IN FOCUS

SENG 工學院 SCHOOL OF ENGINEERING

25 INNOVATING TODAY IMAGINING TOMORROW 敢・創・未來 HKUST

Innovating Today Imagining Tomorrow

HKUST ENGINEERING
| Fall 2016 |
Newsletter No.28

Dean's Message

Joining the School of Engineering in May, in the last months of the academic year and amid HKUST's 25th Anniversary, I have had to bring myself up to speed fast. However, with the School's great staff and faculty, the transition from the University of California, Santa Barbara, where I worked for the past 23 years, has been rapid and smooth and I have enjoyed every minute of being here.

One reason for such excitement is the momentous time for engineering in which we now live and the fresh horizons opening up for the School. People everywhere are now starting to realize and respect the essential role of engineers in solving the major problems of the future. Climate change and sustainability, smart buildings and mega-city living, energy, healthcare, and many other issues all need to be addressed. It will be engineering researchers and practitioners, from civil to aerospace, computer science to communications, biomedicine to finance and often working across disciplinary boundaries, who will generate those solutions. Engineering will spur economic activity through entrepreneurship and innovation; and impact hugely on how we live our lives. I often refer to this as the "Century of Engineering".

Rise of technology and innovation in Asia

I believe Asia will play an especially important role. The region has recognized the critical role of higher education in science and technology development and made an impressive commitment to expansion in the past 10 years. With Asia's growing talent pool and fast-developing economies, quality engineering jobs will likewise increase. In turn, this will motivate more to study and enter engineering, giving the region an increasingly dominant global role in shaping future innovation.

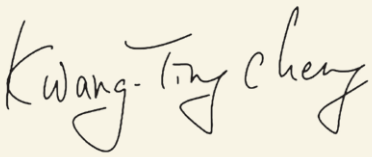
As the world's eyes turn to Asia, this School – already ranked as a top global and regional leader – will be in a key position to draw in and nurture leading minds locally and globally. We have already done very well in terms of international reach and positive feedback about our students and graduates from alumni and industry. But we need to do more to establish engineering as a dynamic and rewarding career for top young minds within Hong Kong.

Elevating engineering

Indeed, I believe we are at a historic moment where the local mindset about engineering could change. The Hong Kong government has been pushing hard to move the city from a service-based to a knowledge-based economy by encouraging Science, Technology, Engineering and Mathematics (STEM) education in schools and promoting innovation, entrepreneurship and technology in society. The "cool" work and investment in hi-tech companies and engineering concepts, and increasingly diverse career paths, are another impetus for change.

The School must grasp this unprecedented time to excel and be fully acknowledged for its excellence. As Dean, I shall be endeavoring to create the conditions, internally and externally, to enable faculty, students and staff to optimize their potential. I will also seek to ensure the community at large recognizes the social value, personal satisfaction, and prestige awaiting those who study at our School.

This will require a continual pipeline of forward-thinking research and education, well-designed and executed management strategies, supportive resources and active promotion, and determination, discipline and drive. Working together with members of the School and University, our alumni, and partners in government and industry, I fully believe we can and will become one of the powerhouses of this "Century of Engineering".



Prof Tim K T Cheng
Dean of Engineering

Research Boost as HKUST Establishes National Engineering Centers

In a key move for research in Hong Kong, HKUST has established two branches of the Chinese National Engineering Research Centers (CNERC).

The Hong Kong Branch of CNERC for Control and Treatment of Heavy Metal Pollution, directed by Prof Guanghao Chen, Chair Professor of Civil and Environmental Engineering, and the Hong Kong Branch of CNERC for Tissue Restoration and Reconstruction, directed by Prof Benzhong Tang, Stephen Kam Chuen Cheong Professor of Science and Chair Professor of Chemistry, are set to play a significant role in future research initiatives and collaborations. Each will receive annual support of up to HK$5 million from the Innovation and Technology Commission.

