Faculty of ENGINEERING

Spring 2019 Newsletter
Interview with new Dean of Engineering

Professor Christopher Chao returned to the University of Hong Kong with a new role last summer. He is fulfilling a wish to become a scholar at his alma mater. “It’s a good timing for me to try out something new. It will be a more exciting platform for me to look after five different departments rather than one department,” he said. He was the head of mechanical and aerospace engineering at the Hong Kong University of Science and Technology before taking up the new role at HKU.

Professor Chao was admitted to study engineering at the University in 1985. “It was a major event in my family as I was the first member to enter the University at a time only a few percent of school leavers got a place,” he said.

He received a first-class engineering degree in Mechanical Engineering in 1988. After working at the Swire Group for two years, Professor Chao went to the University of California, Berkeley for studying PhD, with a focus on combustion and energy engineering. “This is a cross-disciplinary area that includes chemical engineering, physics and other areas like that in addition to mechanical engineering. And when you talked about energy, it is also related to climate change and environmental protection, so I built up my interest in these topics, too,” he said. Professor Chao was awarded a HK$7 million Collaborative Research Fund grant recently to develop advanced cooling technology to make buildings more energy-efficient.

New Initiatives

One of Professor Chao’s immediate tasks is to lead the launching of one of the new Bachelor of Arts and Science (BASc) degree programmes and to participate in the launching of another two. This is a new initiative by the University to promote interdisciplinary study and Engineering is joining force with various Faculties to offer BASc in FinTech, artificial intelligence and design. “The new FinTech programme led by Engineering covers not only knowledge in engineering or computer science aspects, but also other areas like art and humanity, business and law etc. to fit into the social context of the industry. I think the students who pursue BASc programmes should aim higher and look into a bigger picture in an international arena,” he said.

Professor Chao believes that the best engineering schools around the world all value nurturing talents with innovative ideas. “The new Tam Wing Fan Innovation Wing is definitely a place where students can expand their imagination and make their ideas become reality. We hope to provide every student with the opportunities to innovate and pursue their passions.” The Innovation Wing is expected to be ready in 2020. In the meantime, engineering students conduct experiments in the DreamLab and pursue the interdisciplinary projects. “We hope that the future engineers will be well-rounded, not only equipped with knowledge and abilities to solve technical problems, but also the skills to communicate effectively with other stakeholders from different disciplines,” he further added.

The Role of Engineering and Opportunities

In the fast-changing world, engineering plays a pivotal role in contributing to positive social impact and facilitating economic development. “Here in Hong Kong, driving innovation and technology development is one of the highly prioritized endeavours of the HKSAR Government. Together with the opportunities in China, it is the best of times for engineering to play a more central role,” he said, adding, “We must grasp the opportunities in order to stay competitive!”

The development of the Greater Bay Area is one of the key strategic planning of the HKSAR Government. All local institutions are pinning their development hopes in the Area. Professor Chao thought that the Faculty could seize the opportunity in many ways. “I would rather say...”
it is a collaboration opportunity than competition,” he said, “By leveraging our comparative advantages, deeper cross-boundary cooperation on innovation and technology will be resulted. For instance, our researchers can make use of the spacious land in the Greater Bay Area for more intensive experiment and field tests. With the world-class quality control system in Hong Kong and the massive market in China, more commercialisation of technology research outputs will be allowed as well.” Professor Chao explained.

In recent years, the Faculty has been partnering with prestigious universities like Harvard University, Cambridge University and Tsinghua University in establishing joint laboratory or launching dual degree programmes. “These partnerships are only the beginning. There are many more collaborations with academic institutions and industry in the near future, not only related to research, but also related to teaching and learning,” Professor Chao adding, “We can drive innovative research with more societal impact by strengthening the partnership with them. Students will also benefit as they will have chances to learn in these top universities and world-renowned companies. It will definitely widen their horizons.” He is also keen to see the Faculty with a well-mix of top notch researchers from a wide array of engineering interests as compared with other universities in Hong Kong.
A collaborative hub to foster innovation and creativity - Tam Wing Fan Innovation Wing

The Tam Wing Fan Innovation Wing (Innovation Wing) is envisioned to groom our students with creative, interdisciplinary and hands-on skills to offer solutions to future problems. This new iconic landmark will be located on the G/F and LG/F of the existing Hui Oi Chow Building, covering 2,400m² of floor area. The new facility will house interactive teaching and learning spaces, Makerspaces, brainstorming areas, etc., and is expected to be completed by 2020.

The provision of state-of-the-art facilities in a collaborative space will enable curriculum innovations that emphasise hands-on and experiential learning activities. The Innovation Wing will be a platform to engage young generation to explore the world, create opportunities for them to learn about the needs of the underprivileged and acquire practical hands-on experience in developing solutions with real world impact.

The Innovation Wing will join hand with Engineering teaching departments to actively support student experiential learning activities in order to facilitate students to apply their knowledge and innovation to serve the community.

Dedication Ceremony for Tam Wing Fan Innovation Wing

To honour Mr and Mrs Tam Wing Fan for their very generous pledge to donate HK$100M in support of the establishment of Innovation Wing, a dedication ceremony was held on April 27, 2018.

The Ceremony was officiated by the Guests of Honour Mr and Mrs Tam Wing Fan. Other officiating guests included HKU Council Chairman Professor the Honourable Arthur K.C. Li, Professor Paul K.H. Tam, Professor T.H. Tse, Mr Edward Ho and Mr Heman Hsuan.
The H.K.U. Engineering Alumni Association (HKUEAA) pledged a donation of over HK$0.6M in support of experiential learning activities in the Faculty for three years from 2017/18 academic year. A Memorandum of Understanding Signing Ceremony was held earlier in 2018. The Faculty thanked the HKUEAA, our staunch supporter, for their generosity and visions to partner with us to nurture the young generation.

The fund has been subsequently used to support experiential learning activities in the Innovation Wing. It helped to foster and embrace creative and interdisciplinary ideas, and facilitate the actualization of students’ ideas through hands-on projects in which they “learn by doing.” Students were encouraged to think out-of-the-box and this would enhance their critical thinking and entrepreneurship skills. Since its establishment in 2018, the fund has supported 52 students in three projects.

**Project 1: Design, Build and Fly Team**

Two Design, Build and Fly (DBF) teams from Department of Mechanical Engineering participated in the Payload Challenge 5 organised by British Model Flying Association (BFMA) in June 2018. The competition was taken place at BMFA Buckminster and consisted of three rounds of competition for achieving the maximum payload to weight ratio. The teams had chances to exchange knowledge on design and building of RC plane with other 16 teams from top universities in Aeronautics through discussions and presentations. Eventually, our DBF Team #1 won the third place while Team #2 achieved a sixth place.

**Project 2: Engineering Team for Sustainability in Myanmar**

The latest cloud computing and Internet of Things (IoT) technologies may give a promising direction to solve the global issue of food crisis. A group of thirteen students from Civil Engineering, Mechanical Engineering, Computer Science and Electrical and Electronic Engineering with 2 teachers joined an overseas experiential project in Myanmar in August 2018. They worked closely with the teachers and students from Dagon University on the possibilities in using the IoT technologies, cloud computing and sensor technologies to improve urban farming technologies.

**Project 3: RoboMaster Competition**

RoboMaster is an annual robotics competition for teams of aspiring engineers. HKU Team HeraKles was formed by 30 students from Engineering and other faculties. They finished fifth in the International Regional Competition and was awarded the Second Prize. The team joined the Final Tournament and got a Third Prize eventually.
World's first intra-operative MRI-guided robot for bilateral stereotactic neurosurgery

A mechanical engineering team led by Dr Kwok Ka-wai designed the first neurosurgical robotic system capable of performing bilateral stereotactic neurosurgery inside a magnetic resonance imaging ("MRI") scanner. The team also conducted pre-clinical validation of the system with CUHK neurosurgeons, Dr Danny Chan Tat-ming and Professor Poon Wai-sang. This innovative technological breakthrough can facilitate the treatment of Parkinson's disease and other neuropsychiatric disorders.

DBS therapy, like a heart pacemaker, can deliver electrical signals through implanted electrodes to the deep brain targets. It helps to restore normal nerve cell activity. This surgery is tremendously demanding on accuracy, by targeting only the tiny nucleus structures and not damaging the surrounding critical tissue. Without the intra-operative updates of a surgical "roadmap", the brain may shift after the skull is opened and inevitably lowers the targeting accuracy. Conventional DBS is performed while the patient is awake under local anesthesia. Surgeons have to rely on verbal or physical interactions with the patients to ensure the electrode placement is going well. These surgical complications motivated the HKU-led team to develop a compact robot guided by MRI. This facilitates less invasive stereotactic procedures on the patient under general anesthesia, as surgeons could accurately control and evaluate the stereotactic manipulation bilaterally to the left and right brain targets in real time.

The team successfully resolved many unmet technical challenges. For example, MRI scanners have very strong magnetic fields and most metallic components are forbidden in MRI environments, including the electromagnetic (EM) motors commonly used in robots. The team developed a totally magnetic resonance ("MR") compatible tele-operated system driven by liquid. It does not generate any EM interference or affect imaging quality even during the robot operation. A manipulator is designed to perform dexterous operation towards the left-and-right brain targets, and the area required for an invasive anchorage is very small. The compact robot design can be accommodated inside a standard MRI head coil for imaging and intervention. Advanced 3-D tracking markers are also developed, which enable fast localization of robot instruments in MRI in real time.

