime Silk Road', which was one of the academic activities to celebrate the 50th Anniversary of the Institute of Chinese Studies

and the 60th Anniversary of the United College of CUHK. The Symposium brought together more than a hundred scholars coming from around the world. It was the first international linguistics activity to examine the 21st Century Maritime Silk Road from the unique perspective of the Belt and Road Initiative. 







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