The approval of the two research centers by the State Ministry of Science and Technology brings the number of national research facilities at HKUST to four. Two Partner State Key Laboratories focused on Advanced Displays & Optoelectronics Technologies and Molecular Neuroscience have already been established, led by Prof Hoi-Sing Kwok, Dr William M W Mong Professor of Nanotechnology and Chair Professor of Electronic and Computer Engineering, and Prof Nancy Ip, The Morningside Professor of Life Science and Chair Professor of Division of Life Science, respectively.

The CNERC on heavy metal pollution will address the increasing national need for a clean water supply, exploring energy-saving sewage treatment, optimization of water systems and cost-effective sustainable alternative water resources. The center will bring together water-related experts, academics and engineers from Hong Kong, Mainland China and overseas to study and develop novel techniques for adoption by industry. Prof Chen and his research team have achieved international renown for their innovative technologies on wastewater treatment in the past 10 years. These include the SANI process, which treats sewage through a method that minimizes sludge production and saves space and cost in treatment, as shown by the large-scale trial at Sha Tin Sewage Treatment Works.

The tissue-based center will explore new luminescent materials and their hi-tech applications in biomedical sensors and chemical probes. The center will also foster collaborative activities between academics, the research community, and industry in and beyond Hong Kong.

Prof Gang Wan, Vice-Chairman of the Chinese People's Political Consultative Conference and Minister of Science and Technology, officiated at the ceremony at HKUST for the establishment of the two branches.

HKUST President Prof Tony F Chan said that the University seeks to boost technological advancement in the region by fostering research cooperation. "The addition of two new national research centers is bound to add momentum to scientific collaboration across the border as well as our pursuit of research excellence."

Big Data Solutions to Boost Bio Intelligence Applications

With the growing need for analysis and useful ways to employ the huge amount of information now available in many different fields, the opening of the HKUST Big Data for Bio Intelligence Laboratory is both a timely and valuable addition to the University's cross-disciplinary research endeavors.

The laboratory, established following a generous donation from industrialist Mr Raymond Chu, will focus on analytic solutions for big data in biology and healthcare, including applications related to biomedicine and sustainable living. It will be co-directed by New Bright Professor of Engineering Prof Qiang Yang, Chair Professor and Head of Computer Science and Engineering, and Prof Yang Wang, Chair Professor and Head of Mathematics, and seek to act as a bridge between academia and practitioners.

Research covered will include "deep learning solutions", which help computers make decisions, and "transductive transfer learning" that allows computer models to be adapted for use in different application domains. Exploration will also encompass genetic farming, looking at how to automate and make the process more user-friendly as well as scaling it to enable the use of very large data sources.

HKUST President Prof Tony F Chan said he was very grateful to Mr Chu for supporting the laboratory and delighted it would assist the University in providing new insights into the rapidly developing big data research area, which aligns with HKUST's strategic direction.

Tiny Lasers Show Way to Light-Based Computing Era

The fabrication of microscopically small lasers directly on silicon by Prof Kei May Lau, Fang Professor of Engineering and Chair Professor of Electronic and Computer Engineering, and her group has given the prospect of light-based computing a major boost. The breakthrough, impossible to achieve for over 30 years, saw the integration of subwavelength cavities onto silicon, enabling high-density on-chip light-emitting elements to be created and demonstrated.

The advance represents an exciting step forward for the semiconductor industry. Prof Lau, who worked in collaboration with scientists from the University of California, Santa Barbara, Sandia National Laboratories and Harvard University, said such lasers could increase microprocessor capabilities and allow the microprocessors to use much less power, moving photonics and electronics integration on a silicon platform closer to reality and potentially providing a key solution for next-generation green information technology. The lasers used measure just one micron in diameter, and are 1,000 times shorter in length and one million times smaller in area than those currently used for commercial applications.

Photonics has long been the most energy-efficient and cost-effective method to transmit large volumes of data over long distances. With the new silicon-based integrated lasers, photonics may be able to be used for short-distance data transmission as well. "These whispering gallery mode lasers are an extremely attractive light source for on-chip optical communications, data processing and chemical sensing applications," Prof Lau said.