The success of this project represented a major step towards safer, more accurate and effective brain surgery. It is believed that all these components can be applied to other interventions requiring MRI guidance, e.g. cardiac catheterization, prostate or breast biopsy. The research team plans to conduct further clinical studies to determine the efficacy of the system.

Best Conference Paper Award in the IEEE International Conference on Robotics and Automation 2018

The team was conferred the Best Conference Paper Award in the largest international forum for robotics scientists, the IEEE International Conference on Robotics and Automation 2018 (ICRA'18), which was held in Brisbane, Australia, from May 21 to 25, 2018. The ICRA is the world's top conference where robotics scientists can introduce and present their latest work. More than 3,000 participants from academia and industry join the conference annually. ICRA'18 reviewed 2,539 papers, a new record in its history, from 61 countries. A total of 1,030 papers were selected for presentation.

The team was conferred the final best out of 35 finalists in all the nine robotics categories, including robot vision, cognitive robotics, robot manipulation and unmanned aerial vehicles. Other shortlisted universities and companies include MIT, Harvard, Stanford and DeepMind. The team project was also shortlisted as a finalist for the Medical Robotics paper award at the same Conference.
Future robots need no motors
World’s first nickel-hydroxide actuating material that can be triggered by both light and electricity

A mechanical engineering team led by Professor Alfonso Ngan Hing-wan of Mechanical Engineering Department published an article in Science Robotics with a title of “Light-stimulated actuators based on nickel hydroxide-oxyhydroxide”. It introduced a novel actuating material – nickel hydroxide-oxyhydroxide – that can be powered by visible (Vis) light, electricity, and other stimuli. The material actuation can be instantaneously triggered by Vis light to produce a fast deformation and exert a force equivalent to 3,000 times of its own weight. The material cost of a typical actuator is as low as HK$4 per cm$^2$ and can be easily fabricated within three hours.

In addition to its Vis light actuation properties, this novel material system can also be actuated by electricity, enabling it to be integrated into the present well-developed robotics technology. It is also responsive to heat and humidity changes so that they might potentially be applied in autonomous machines that harness the tiny energy change in the environment. Because the major component is nickel, the material cost is low. The fabrication only involves electrodeposition which is a simple process, and the time required for the fabrication is around three hours, therefore the material can be easily scaled up and manufactured in industry.

The newly invented nickel hydroxide-oxyhydroxide responses to light almost instantaneously and produces a force corresponding to about 3,000 times of its own weight (Figure 1).

When integrated into a well-designed structure, a “mini arm” made by two hinges of actuating materials can easily lift an object 50 times of its weight (Figure 2). Similarly, by utilizing a light blocker, a mini walking-bot in which only the “front leg” bent and straighten alternatively and therefore moves under illumination was made so that it can walk towards the light source (Figure 3). These demonstrate that future applications in micro-robotics including rescue robots are possible.

The evidences revealed that this nickel hydroxide-oxyhydroxide actuating material can have different applications in the future, including rescue robots or other mini-robots. The intrinsic actuating properties of the materials obtained from our research show that by scaling up the fabrication, artificial muscles comparable to that of mammalian skeletal muscles can be achieved, and applying it in robotics, human assist device and medical devices are possible.

From a scientific point of view, this nickel hydroxide-oxyhydroxide actuating material is the world’s first material system that can be actuated directly by Vis light and electricity without any additional fabrication procedures. This also opens up a new research field on light-induced actuating behaviour for this material type (hydroxide-oxyhydroxides) because it has never been reported before.

The research team members are all from the HKU Department of Mechanical Engineering, led by Professor Ngan’s group in collaboration with Dr Li Wendi’s group on light actuation experiment and Dr Tony Feng Shien-ping’s group on electrodeposition experiment.
A real-time ultraflexible sensor that makes inflammation testing and curing 30 times faster

A research team led by Dr Paddy Chan Kwok-leung of the Mechanical Engineering Department, in collaboration with Professor Gilberto Leung Ka-kit (Tsang Wing-Hing Professor in Clinical Neuroscience) and Dr Anderson Tsang Chun-on of Surgery, and Professor Xu Aimin of Department of Pharmacology and Pharmacy, developed a C-reactive protein (CRP) sensor integrated onto a medical catheter for direct CRP sensing (Figure 1). This organic sensor has a total thickness less than one micrometer (~1/50 of Asian human hair), which can significantly save the time for sample and data collection, from currently a few hours to 10 minutes or less. In other words, testing and curing of inflammation can be speeded up by 30 times. The real-time signal read out has a great potential in allowing the doctors to take necessary immediate actions.

This mechanically flexible organic electronic device developed by Dr Chan's team, as a demonstration of concept, is to measure the biological information in real-time. This device can sense the CRP level down to 1 ug/mL, and hence more sufficient to deviate the health condition of the patients. The research finding was published in journal Advanced Science.

CRP level in the blood is an important indicator reflecting the level of the inflammation of patients. It is currently tested by blood analysis which cannot provide real-time information of the patients. The new organic device developed by the team can measure the biological information in real-time with very little sample volume.

The CRP sensor developed by the team is just an example to demonstrate the concept of the ultrathin devices. Other sensors such as neurotransmitter, and bacteria sensors can also be used. Other than the high sensitivity and fast response time, another major achievement of this ultra-thin and ultra-flexible sensor device is their compatibility with the standard sterilization processes adapted in the hospitals. Dr Chan's team developed a “capsule-like” CTIOF encapsulation layer which allows the device to withstand high pressure, temperature and moisture environment. By using a CTIOF capsule with only 250 nm, this device can withstand boiling water or hot steam for more than 30 minutes without showing performance degradation (Figure 2). This sterilization compatibility makes the device an appropriate tool to be used together with surgical instruments in operation room which requires aseptic environment.

In order to transfer the sensors onto different medical devices, Mr Ji Xudong, a PhD student of Dr Chan’s team, adapted a hydrophilic-hydrophobic double layer plastic substrate which can be easily detached from the glass holder once in touch with water. Such floating properties make transferring the sensors onto different substrates or objects a lot simpler and more importantly, the device show no performance degradation after transferring among different subjects (Figure 3).

In the future, Dr Chan and his team will further enhance the sensing power of the devices by integrating neurotransmitter and pressure sensors onto the catheter. They will also develop a sensor platform for the clinical tests on animals. Other than the CRP sensor for the blood, the team also plans to measure other bio-markers especially the neurotransmitters which can provide valuable real time information of the patients suffering from head injury or strokes. The team between HKU Engineering and Medicine is also aiming at developing a big data system to continuously measure and monitor various valuable biomedical information from the brain or other parts of the body. Once the data are becoming available by utilizing these low-cost sensors, the team is hoping the real-time measured signals can allow the doctors to take immediate actions to heal the patients.
Interdisciplinary research conducted by the HKU-Cambridge Clean Energy and Environment Research Platform (HKU-Cambridge CEERP) revealed that there is a statistically significant, positive relationship between ambient PM2.5 (Particulate Matter of width 2.5 microns or less) concentration and the Social Deprivation Index in Hong Kong, and showed the existence of air pollution-induced environmental injustice at the constituency area level in the territory. The paper was published in the journal *Environmental Science and Policy* (Li, V.O.K., Han, Y., Lam, J.C.K., Zhu, Y., and Bacon-Shone, J., 2018, Air pollution and environmental injustice: Are the socially deprived exposed to more PM2.5 pollution in Hong Kong?, 80, 2018, 53-61).

Existing research on air pollution-induced environmental injustice in Hong Kong was based on sparse air pollution data due to the limited number of government pollution monitoring stations (only 16, one added recently) in the territory, rendering it difficult to study the relationship between air pollution exposure and social deprivation (SD), and hence the study of environmental injustice, at finer geographical scales.

This challenge was overcome by a research led by Professor Victor Li On-kwok, Director of HKU-Cambridge CEERP and Dr Jacqueline Lam Chi-kei, Co-Director of CEERP through the development of a Granger Causality Model. This model utilised readily available urban dynamics data closely related with air pollution as proxy data, including ambient pollutants concentration, traffic, meteorology and urban morphology to provide a fine-grained (100m x 100m) estimation of air pollution in Hong Kong, transforming the measurements of 16 government monitoring stations to 110,000 virtual stations.

SD is measured by the Social Deprivation Index (SDI), which is a composite indicator comprising four SES variables, namely, low-income, low-education, non-professional occupation, and non-owner occupier, selected and combined via Principal Component Analysis. SES data are available from the 2011 Population Census.

The team found that there is a statistically significant, positive relationship between ambient PM2.5 concentration and SDI in Hong Kong, based on the SDI and mean PM2.5 exposure values derived from 412 constituency areas. The higher the SDI, the higher the mean PM2.5 exposure. In other words, the postulation of air pollution-induced environmental injustice at the constituency area level in Hong Kong is justified.

This study highlights an emerging need for Hong Kong to develop more integrated, human-centric, location- and justice-based environmental policies, and the need for evidence-based policy-decision-making to properly address air pollution-induced environmental injustice.

The policy implications and recommendations can be extended to the rest of the world, particularly cities like Beijing, where the growth of Gross Domestic Product is rapid, population density and pollution concentrations (including particulate pollution) are high, and the income gap between the rich and the poor is widening.
A significant breakthrough in tissue engineering for cultivating human tissues and organs

Dr Lin Yuan and his student Dr Gong Ze from the Department of Mechanical Engineering, in collaboration with researchers from University of Pennsylvania, University of Virginia and Stanford University, made a significant breakthrough in the area of cell mechanics which marks a major step in furthering scientists’ fundamental understanding of how cells perform their biological duties in vivo.

Dr Lin and his international collaborators are the first team worldwide to reveal the mechanism by which surrounding viscoelasticity affects cell response across a wide range of material parameters. The findings were published in the prestigious international academic journal Proceedings of the National Academy of Sciences of the United States of America (PNAS).

"Regenerative Medicine" or "Tissue Engineering" studies use living cells to grow adult tissues, such as skin, blood vessels, joints, or major organs such as the heart, to be used for transplantation or repair. A key to cultivating living cells is to provide the cells with proper extracellular matrix (ECM) close to the natural body environment suitable for their growth and functioning.

The team used combined theoretical and experimental approaches to demonstrate that viscous dissipation in ECM can be as important as elasticity in directing cell response. Specifically, the research team developed a stochastic model to examine the dynamics of motor clutches formed between the cell and a viscoelastic substrate as well as its implications in the spreading of cells.

Findings revealed that on soft ECMs, maximum cell spreading is achieved at an optimal level of viscosity (Figure 1) in which the material relaxation time falls between the timescale for clutch binding and its characteristic binding lifetime. That is, viscosity serves to stiffen soft substrates on a timescale faster than the clutch off-rate, which enhances cell–ECM adhesion and cell spreading. On the other hand, for substrates that are stiff, the model predicts that viscosity will not influence cell spreading as the bound clutches are saturated by the elevated stiffness, see Figure 2. The model was tested and validated on three different (i.e. hydrogel, polyacrylamide- and hyaluronic acid-based) material systems synthesised by the research team and well-explained the different observed effects of viscosity on each substrate.

Figure 1: Cell spreading speed is significantly influenced by the elastic and viscous parameters of the material.

Figure 2: Schematic illustrates effects of material viscoelasticity on cellular behavior based on the comparison of the clutch binding timescale, substrate relaxation timescale and adhesion lifetime scale.
Four engineering academics named "Highly Cited Researchers 2018"

Among the fifteen academics of the University of Hong Kong named by Clarivate Analytics in the list of "Highly Cited Researchers 2018" among the world's top researchers, four are from Engineering – Professor Zhang Tong of Civil Engineering, Professor Wallace Choy Chik-ho of Electrical and Electronic Engineering, Professor James Lam and Professor Dennis Leung Yiu-cheong of Mechanical Engineering.

Highly Cited Researchers are selected for their exceptional research performance, determined by production of multiple highly cited papers that rank in the top 1% by citations for field and year in Web of Science. Their works have been highly cited by fellow academics and are hence making a significant impact in ongoing research in their respective fields of study.

In addition, the University commissions a search to identify the top 1% scholars at HKU every year. The database adopted for this exercise is Essential Science Indicators, which uses data from Web of Science indexed journal articles with results presented in 22 subject fields. For the year of 2018, 114 HKU colleagues made it to the list, among whom 27 (23.6%) are from the Faculty of Engineering. Department of Electrical and Electronic Engineering tops our list with 13 colleagues, followed by 5 from Civil Engineering, 5 from Mechanical Engineering, 3 from Computer Science and 1 from Industrial and Manufacturing Systems Engineering.

### Top 1% Scholars at HKU

#### Civil Engineering
- Professor Li Xiao-yan
- Dr Szeto Wai-yuen
- Professor Tang Chuyang
- Professor Wong Sze-chun
- Professor Zhang Tong

#### Electrical and Electronic Engineering
- Professor Chan Shing-chow
- Professor Chau Kwok-tong
- Professor Chesi Graziano
- Professor Wallace Choy Chik-ho
- Professor Hill David John
- Dr Huang Kaibin
- Professor Ron Hui Shi-yuen
- Professor Hung Yeung-sam
- Dr Jiang Lijun
- Dr Lee Chi-kwan
- Professor Victor Li On-kwok
- Professor Tan Siew-chong
- Dr Wu Yik-chung

#### Computer Science
- Professor Lam Tak-wah
- Professor Wang Wen-ping
- Dr Yiu Siu-ting

#### Mechanical Engineering
- Professor James Lam
- Professor Dennis Leung Yiu-cheong
- Professor Li Yuguo
- Dr Anderson Shum Ho-cheung
- Professor Wang Liqiu

#### Industrial and Manufacturing Systems Engineering
- Professor George Huang Guo-quan
Collaboration with Harvard SEAS on establishing a Laboratory for Instrumentation for Precision Medicine

The Faculty of Engineering and the Harvard John A. Paulson School of Engineering and Applied Science (Harvard SEAS) signed a Memorandum of Understanding on December 2, 2018, to set up a Laboratory for Instrumentation for Precision Medicine.

Professor Christopher Chao, Dean of Engineering of HKU and Dr. Fawwaz Habbal, Executive Dean for Education and Research, Harvard SEAS officiated at the signing ceremony.

The event was witnessed by The Honourable Mrs Carrie Lam, the Chief Executive of the Hong Kong Special Administrative Region (HKSAR); Mr Kurt W. Tong, Consul General of the United States to Hong Kong and Macau; Professor Xiang Zhang, President and Vice-Chancellor of HKU; Dr. Nicholas W. Yang, the Secretary for Innovation and Technology of the HKSAR Government; and Professor David Weitz, Mallinckrodt Professor of Physics and Applied Physics, Harvard SEAS.

The Faculty of Engineering and Harvard SEAS aim to establish a laboratory focused on medical instrumentation for microfluidic-based diagnostics, drug delivery and sensor development in the age of precision medicine, in response to the HKSAR Government's initiative to turn Hong Kong into a global hub of innovation and technology, particularly in the areas of healthcare technologies.

The Honourable Mrs Carrie Lam, Chief Executive of the HKSAR, said: “The HKSAR Government is committed to attracting world-leading research institutions to conduct collaborative research. The signing of the MoU between the HKU Faculty of Engineering and Harvard SEAS, which signifies enhanced collaboration and cross-fertilisation in the research area of precision medicine in Hong Kong, is a very significant step in this endeavour. I wish the two universities great success in the collaboration.”

U.S. Consul General Kurt W. Tong said: “The U.S. Consulate General welcomes this important and positive milestone in U.S.-Hong Kong science and technology cooperation.”

“Today’s memorandum brings together two universities that are known and respected around the world for our commitment to pursuing world-class, pioneering research,” Professor Xiang Zhang conveyed in the ceremony.

Precision medicine (PM) is an emerging field of research by scientists. Innovation and technological development in the area will open up a new paradigm in healthcare leading to the customisation of healthcare, with medical decisions, treatments, practices, or products being tailored to individuals.

The Laboratory will be organised into themes based on technologies that HKU and Harvard SEAS are pioneering and share interests and competitive edge in, such as microfluidics, drug formulations, sensors and detectors.

Dr Fawwaz Habbal expressed that “HKU has excellent educational programs and first class research capabilities. Our collaboration will enable the talented engineers and scientists in both Universities to create significant innovative instrumentation for precision medicine, and will facilitate the design of devices and treatments that will impact health care across the world.”

Professor Christopher Chao commented that “the signing of MoU is the first but promising step forward for the two institutions. It is expected that by joining the strengths of the two academia, a strong platform will be built for translating fundamental breakthroughs and more synergistic activities will be conducted for the advancement of healthcare-related technologies that can lead to strong technology transfer value and societal impact.”

The Faculty of Engineering and Harvard SEAS intend to submit a proposal to the HKSAR Government under the recently announced Health@InnoHK research cluster initiative, with a plan to establish a research laboratory in the Hong Kong Science Park.
Dual Bachelor’s Degree Programmes offered with Tsinghua University

By leveraging the unique capabilities of the University of Hong Kong (HKU) and Tsinghua University (THU), two four-year Dual Bachelor’s Degree Programmes will be offered, one in Business and Economics, the other in Computer Science and Technology. Students who completed the programmes will receive bachelor's degree certificates from both universities respectively. A signing ceremony of Memorandum of Understanding was held on November 30, 2018, and HKU President Professor Xiang Zhan and THU President Professor Qiu Yong officiated at the signing ceremony.

This is the first time for HKU to collaborate with a Mainland university on dual degree programmes at undergraduate level. The dual bachelor's degree programmes will be open to students worldwide and the first batch of intake is expected in the academic year 2020-21.

Inaugural symposium by the Centre for Water Technology and Policy

The University of Hong Kong has been emphasising the importance of embracing inter-disciplinary, international, innovation and impact as its four pillars going forward. To further these ends, the Faculty of Engineering and the Faculty of Social Sciences, in close collaboration, jointly established and operated the Centre for Water Technology and Policy for water safety, security and urban sustainability.

An inaugural symposium was organised on May 29, 2018, at the Social Sciences Chamber of HKU. Guest speakers from UC Berkeley, McGill University, Arizona State University, National University of Singapore, Beijing Normal University, the University of Hong Kong, the Chinese University of Hong Kong and the Hong Kong University of Science and Technology shared their views towards the theme “Climate-resilient Urban Water Systems: New Technologies and Policy Challenges” in this one-day symposium.
Enhancing STEM education among young generation

STEM education is being promoted as a key emphasis in education nowadays. It is essential for students’ lifelong learning and whole-person development. In order to promote and enhance STEM education among young generation, especially to primary and secondary school students, the Faculty of Engineering organised various activities in 2018.