The research was published as the cover story in *Applied Physics Letters* and further highlighted by online media.

WeChat-HKUST Joint Laboratory Established

The launch of the WeChat-HKUST Joint Laboratory on Artificial Intelligence Technology (WHAT LAB) has initiated a dynamic collaborative platform for research into artificial intelligence and big data at the University.

WeChat is the hugely successful cross-platform instant messaging service developed by Mainland Internet giant Tencent, with 800 million monthly active users. The joint laboratory will enable researchers at the University to leverage the WeChat social network to develop innovative artificial intelligence applications. Research will include intelligent robotic systems, natural language processing, data mining, speech recognition and understanding.

The move marks a milestone in collaboration between WeChat and higher education, and will seek to boost understanding and advance smart and intelligent living through cutting-edge applications. WHAT LAB is led by New Bright Professor of Engineering Prof Qiang Yang, Chair Professor and Head of Computer Science and Engineering. "WeChat is one of the most important mobile platform companies in the world," Prof Yang said. "The Joint Lab will not only strengthen WeChat's ability to provide services intelligently, but also enable HKUST to become a top player in artificial intelligence research and practice worldwide."

IELM Academic Wins National Research Award

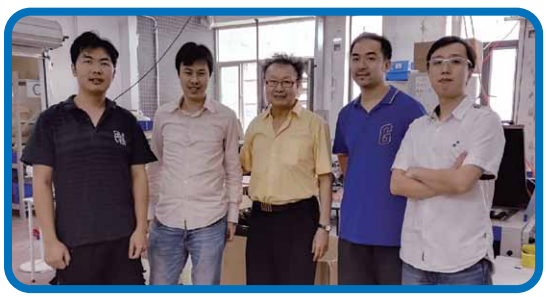
Prof Xiangtong Qi, Industrial Engineering and Logistics Management, received one of China's top research accolades when he was honored with a Natural Science Award (Second Class) in the 2015 Higher Education Outstanding Scientific Research Output Awards (Science and Technology).

The awards, set up by the Ministry of Education, recognize highly significant research projects by individuals or units at tertiary institutions in China. Prof Qi and his collaborators from Nanjing University, Nanjing University of Aeronautics and Astronautics, and Hong Kong Polytechnic University received the honor for the project, "Theory, Method, and Application of Game under Uncertain Environments". The research uses game-theoretic analysis to study how to cope with uncertainty, in particular unexpected disruptive events, in supply chain management. The team has been working collaboratively on the topic for over 10 years.

Prof Qi also received a First Class Award at the 14th China Society of Logistics Best Paper Awards, together with Dr Mingzhu Yu, 2012 PhD in Industrial Engineering and Logistics Management, currently working at Shenzhen University; and an Honorable Mention in the IIE Transactions 2015 Design and Manufacturing Paper Award, with co-authors Dr Liang Lu, 2011 PhD in Industrial Engineering and Logistics Management, now at Amazon, and Prof Zhixin Liu from the University of Michigan-Dearborn.

Cool Shoes Provide Breath of Fresh Air

Now there is a new way to keep your feet cool and dry all day, every day, thanks to the creativity and initiative of Prof Neville Lee, Industrial Engineering and Logistics Management, and alumni Albert Chan, Jacky Chow, and Kevin Lam, all 2006 MPhil in Industrial Engineering and Engineering Management. The quartet has come up with a new air-cooling patented technology that they have gone on to turn into "super air-cooled shoes" (http://kemfert.com).



The technology enables 100 cans of air to circulate in just 10 to 15 minutes of walking, with a bending-actuated pumping system at the bottom of the shoes, providing up to 50 times more air flow by pumping out heat and water vapor. The invention can help alleviate many humidity or heat-related foot ailments, such as sweaty feet and athlete's foot.

The product was first displayed at the InnoCarnival 2015, and has been featured in the media and on social media.