Ultraviolet Radiation Measurement and Application Design Competition

The Faculty of Engineering, the Hong Kong Observatory and the Hong Kong Meteorological Society jointly organised the Ultraviolet Radiation Measurement and Application Design Competition. The competition was the first of its kind in Hong Kong with a primary objective to enhance knowledge of and interest in information technology and instrumentation among the young generation. It also encouraged the practice of innovative technologies and creative design ideas. Over 400 participants from primary, secondary and international schools ranging from Primary 4 to Secondary 6 joined the competition.

HKUEEE Summer Programme 2018

Department of Electrical and Electronic Engineering tailored the HKUEEE Summer Programme for senior high-school students from July 31 to August 8, 2018. Participants not only had chances to have field visits to HKU Laboratory of Biomedical Imaging and Signal Processing, ASTRI, SenseTime Group Ltd. and ASM Pacific Technology, they also formed teams to build their own gadgets with electronic components.
Day camps for Smart City Project Programme

“Smart City Project programme 2017/18” was organised by the Education Bureau of HKSAR Government. The Smart programme aimed at helping students to integrate and apply their knowledge and skills acquired from the school curriculum, in particular from the STEM Education, to suggest innovative ways to realise the ideas of Smart City in the development of their home, school, community and city environment.

The HKU e-Learning Development Lab was commissioned to run 10 day camps from February to May 2018 for the programme. Diversified STEM skills on robot, augmented reality, 3D printing, artificial intelligent, big data analysis, mBot, Internet of things, Microbit, wireless microcontroller, smart traffic light and solar energy were introduced to participants.

IMSE co-organized International Symposium on STEM Education

The University of Hong Kong hosted the 2018 International Symposium on STEM Education in June 2018. This symposium was jointly organised by HKU Academy for the Talented, Department of Industrial and Manufacturing Systems Engineering and the Common Office with a theme “Cities on the Move”. It attracted over 80 students from Hong Kong and nineteen countries such as the United States, Germany, Canada and Mainland China, to participate in and discuss how advanced technologies such as artificial intelligence, virtual reality and other new technologies could be applied to daily life and improve the quality of life.
Serving the reconstruction project in Sichuan

In the past decade after the devastating 5.12 Wenchuan earthquake in Sichuan, engineering teachers and students have been actively serving the reconstruction projects in Sichuan. A team of 20 engineering students from Computer Engineering, Computer Science, Electrical Engineering and Mechanical Engineering joined a Sichuan Reconstruction Project which was jointly organized by the Faculty of Engineering and the University of Electronic Science and Technology of China. The project was supported by the China 1000 Exchange Program.

The team visited cities in Sichuan, such as Chengdu, Deyang and Yingxiu, from January to June in 2018 and served two of the reconstructed schools. For instance, the team helped Yingxiu Middle School in upgrading its computer laboratory with STEM education facilities. Students also served as instructors in teaching the local teachers and students on computer programming.

International Summer Interflow Programme at Tianjin University

The 2018 International Summer Interflow Programme was jointly organised by the Faculty of Engineering and Tianjin University under the China 1000 Exchange Programme of the Ministry of Education of the People’s Republic of China. 21 engineering students participated in the programme in July 2018.

This was the fifth summer programme jointly organised by the universities. In line with the theme of “Artificial Intelligence” this year, participants not only learnt how to make use of an AI chipset for voice recognition and implemented them in a robot car, but also allowed an interflow of cultural and university between Hong Kong and Tianjin.
Hung Hing-Ying Distinguished Professorship in Science and Technology

The Hung Hing-Ying Distinguished Visiting Professorship in Science and Technology aims to attract top academics in the fields of science and technology to spend time at HKU over a span of two to three years. Professor Kazuhiro Kosuge of the Tohoku University is a leader in the world robotics community and is very influential in Japan. He was appointed as Hung Hing-Ying Distinguished Professor in Science and Technology in 2016. He delivered another public lecture on "Universal Manipulation for a next generation of industrial robots" on October 16, 2018. The lecture was well received and inspiring with full house attendance.

“New Materials, Devices, Physics and Brain-Inspired Architectures for Computing”

Dr R. Stanley Williams, former Senior Fellow and Senior Vice President at Hewlett Packard (HP) Labs in Palo Alto of California in US, was invited to deliver a seminar on August 21, 2018. Prior to his engagement with HP, Dr Williams was a member of the technical staff at AT&T Bell Labs and a Professor in the Department of Chemistry at UCLA. His primary scientific research has been in the areas of solid-state chemistry and physics and their applications to technology for over 40 years. This has taken him on a journey that began with surface science; expanded to electronic, photonic and ionic nanotechnologies; and now encompasses computation, chaos, complexity and neuroarchitectonics.
William M.W. Mong Distinguished Lecture Series

Over the past 22 years, the William M.W. Mong Research Fund has provided invaluable resources for the Faculty to enhance its research capability through Distinguished Lecture Series. Academics from all over the world have shared their insights on multi-disciplinary topics under the Lecture Series, from environmental engineering, medical science technologies to smart systems. Various lectures with different topics were presented in 2018.

Public lecture on "The mystery of ground settlement"

In response to the public concerns on ground and structures settlements, a seminar was jointly organised by the Faculty, the Department of Civil Engineering and the Hong Kong Institute of Engineers in September 2018.

It is impossible to give simple answer to the phenomenon of ground settlement, Professor Francis Au Tat-kwong and Dr Fiona Kowk Chung-ye of the Civil Engineering Department attempted to help the audience recognise the complexity of this phenomenon in a city.
Start-up companies received support to commercialise R&D results

Eight start-up companies formed by Professors, students or alumni of the Faculty of Engineering received funding support from the 2018/2019 Technology Startup Support Scheme for Universities @ HKU (TSSSU@HKU) to commercialise their Research and Development results. The TSSSU@HKU Award Celebration Gathering was held on July 26, 2018 at HKU to acknowledge the achievements of the TSSSU awardees.

This year, a total of sixteen teams received support from the TSSSU@HKU and eight of them were from the Faculty of Engineering:

**Name of TSSSU Awardees:**
CSC Limited  
**Founder:** Dr Chow Kam-pui, Department of Computer Science  
**Business:** Provision of cyber intelligence and cyber security consulting

**Name of TSSSU Awardees:**
Coral Limited  
**Founder:** Dr Kevin Tsai Kin-man, Department of Electrical and Electronic Engineering  
**Business:** High speed imaging for cancer diagnostics

**Name of TSSSU Awardees:**
EN Technology Limited  
**Founder:** Dr Anderson Shum Ho-cheung, Department of Mechanical Engineering  
**Business:** Novel encapsulation technologies for food and cosmetics industries

**Name of TSSSU Awardees:**
Ezone Technology Co Ltd  
**Founder:** Dr Paddy Chan Kwok-leung and alumni, Department of Mechanical Engineering  
**Business:** Non-invasive blood glucose monitoring

**Name of TSSSU Awardees:**
Hactis Limited  
**Founder:** Dr Henry Lau Ying-fai, Department of Industrial and Manufacturing Systems Engineering  
**Business:** VR technology for training and education

**Name of TSSSU Awardees:**
Brain Invest Limited  
**Founder:** Dr Yi Yu Siu-wai, Department of Computer Science  
**Business:** Financial technology based on artificial intelligence and big data analysis

**Name of TSSSU Awardees:**
Novel Sonics Limited  
**Founder:** Dr Leung Wai-ning, Department of Electrical and Electronic Engineering  
**Business:** Biomedical ultrasound imaging products for non-invasive and real time diagnosis of Cardiovascular diseases

**Name of TSSSU Awardees:**
High Performance Solution Limited  
**Founder:** Dr Tony Feng Shien-ting, Department of Mechanical Engineering  
**Business:** Thermo-electrochemical capacitor (TEC) for converting low grade wasted heat into electricity

"The Future of Living" Expo Showcase

2018 marks the 65th anniversary of Shun Hing Group as well as the 100th anniversary of Panasonic. To commemorate this occasion, Shun Hing Group hosted an exhibition with a theme "The Future of Living" at the Hong Kong Convention and Exhibition Centre from November 7 to 10, 2018. We were honoured to join this exhibition to showcase our research achievements to the public. Visitors were excited to know more about the Faculty and meet 'ATLAS', one of the world's most advanced humanoid robots.
Promoting Virtual Reality applications in the community

The imseCAVE (Cave Automatic Virtual Environment (CAVE)) is a fully immersive and interactive visualization system that provides extremely vivid stereoscopic views of sceneries in 3-D designed and developed by the research team in the Department of Industrial and Manufacturing Systems Engineering (IMSE). The system is developed based on the technologies of distributed and interactive virtual reality, with real-time motion capture capability.

The IMSE Department collaborated with the Correctional Services Department (CSD) in deploying virtual reality scenario training with imseCAVE into the induction training courses provided by CSD Staff Training Institute from year 2017-18. There are currently three training scenarios included self-mutilation, suicide and fighting among prisoners. It was expected to enhance trainees’ capabilities in handling with contingencies.

In addition, the IMSE Department joined hands with HKU Common Core Curriculum Office in setting up an unique digital cultural space at the Global Lounge of HKU from April to December 2018. The imseDOME, currently the most mobile and affordable VR system that can display high resolution 4K images, was installed to showcase VR films and students’ creative works.

Unlike other VR systems that require the viewers to wear 3D glasses or VR headsets, the imseDOME audience simply steps in to a place like the Sky Theatre in the Hong Kong Space Museum and would immediately be surrounded by the cinematics of 4K high-definition moving images, as well as captivating scenes of a VR films. The powerful viewing experience creates an immersive feeling which encourages interactions among audiences.

Delegation visit to Alibaba

A delegation, comprised of thirteen representatives of the Faculty, visited Alibaba Headquarter for a comprehensive understanding of their digital technology development. They brought up discussions on possible collaboration opportunities on areas like engineering research and technology transfer on Artificial Intelligence and Big Data Analytics, as well as management of innovation centre. In addition, eight delegates were invited to introduce their research projects to over 250 Alibaba staff at DAMO Academy, a global research and development initiative set up by Alibaba.
Class of 2018, Congratulations!

The 200th Degree Congregation of the Faculty of Engineering 2018 was held on December 6, 2018. The session for taught postgraduate programmes was held at the Hong Kong Cultural Centre while the two sessions for undergraduates and research postgraduates were held at the Grand Hall, Lee Shau Kee Lecture Centre of the University of Hong Kong. Nearly 1,200 graduates attended the ceremonies with their parents and friends to share their joy.

We were delighted to have Ir T.K. Chiang, Managing Director of CLP Power Hong Kong Limited and Dr Sunny Chai, Chairman of Board of Directors of the Hong Kong Science and Technology Parks Corporation as our Guests of Honour. Ir Chiang and Dr Chai encouraged our young engineers to keep an open mind and get ready for opportunities.
Events Spotlight

“Think Big, Think HKU Engineering”

The University’s Information Day for Undergraduate Studies 2018 was held on November 3, 2018, and it attended by over 100,000 students, parents, teachers, as well as members of the public. With a theme “Think Big, Think HKU Engineering”, the Faculty’s exhibition at Haking Wong Building Podium was very impressive, projecting an image of a contemporary and cohesive faculty with different departments and disciplines.

Admissions Talks on BEng programme, HKU-Cambridge Joint Recruitment Scheme, Bachelor of Engineering in Biomedical Engineering and the new programme – Bachelor of Arts and Sciences in Financial Technology (FinTech) were given with full house of attendance. Interesting projects were showcased in Student Union area and laboratories. Visitors gained a basic understanding of various engineering disciplines through laboratory tours, exhibitions and hands-on projects. The event was clearly successful in showing potential students and their families some of the wonderful opportunities available here at the Faculty.

“Connecting HKU Engineering”

With a view to providing a platform for parents of the freshmen of our undergraduate programmes to better understand the Faculty and the first year experience of new students, a sharing session “Connecting HKU Engineering” was held on August 29, 2018 at Loke Yew Hall. More than 160 freshmen parents joined us and they were very enthusiastic to learn about students’ campus life, the Faculty’s laboratory facilities, as well as the unique experience and ample opportunities that lie ahead.

One of the programme highlights was sharing from guest. We were honoured to have Ir Alex Kwan, Executive Director (Engineering & Technology) of Hong Kong Airport Authority, to share his experience and vision with the participants. Ir. Kwan graduated from the University of Hong Kong with a degree in Civil Engineering. He is also the Immediate Past President of the H.K.U. Engineering Alumni Association. Besides sharing with us his career accomplishments and how HKU Engineering helps his career development, Ir. Kwan gave some suggestions to students and parents on their university life as well.

This was followed by a sharing session from alumni Mr Stanley Siu, Mr Anthony Chiu; and students Mr Kelvin Ng and Miss Angel Woo. They shared their experience in choosing majors, participation in extra-curricular activities, etc.
"Air Guitar" and "Luminosite" won top prizes at national "Mobile Application Innovation Contest"

An Engineering team, comprising three BEng(CE) students Will Lam Wun-yin, Daniel Kwok Ching-fung and Alex Teoh Jian-ning, won a First Prize Award at the "2018 China Collegiate Computing Contest – 3rd Mobile Application Innovation Contest" co-organised by Zhejiang University and Apple Inc.

Their award-winning innovative design "Air Guitar" is a motion-activated iOS app for guitar beginners or people who want to play guitar but are bound by the environment. The app enables them to play guitar and experience music anytime and anywhere, with their iPhone. The app can detect the motions and the gestures of the player, transform the actions into guitar chords, so as to mimic the experience of playing a guitar. Users can also record the chords and the songs they play via the Air Guitar app. The Team has been invited by Apple Inc to join the upcoming Worldwide Developers Conference.

Another team, comprising two BEng(CE) students Desmond Wong Chi-ping and Felix Wong Kwong-yat and one BEng(CS) student Yeung Tsz-lok, won a Second Prize Award with the app "Luminosite", which uses navigation and AI obstacle detection technology to provide surrounding information to people who are visually impaired.

They are the first Hong Kong teams to win top prizes at the competition.

The Mobile Application Innovation Contest is part of the China Collegiate Computing Contest. It attracted over 800 teams from colleges and universities in the Mainland, Taiwan, Hong Kong and Macau to take part. Four teams shortlisted from Hong Kong represented the territory to take part in the competition, among them two were from HKU. After the first and second rounds of the competition, 56 apps were selected from the 591 works submitted for the final round of the contest which took place at Zhejiang University on September 17, 2018. Selected teams were invited to showcase their apps to the public and to give a presentation.

Organised by the Advisory Committee of Computing for Higher Education of Ministry of Education of the PRC, the Advisory Committee of Software Engineering for Higher Education of Ministry of Education of PRC, the Advisory Committee of University Computing Programme for Higher Education of Ministry of Education of PRC and China National Society of Computing Studies for Higher Education, the China Collegiate Computing Contest is a technology-based competition for students in various professional disciplines of higher education in China.
MSc Civil Engineering Students won the Championship in international earthquake engineering competition

A civil engineering postgraduate team won a total of six awards at “Introducing and Demonstrating Earthquake Engineering Research in Schools” (IDEERS2018), including the Championship (First Prize) of the Postgraduate Division, Structural Design Awards, Aesthetic Architecture Award, Design-Concept Exhibition Awards, Best Presentation Award and Innovation Award of Seismic Isolation and Energy Dissipation.

The winning team consisted of 4 MSc Civil Engineering students, Peter Choi Siu-kwan, Tommy Wong Po-hon, Michael Cheng Chun-ho and Andy Tang Hing-ka and was supervised by Dr Ray Su Kai-leung, of Department of Civil Engineering. They participated in the postgraduate division of the competition and joined a 3-day competition at the Taiwan National Center for Research on Earthquake Engineering (NCREE) in September 2018.

The “Introducing and Demonstrating Earthquake Engineering Research in Schools” is a renowned international earthquake engineering competition for civil engineering students which was jointly organised by National Center for Research on Earthquake Engineering (NCREE), the National Applied Research Laboratories (NARLabs) and the British Council every year since 2001. It attracted teams from all over the world including the US, UK, New Zealand, Guatemala, Japan, Indonesia, Taiwan and Hong Kong, etc. This year, there were over 100 teams and 500 participants competing in three divisions, high-school, undergraduate and postgraduate.

Teams competed under the Postgraduate Division were required to design and construct a building model which was able to survive under 1000gal earthquake accurately but fail at 1050gal to ensure the model was not over-designed. They were also required to design a model façade and a poster introducing their seismic design and give a presentation in a conference. The HKU team started designing and constructing a building model with combination of seismic protection devices, performed numerical simulation and experiments for the building model a few months before the competition. The team eventually scored the highest in the presentation, lowest top floor acceleration measured and the highest total score among all teams in the postgraduate division and won six awards in total.
Student achievements

Computer Science team won Pioneer Award in FinTech competition in Chengdu

Dr Yiu Siu-ming of Computer Science Department led a team with PhD student Chan Chui-fai and BEng(CS) students Ali Waqas, Arora Saksham, Tarun Sudhams, Vashishtha Anushka and Jha Piyush came second (Pioneer Award) in "Chengdu 80," a FinTech Design and Development competition held from October 30 to November 4, 2018. The competition was one of the core events of the Southwestern University of Finance and Economics (SWUFE) – Consortium for Data Analytics in Risk Annual Conference. Eight teams from top universities, included Georgia Institute of Technology, National University of Singapore, Peking University, Shahjalal University of Science & Technology, SWUFE, Tsinghua University and UC Berkeley, were invited to participate in the competition.

PIERS 2018 Best Student Paper Award

Chen Menglin, a student supervised by Dr Jiang Lijun of Department of Electrical and Electronic Engineering, won the 3rd prize of PIERS 2018 Best Student Paper Award in Toyama, Japan. The paper was entitled "Orbital Angular Momentum Generation Using Composite Quasi-continuous Metasurfaces with a Perfect Efficiency," and was co-authored by Chen Menglin and Dr Jiang Lijun.

Medical Engineering student took Silver at the ASM Technology Award 2018

Abdul Latif Motan Daniyal (middle), a BEng(MedE) student supervised by Mr Stuart Moran, Dr Kevin Tsia Kin-man (left) and Dr Kenneth Wong Kak-yuen of the Department of Surgery, LKS Faculty of Medicine, won a Silver Award of the ASM Technology Award 2018 with his outstanding and innovative project named "Development of a Novel Integrated Luminaire System for Pediatric Tumor Surgeries." Daniyal was awarded a scholarship of HK$30,000 and was invited to a Technology Tour to Munich, Germany organised by ASM Pacific Technology Limited.
Student achievements

Project MindoroBots awarded the National Runner-Up in the James Dyson Award 2018

MindoroBots is an initiative by BEng(CE) students Sidhant Gupta (fourth from the right) and Rohak Singhal (third from the right) to build open-source robots which aim to reliably and effectively replace humans in coral reef surveying. It was awarded National Runner-Up in the James Dyson Award 2018. The James Dyson Award is an annual design engineering competition open to students and recent graduates from 27 countries.