Ms & Mr Young Engineers

Learning at the School of Engineering involves much more than attending lectures. Here, three students recount their testing and fulfilling experiences in hands-on engineering design competitions

Michelle Long Yan Shum

BEng, Mechanical Engineering (2016)
AIAA Design/Build/Fly Competition 2016, Kansas, US

Michelle (second left) at the AIAA Design/Build/Fly Competition with her teammates.

I grew up in Hong Kong and studied at a girls' school, and many people have asked me how I developed my interest in engineering. Here I must acknowledge – and thank – my school science teachers for the very large part they played in making science interesting and building my foundation for future learning. I was further inspired by the Discovery Channel television show, *How It's Made*, which looks at how items in daily life are manufactured and shows why engineering is so fascinating and life-changing.

My major at HKUST was Mechanical Engineering, with a minor in Aeronautical Engineering. Joining the 2016 AIAA Design/Build/Fly Competition, held in the US, formed part of my final year project. This year's contest required teams to design and build two radio-controlled aircraft – a manufacturing support aircraft and production aircraft – that could complete a number of tasks. In our team, I was mainly in charge of building the production aircraft.

In preparing for the competition, we had to build several generations of planes to test different possibilities and maximize performance. Some crashed during test flights. Some were unable to even take off. But through patience and resilience, we coped with such setbacks. After every test flight, we investigated the reasons for failure by revisiting the aircraft's structure and design and reviewing the test flight video to make modifications to the next generation.

Even though the going was tough, we always had the enthusiastic support of supervisor Prof Larry Li, Mechanical and Aerospace Engineering, and our hard work and perseverance paid off. When it came to the actual competition in Wichita, Kansas, we achieved our goal – a place in the top 25 out of 80 teams from all over the world. Such success was not only based on knowledge but our team's persistence and never-say-never spirit.

My AIAA experience showed me the impact of determination and hard work on a project's outcome as well as made me more competent and skillful as an engineer, attributes I am now applying as a field engineer trainee for Schindler Lifts (HK). Our team's joint commitment also built a strong bond among members – the greatest prize of all in joining the competition.

Aaron Chung Faat Yau

BEng, Mechanical Engineering (2016)
Sunstrider Team
New Energy New Generation Solar Car Competition

As a car enthusiast who has dreamed of building a real car, entering HKUST, one of the world's top universities for engineering, had always been my holy grail. During my four years at the University, I accumulated invaluable experiences through participating in both local and international engineering competitions.

In my final year, I was thrilled to hear from Prof Robin Ma, Mechanical and Aerospace Engineering, that the Hong Kong government was organizing its first solar car competition. Not long after learning the good news, I invited several classmates to join me in entering this pioneering competition, organized by the Environment Bureau and the Electrical and Mechanical Services Department. Eventually, we gathered together a group of 10, and named ourselves 'Sunstrider'.

Creating a team was only the first of many challenges we needed to face in the next nine months. Throughout the preparatory stages, there were many differences of opinion among team members in areas ranging from prototype-building to buying solar panels, purchasing motors to where to put the solar panels. However, as I learned from the competition, one of the best ways to solve such problems is to articulate the reason and ultimate aim behind every opinion or action you contribute to your team. In other words, you constantly have to make sure you understand and are understood by your teammates. After all, we all had the same goal – to draw the world's attention to an eye-popping solar car built by HKUST engineering students.

Along the way, the team engaged in various tests and manufacturing, including solar panel absorbance and conversion testing, aerodynamics simulations, stress testing, carbon fiber manufacturing, battery loading testing, solar tracking testing, and more. And thanks to solid support from our professors and the Department of Mechanical and Aerospace Engineering, we managed to build the most efficient solar car in terms of energy in the contest and win the Energy Efficient Design Award.

The solar car competition was a life-changing event for me. Not only did I benefit from the hands-on experience of building a real car, but it also acted as a catalyst for my future career development. Ahead of graduation, I received an offer from Honda Motor Co Ltd to work as an engineer in Japan. I strongly recommend all students to participate in competitions during your years at HKUST. The experience is sure to be unforgettable.