The Best Presentation Award in 2018 Croucher Summer Course on Neutron Scattering

With a presentation entitled “Inelastic Neutron Scattering Data Analysis on Silicon”, Wang Chen (5th from the right) won The Best Presentation Award in 2018 Croucher Summer Course on Neutron Scattering with a presentation entitled “Inelastic Neutron Scattering Data Analysis on Silicon”. Wang is a PhD student supervised by Dr Chen Yue of Mechanical Engineering Department. His award-winning presentation incorporated experimental neutron scattering data and theoretical studies based on density functional theory and molecular dynamics simulations during his PhD study.

Teams “Victorious Secret” and “Wheel-Power” won Regional Prizes in the Schneider Electric: Go Green in the City Competition

EEE students got excellent results in the “Go Green in the City” competition organised by Schneider Electric. Team “Victorious Secret”, comprised of Kelly Lu Zhaohan and Yeung Yip-yan (students of BEng(ElecE)), won the Regional Second Prize in the Greater China Regional Final Competition, while “Wheel-Power” team led by Agnes Wong Ka-yee (BEng(EE)) got a Third Prize of the Greater China Region.
Silver Award at the "The 4th Chinese College Students ‘Internet Plus’ Innovation and Entrepreneurship Competition"

A team of EEE research postgraduates, included (from left) Li Min, Wang Rong and Qiu Hai mi, received the Silver Award at the "The 4th Chinese College Students ‘Internet Plus’ Innovation and Entrepreneurship Competition" in Xiamen in October 2018. Their project entitled "On-demand Band-rejected Wideband Antenna Based on Peelable DELC Resonator Membrane" and was supervised by Dr Jiang Liqun.

Team “Alpha” won a second runner-up in the 2018 Smart City Datathon

Team "Alpha" from the Department of Industrial and Manufacturing Systems Engineering won a second runner-up in the 2018 Smart City Datathon in October 2018. The Datathon was organised by the Asian Institute of Supply Chains & Logistics of The Chinese University of Hong Kong and was designed to inspire innovation in the development of creative applications, business models and smart city concepts through Big Data Analytics. Out of 70 teams, 20 teams from the Mainland, Taiwan, South Korea, Singapore, Malaysia, Thailand, Australia and Hong Kong were selected for final round. The teams were given 35 hours to develop innovative operation and business models, services or systems that could bring values to the cities and the aviation and logistics industries.

Young Persons’ World Lecture Competition 2018

Guo Lin (3rd from the left), a PhD student supervised by Professor Min Wang of Mechanical Engineering Department, got a Second Place at Young Persons’ World Lecture Competition 2018 in South Africa in October 2018. She won the regional competition in Hong Kong and became one of the finalists of the world competition with full sponsorship. Her lecture entitled "Combating Cancers with A New Superweapon" was based on her PhD research on advanced tissue engineering scaffolds incorporated with theranostics that has been conducted exclusively in HKU.
**Hong Kong Scholarship for Excellence Scheme 2018/19**

Congratulations to Michael Lam Cheuk-him (left) from medical engineering programme! He was selected as one of 83 awardees of the Hong Kong Scholarship for Excellence Scheme 2018/19 which supports his overseas postgraduate study in Imperial College London. The Scheme was launched by the HKSAR Education Bureau with an aim to support local students to pursue studies in world-renowned universities outside Hong Kong.

**Hong Kong IET Prize 2018**

Congratulations to Cheng Yau-chung, a BEng(EE) student, for receiving Hong Kong IET Prize 2018. The IET Hong Kong is the largest overseas local network with 5,000 members in Hong Kong and Macau. The IET Prizes delivered the IET’s vision by underpinning their mission: to inspire, inform and influence the global engineering community, supporting technology innovation to meet the needs of society. An award ceremony was held on September 21, 2018 and Dr Hou Yunhe, supervisor of Yau-chung, joined this special occasion to share his joy.

**First runner-up at ACM-HK Programming Contest 2018**

Team "Div3 Borderline --", consisted of three BEng(CS) students Kwok Kin-hei, Hui Pak-nam Huang Qingwei and coached by Mr Sun Bintao, got the first runner-up at the annual ACM-HK Programming Contest held in June 2018 at the City University of Hong Kong. They competed with over 30 teams from other tertiary institutions in Hong Kong and Macau.
Student achievements

Student AI project “Tale” awarded at the 18th Asia Pacific Information and Communication Technology Alliance Awards

Hong Kong achieved record-breaking results at the 18th Asia Pacific Information and Communication Technology Alliance Awards held in Guangzhou in October 2018 sweeping six Winner and 13 Merit awards. “Tale”, a student project on an AI-enabled solution for the coaching of presentation skills initiated by David Lau Kin-fung (BEng(CS)), Jaime Lao Kit-ying (BEng(ME)) and HKUST student Douglas Tse, won the top award in the “Student - Tertiary Students Project” category.

Champion at 2018 IEEE AP/MTT Postgraduate Conference

Wang Rong, research postgraduate supervised by Dr Jiang Lijun of Electrical and Electronic Engineering, won the Champion of the Student Paper Competition (AP Session) at 2018 IEEE AP/MTT Postgraduate Conference at the Chinese University of Hong Kong in November 2018. The awarded paper entitled “Band-rejected Wideband Antenna Based on Peelable Resonator Membrane” was co-authored by Wang Rong, Li Min, Raju Salabuddin (HKUST), Robert C. Roberts, Mansun Chan (HKUST) and Dr Jiang Lijun.

Outstanding Electrical Power and Energy Engineering Student 2018

Gautama Brandon (left), BEng(EE) student, was named the “Grand Award” of the Outstanding Electrical Power and Energy Engineering Student Award 2018 by the IET Hong Kong. He was selected for the award with his outstanding academic performance, strong leadership ability demonstrated in his extra-curricular activities and community service. Professor Chau Kwok-tong (right), Head of Electrical and Electronic Engineering Department, shared the joy with Brandon at the prize presentation ceremony.
Student achievements

12th IEEE (Hong Kong) Computational Intelligence Postgraduate Paper Contest

Chu Kai-fung (middle), a postgraduate supervised by Professor Victor Li On-kwok (left) and Dr Albert Lam (right) of Electrical and Electronic Engineering Department, won the Champion of the 12th Postgraduate Paper Contest organised by the IEEE (Hong Kong) Computational Intelligence (CI) Chapter with his excellent work on "Travel Demand Prediction Using Deep Multi-Scale Convolutional LSTM Network".

Engineering students won prizes at "Challenge Cup" National Competition Hong Kong Regional Final

Wang Rong (left) received Second-place Award in the "Information and Technology" category.

The "Challenge Cup" National Competition Hong Kong Regional Final – Hong Kong University Student Innovation and Entrepreneurship Competition 2018 was organised by the Hong Kong New Generation Cultural Association. This year, 560 students from 19 tertiary institutions submitted 188 projects for the two categories of the competition, namely "Innovation" and "Entrepreneurship". Engineering students won prizes in different categories:

<table>
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<tr>
<th>Awardee(s)</th>
<th>Project</th>
<th>Categories</th>
<th>Prize</th>
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<tbody>
<tr>
<td>Wang Rong (EEE)</td>
<td>通信抗幹擾技術：基於可分離型薄膜諧振器的請求式、</td>
<td>Innovation: Information and Technology</td>
<td>Second-place Award</td>
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<td>阻帶可調型超寬帶天線</td>
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<td>Fu Xiang-yu and Zhang Yage (ME)</td>
<td>Digital electro-microfluidics platform for manipulating liquid marbles and its applications</td>
<td>Innovation: Mathematics and Physics / Mechanics and Control</td>
<td>Second-place Award</td>
</tr>
<tr>
<td>Michael Lam Cheuk-him (BME)</td>
<td>Investigate pulse reading in traditional Chinese medicine using a wearable sensing device prototype and an ultrasound pulse wave imaging technique</td>
<td>Innovation: Life Science</td>
<td>Third-place Award</td>
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Engineering Scholars won two awards at the 46th International Exhibition of Inventions of Geneva

Engineering Scholars won two awards and one prize at the 46th International Exhibition of Inventions of Geneva (IEIG) held from April 11 to 15, 2018.

Professor Ron Hui Shu-yuen of the Department of Electrical and Electronic Engineering was awarded a Gold Medal with Special Recognition by the International Jury of Experts and The Prize of Patent Office of Cooperation Council for the ARAB STATES OF THE GULF – GCCPO with his project “Passive LED Power Driver: A Smart and Environmental-Friendly Street Lighting Technology”.

Another innovation “High Viscosity Mixing Tech – Efficient and Rapid Mixing of Highly Viscous Fluids” conducted by Dr Kong Tiantian, Dr Liu Zhou, Dr Anderson Shum Ho-cheung, Professor Wang Liqiu of the Department of Mechanical Engineering won a Silver Medal.

IEIG is one of the top three events held in Geneva, Switzerland, annually and it is exclusively devoted to inventions and innovations from around the world. The recognitions demonstrated the excellence of inventions and researches by our faculty members.

To congratulate the winners of the 46th Geneva Awards, a Reception for Awardees which was officiated by the Honourable Mrs Carrie Lam, The Chief Executive of the HKSAR, was held at the Central Government Offices in June 2018.

The winning teams showcased their award-winning projects to the guests and media. A full-scale street lighting demo of Professor Hui’s winning passive LED driver technology was setup at the Reception to demonstrate its capabilities and benefits.

The Chief Executive expressed her interest in the winning passive LED drive technology and she was also keen to consider how the Government may employ such technology for the benefit of the Hong Kong public.

Professor Ed X. Wu awarded the 12th Guanghua Engineering Science and Technology Prize by the CAE

Professor Ed X. Wu of the Department of Electrical and Electronic Engineering received the 12th Guanghua Engineering Science and Technology Prize by the Chinese Academy of Engineering (CAE).

The Guanghua Engineering Science and Technology Prize is awarded once every two years and is considered as the highest national honour in the field of engineering and technology. It aims to recognise outstanding Chinese engineers and scientists who have made outstanding achievements and significant contributions to the field of engineering technology and engineering management. Professor Wu was nominated by the Hong Kong Academy of Engineering Sciences. He was another HKU scholar to win this prestigious award after Electrical and Electronic Engineering Honorary Professor Chan Ching-chuen who was awarded in 2016.
Honours and Awards

HKU Engineering received Global Innovation Awards at TechConnect World Innovation Conference & Expo 2018

HKU Engineering won two Global Innovation Awards at the TechConnect World Innovation Conference & Expo (TCWI) 2018 in the United States in May. The two award-winning innovations were "Omniphobic porous membrane and methods for preparing the same" and "Super Steel - A method for the fabrication of a super-strong and ductile multi-phase steel", both by the Department of Mechanical Engineering.

The Innovation Awards identify the top 15% of submitted technologies as ranked by the TechConnect Corporate & Investment Partner Committee. Innovation rankings are based on the potential positive impact the submitted technology will have on a specific industry sector. Over 240 submissions from about 95 organisations including global academic technology transfer offices, early-stage companies, small business innovative research (SBIR) awardees, and government and corporate research laboratories were received this year.

The aim of TCWI is to accelerate the commercialisation of innovations out of the lab for applications in the industry. For over 20 years, the event has been held to connect top applied research and early-stage innovations from universities, labs, and startups with industry end-users and prospectors.

Professor Ron Hui named Fellow of the US National Academy of Inventors

Professor Ron Hui Shu-yuen of the Department of Electrical and Electronic Engineering was named a Fellow of the US National Academy of Inventors (NAI). He was the only Fellow named from a Hong Kong university.

Election to NAI Fellow status is the highest professional distinction accorded to academic inventors who have demonstrated a prolific spirit of innovation in creating or facilitating outstanding inventions that have made a tangible impact on quality of life, economic development and the welfare of society.

The 2018 class of 148 Fellows represent 125 research universities and governmental and non-profit research institutes worldwide and are named inventors on nearly 4,000 issued U.S. patents. They include Nobel Laureates, recipients of the U.S. National Medal of Technology & Innovation and U.S. National Medal of Science, and presidents and senior leaders of research universities and non-profit research institutes.
Dr Anderson Shum named “New Innovators” in IEEE NANOMED 2018

Dr Anderson Shum Ho-cheung of Mechanical Engineering was selected as one of the three New Innovators in IEEE NANOMED 2018 which was held at the Waikiki Beach, Hawaii, USA, from December 2 to 5, 2018.

The IEEE International Conference on Nano / Molecular Medicine and Engineering (IEEE NANOMED) is one of the premier annual events organised by the IEEE Nanotechnology Council to bring together physicians, scientists and engineers in the area of Nano / Molecular Medicine and Engineering. The New Innovators in NANOMED 2018 recognised individuals who have demonstrated exceptional technical advancement and innovation in the field of Nano / Molecular Medicine and Engineering in the early career.

Dr Luo Ruibang named top 10 young Innovators under 35 in Asia Pacific by MIT Technology Review

Dr Luo Ruibang, Assistant Professor of Computer Science, was named as one of the top 10 young Innovators under the age of 35 in Asia Pacific by MIT Technology Review.

Dr Luo and his team used Next-Generation Sequencing and Single Molecule Sequencing technologies and developed algorithms for two fundamental genome sequence analysis problems, ‘genome assembly’ and ‘genome alignment’, shortening the time required for cancer and rare disease diagnosis and pinpointing the problems more accurately for targeted treatment. His research was commercialised in the market in 2016 and have provided the technology to both public and private hospitals in conducting such diagnosis for patients.

Professor Quentin Yue received Science and Technology Award from China Society for Rock Mechanics and Engineering

Professor Quentin Yue Zhong-qi from the Department of Civil Engineering and his team won the second class award of the 9th Science and Technology Award from the China Society for Rock Mechanics and Engineering for the study of the “Science and Technology of the Large-scale Underground Engineering of the Longyou Grottoes in Zhejiang Province” in the category of Natural Science.

Professor Yue’s team included members from the Institute of Geology and Geophysics of the Chinese Academy of Sciences, China University of Geosciences and Longyou Grottoes Institute. The team conducted the research study on “why the large ancient underground rock caverns (Longyou Grottoes) in Longyou City, Zhejiang Province remained intact for thousands of years.”
Honours and Awards

Harvard Medical School and Mechanical Engineering conferred the First Prize Paper Award in the IEEE Transactions on Power Electronics

In collaboration with the Harvard Medical School, a mechanical engineering team led by Dr Kwok Ka-wai was conferred the First Prize Paper Award for 2017 in the IEEE Transactions on Power Electronics.

The paper “Intermediate Range Wireless Power Transfer with Segmented Coil Transmitters for Implantable Heart Pumps” was co-authored by Dr Kwok Ka-Wai and two research postgraduate students Mr Lun Tianle and Ms Guo Ziyan from the Department of Mechanical Engineering and their collaborators Dr Tang Sai-chun (first author) and Dr Nathan J. McDannold from Brigham and Women’s Hospital, Harvard Medical School.

The paper presented a coil segmentation technique that could be implemented on a mid-range wireless transmitting coil for powering implantable heart pumps. This technique successfully reduces the overall required voltage to a safe level on the order of 10V, resulting in hugely-improved safety level compared to similar technologies for powering capsule endoscope which require excitation voltage as high as 3kV.

Two Engineering Scholars elected IEEE Fellow 2019

Professor Yu Yizhou of the Department of Computer Science and Dr Jiang Lijun of the Department of Electrical and Electronic Engineering were elected IEEE Fellows 2019. Professor Yu was awarded for his contributions to geometric and image-based modeling, while Dr Jiang was awarded for his contributions to broadband computational electromagnetic methods.

AI team won “Facebook Low Resource Neural Machine Translation Award”

A team led by Professor Victor Li On-Kwok of the Department of Electrical and Electronic Engineering won the prestigious international award, “The Facebook Low Resource Neural Machine Translation Award”. Team members included Mr Jiatao Gu and Ms Yun Chen, PhD students supervised by Professor Li on AI-driven NLP and Dr Lawrence Cheung, Associate Professor in the Department of Linguistics at the Chinese University of Hong Kong.

This award was open to all universities, and only four awards were granted worldwide. As one of the four global winners, the team will be invited to present their work at the Facebook Headquarters in early 2019, and will take this opportunity to showcase their research strengths in Natural Language Processing.
Honours and Awards

ME team awarded in International Invention Innovation Competition of iCAN 2018

A Mechanical Engineering team, comprised of Professor Dennis Leung Yiu-cheong, Dr. Wang Yi-fei, Ms Kwok Y.H. and Mr. Pan Wending, received a Gold Medal Award, iCAN 2018 Special Inventor Award and IFIA Best Invention Award at the International Invention Innovation Competition of iCAN 2018 with their project titled "A flexible paper-based Al-air battery".

The competition was organised by the Toronto International Society of Innovation & Advanced Skills. It was a representative official event of Canada supported by the Innovation Initiative Co-operative Inc., International Federation of Inventors’ Associations, and World Invention Intellectual Property Associations. A total of 44 countries such as USA, Canada, Mainland, Hong Kong, Taiwan and Korea participated in iCAN 2018 which marked the event's highest record of participating counties in the last three editions.

Dr Jiang Lijun received Technical Achievement Award by the IEEE EMC Society

Dr Jiang Lijun (right) of the Electrical and Electronic Engineering received Technical Achievement Award by the IEEE EMC Society at 2018 Joint IEEE EMC & APEMC Symposium in Singapore. The citation was "for outstanding contributions in electromagnetics and multiphysics modeling methodologies for EMC, signal integrity, and power integrity". The joint IEEE EMC & APEMC Symposium was the largest international symposium organised by IEEE EMC society. It was the largest professional society in electromagnetic compatibility.

Blockchain Funding Award for Dr Cui Heming from Huawei Innovation Research Program (HIRP) FLAGSHIP

Dr Cui Heming of Computer Science received an award of HK$2.18M from the Huawei Innovation Research Program (HIRP) FLAGSHIP 2018 with his proposal "A Blockchain-powered, Trustworthy Internet Layer (System) and its Decentralized and Efficient Applications". This award invoked collaboration opportunities with Huawei, including joint effort on publishing papers in top venues, joint international patent applications, and open-sourcing the blockchain systems developed by Dr Cui’s research group.
Honours and Awards

Engineering scholar received Young Scientist Awards

Dr. Li Ping, Research Assistant Professor of the Department of Electrical and Electronic Engineering, received a couple of Young Scientist Awards in 2018. He first won the 2018 Outstanding Young Research Scientist Award by IEEE APEMC in May for his outstanding contributions to computational electromagnetic algorithms for IC EMC. He was awarded Young Scientist Award at the 2018 International Applied Computational Electromagnetics Society Symposium in July and Young Scientist Award at PIERS 2018 in August.

Dabao project won international architectural awards

The Primary School cum Community Cultural Centre at Dabao Village, the 6th completed project of Project Mingde, won Architizer A+ Popular Choice Award in the “Concepts - Plus-Architecture +Humanitarianism” category, together with two Special Mentions in the categories of “Concepts - Plus-Architecture + Learning” and “Institutional-Primary & High Schools”. It was also named one of the winners in Architectural Design / Other Architecture, Winner in Architectural Design / Educational Buildings in the Architecture MasterPrize™ (AMP) - Architecture Design Award Program.

Dabao village is situated at the remote mountainous area of the northern part of Rongshui County, Guangxi Province. The construction project aims at providing the Yaos with a new primary school and a cultural centre. With the support from Lee Hysan Foundation and PAN Foundation, and a generous donation in the support of the construction costs and the provision of architectural design by Mr. Tong Huang and Ms. Elisabeth Lee, the project commenced in early 2012 and completed by the end of 2015.

The Architizer A+ Award is the largest awards program focused on promoting and celebrating the year’s best architecture and products. The Architecture MasterPrize aims to become one of the most respected architectural awards and set a new benchmark for the architectural and design professions globally. The AMP is dedicated to showcasing and promoting exceptional talent, and the value of the art and science of architecture in enriching our lives.

Al Start-up Fano Labs won prestigious awards

Fano Labs, a spinoff company from the University of Hong Kong and an artificial intelligence startup specializing in speech and natural language processing technologies, has received the Grand Award of the Hong Kong ICT Awards 2018: Smart Business Award, with their project ‘Multilingual Artificial Intelligence Customer Service System’. In addition, it won the top award in the “Business Services - ICT Solutions” category at the 18th Asia Pacific Information and Communication Technology Alliance Awards. The company was co-founded in 2015 by Dr. Miles Wen, a PhD graduate of Electrical and Electronic Engineering and Professor Victor Li On-kwok of Department of EEE.
Welcome home! Civil Engineering Class of 1978

To celebrate the 40th anniversary of their graduation, a group of Class of 1978 alumni of Civil Engineering visited their alma mater on June 22, 2018. After a short meeting with Professor Christopher Chao, the Dean of Engineering, and Professor Francis Au Tat-kwong, Head of Civil Engineering Department, the group visited the Structural Engineering Lab and Environmental Biotechnology Lab to know more about the civil engineering education nowadays.

Homecoming of Electrical and Electronic Engineering Class of 1988

The class of 1998 had their home-coming celebration for their 20th graduation anniversary on October 27, 2018. The alumni, together with their family, came back to their alma mater for a happy re-union. The group visited PC Lab and Chi Wah Learning Commons, saw the demos from the recent final-year project, tried and experienced the new and interesting technology. The memorable event was ended with a dinner at the HKU Convocation Room.
Fond Memories at HKU -
An interview with Professor Paul Cheung

After 38 years of service, Professor Paul Cheung Ying-sheung retired from the University of Hong Kong on July 1, 2018. A special dinner, sponsored by the Pen Makers Workshop which he started after his retirement, was held at Loke Yew Hall on his last day with a theme “Project Candlelight.” We are happy to have a nice chat with Professor Cheung.

Not many people could work in the same place for nearly four decades, how would you summarize your 38-year of experience at HKU? What comes to mind when you look back?

It has been a great blessing for working at HKU for 38 years. HKU gave me many opportunities that I could not have imagined! I joined HKU as a young academic in 1980 and I would never have envisaged I could serve as the Dean of Engineering one day! It was an experience that humbled, educated and shaped me greatly. I always enjoy the academic life here, with the freedom to learn and research into new things, interacting with students and colleagues, handling difficult circumstances and situations with seemingly impossible resources, etc. My service at HKU could be concluded in one word - ‘gratitude’! I am truly grateful to the University, my students and colleagues, for giving me a platform that I have enjoyed and found fulfilling.

What was your greatest challenges and proudest achievements when you served as the Dean of Engineering?

I served as the Dean for two terms from 1994 to 2000 while I was young and inexperienced. Staff is always the most important asset of an organisation, especially in a University. It was a time when HKU was expanding first and I believe “Anything is possible unless proven otherwise”. As Dean, one of the biggest tasks is to manage people. It was very challenging to build more capacity for the Faculty, to attract the best scholars to join and to provide a good environment for our colleagues to work and thrive, etc. I was very proud to get a number of distinguished scholars to join the Faculty. I am happy to see many of my colleagues had good career development and some of them even became our Pro-Vice-Chancellors. Besides, I introduced the strategic planning process in the Faculty which was a rather new idea at that time. I also initiated some new projects like the William Mong Distinguished Lectures and Visiting Professorship, the Faculty-based congregation ceremony and the first self-funded MSc programme in E-commerce and Internet Computing, etc.

What were the most challenging tasks when you served the University as Associate Vice-President (Research) from 2012 to 2015?

I believe setting up SIRI and ZIRI, the two research institutes of HKU in the Mainland, were the most challenging tasks at that time. My Putonghua was rather “putong”, and I did not know the culture in the Mainland well enough. Fortunately, Professor Lap-Chee Tsui, the then Vice-Chancellor, and Professor Paul Tam, the then Pro-Vice-Chancellor (Research), supported me and my team unreservedly. I always emphasise that ‘a world-class university needs to work on world-class problems’. Our most critical problem in research in Hong Kong is that we do not have big enough problems to solve locally and we need to be connected to the academic communities in the Mainland to solve national-level problems. We need to focus on this if HKU wants to stay competitive.
There was a Project Candlelight at Loke Yew Hall on your last day at HKU, what was it and how did it go?

When some alumni knew I was retiring, they wanted to host a celebration party, probably they have waited so long for this to happen! Instead of just having dinner, I proposed to have a sponsored “Project Candlelight”, which was inspired by a very old Cantonese folk song “A Little Candlelight” (一點燭光). It was a fund-raising dinner for three initiatives that I have either started or closely involved in the past decade at HKU: the DreamCatchers (for the mind), the HKU Marathon Team (for the body) and the Faith and Global Engagement Initiative (for the soul). These are the important elements of a whole-person education. We managed to raise over HK$360,000 from the Project Candlelight.

What are your plans after retirement?

I shall continue to serve as Honorary Professors in EEE and in Computer Science Departments. As a co-founder of HKU DreamCatchers, I also serve as Advisor for the iDendron and continue to help with DreamCatchers and its programmes. As a Pen Maker, I started the Pen Makers Workshop, a start-up for teaching others to make hand-crafted pens in order to promote the love and joy of using pen as a writing instrument before we lose the penmanship culture completely.

As a retired professor who witnessed the development of Hong Kong and HKU, can you share your thoughts on future education?

We are living in very challenging times. With the development of technology, change of societal expectations and rapid development in China, enormous changes in education can be expected. I always believe that a world-class university should never be driven by ranking or KPI, it should be driven by its vision. The four years at university is the most formative period for students. Students should not only focus on grades, materialistic values or a high-pay job, but also look for opportunities to create something new. Besides, we must embrace Innovation and Entrepreneurship as it is probably the last window of opportunity in Hong Kong, being late and behind.

Last but not least, I wish to thank all my students, colleagues and friends for walking this journey with me. You have indeed inspired and shaped me! A senior HKU professor in education once shared with me a quote on the purpose of education - “Learning to be, to know, to do and to live together” (Delor, 1996). We must bear this in mind all the time.
Programmes Offered by HKU Engineering

Undergraduate Programmes
- Bachelor of Engineering in Civil Engineering
- Bachelor of Engineering in Computer Science
- Bachelor of Engineering in Computer Engineering
- Bachelor of Engineering in Electrical Engineering
- Bachelor of Engineering in Electronic Engineering
- Bachelor of Engineering in Industrial Engineering and Logistics Management
- Bachelor of Engineering in Mechanical Engineering
- Bachelor of Engineering in Biomedical Engineering
- Bachelor of Engineering in Engineering Science
- Bachelor of Art and Sciences in Financial Technology (Initial intake in 2019-20)

Taught Postgraduate Programmes
- Master of Science in Engineering in Building Services Engineering
- Master of Science in Engineering in Electrical and Electronic Engineering
- Master of Science in Engineering in Energy Engineering
- Master of Science in Engineering in Environmental Engineering
- Master of Science in Engineering in Geotechnical Engineering
- Master of Science in Engineering in Industrial Engineering and Logistics Management
- Master of Science in Engineering in Infrastructure Project Management
- Master of Science in Engineering in Mechanical Engineering
- Master of Science in Engineering in Structural Engineering
- Master of Science in Engineering in Transportation Engineering
- Master of Science in Computer Science
- Master of Science in Electronic Commerce and Internet Computing

Research Postgraduate Programmes
- Doctor of Philosophy (PhD)
- Master of Philosophy (MPhil)

Alumni Contact Update Form

Surname*: 
Given Name*: 
University No.: 
Programme*: 
Year of Graduation*: 
Title: 
Email: 
Mobile: 
Home Address: 
Home Telephone: 
Current Job: 
Office Address: 
Office Telephone: 

*Required field

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