Aaron (right of solar car, kneeling) and Sunstrider team members, together with Mechanical and Aerospace Engineering faculty and staff.

Tianbo Liu

MPhil, Electronic and Computer Engineering (2017)
International Aerial Robotics Competition 2015 – Asia/Pacific

I entered the School of Engineering as a postgraduate in September 2015 after taking my undergraduate studies in Automation at Harbin Institute of Technology. I was keen to study at HKUST, given the high quality of its engineering research, and to experience the unique East-West culture of Hong Kong.

The focus of my research is estimation and control of aerial robots, which I hope can eventually be applied to industry. In line with these practical aspirations, soon after joining HKUST, I became a member of the University team taking part in the International Aerial Robotics Competition (IARC). This took place at Beihang University in Beijing. It was the first engineering competition I participated in as a postgraduate and we won the first prize!

The annual IARC aims to boost technological creativity by setting challenges related to aerial robotics design and providing a platform for aviation enthusiasts to share their knowledge. The task set for IARC 2015 was to develop totally autonomous flying robots – the first time that interaction between ground and flying robots had been included in an IARC challenge. The contest required a single autonomous aerial robot to herd as many autonomous ground robots as possible across a boundary in 10 minutes.

I was responsible for the overall system integration of our flying robot. The first step was to design and refine all the control algorithms. After that, I had to integrate different modules into the system and undertake the debugging. This was the most difficult part of the preparations. Even if all the modules worked well independently, problems continuously appeared during system integration. We all had to think hard about the causes and solutions. This forced every team member to learn more peripheral knowledge rather than focusing on our own specialties, which was a very fruitful process.

The competition was a wonderful experience, not just because we won an award but because we were able to exchange ideas with fellow competitors who share similar interests. This strengthened my passion for aerial robotics and helped me to appreciate other teams' work.

Tianbo (second left) and his team prepare for action at the International Aerial Robotics Competition.

We ♥ Computer

Four recent international graduates, all now working for investment banks in Hong Kong, reflect on how their School of Engineering education equipped them for future success

Dhruv Batra

BEng, Computer Science (2016)
Application Developer, Morgan Stanley

I wanted to join a university where I could learn from the best researchers in their respective fields and also study alongside the brightest students in Asia. HKUST's reputation, high research output, and the flexibility offered by the School of Engineering's programs convinced me to pursue my bachelor degree at HKUST.

Since childhood, I have been passionate about fixing broken things. However, it wasn't until my final years in high school, when I studied computer science, that I was convinced about pursuing engineering at university. I was amazed by the ways in which computer science had already changed our lives and fascinated by its future potential. After creating my first major piece of software (a Sudoku game), I was confident that I wanted to study engineering.

One of my most learning-intensive experiences at HKUST was my year-long membership of the Robotics Team. During this time, I had the privilege of representing HKUST at ABU Robocon, Asia's biggest robotics competition. Robotics helped me diversify my knowledge base and learn about other branches of engineering, such as mechanical engineering and electronic and computer engineering.

I learned how the various fields of engineering come together to create an integrated functioning robot – just as you would in a real industrial engineering project. I also discovered what it was like to work in a team with members from different academic and cultural backgrounds.

I advise prospective and current students to explore as much as you can before you pick a major. Such exploration will help in finding out what interests you. The best way to do this is through internships, workshops, work experience, and networking. Try to ask as many questions as you can and in the process understand where you would like to see yourself five to 10 years down the line.

Vibhor Khurana

BEng, Computer Science (2016)
Technology Analyst, Goldman Sachs

An interest in solving logical and analytical problems was my main reason for pursuing Computer Science and Engineering and a minor in Mathematics. As HKUST is one of the finest universities, with top professors from around the world and highly advanced research developments, the University provided a great academic platform. The culturally diverse environment and variety of learning opportunities, such as the International Exchange Program and Undergraduate Research Opportunities Program, also helped my overall character development.

During my four-year bachelor degree, I tried to make the most of every possible opportunity, including but not limited to going on an exchange semester to the University of Toronto, co-founding the HKUST South Asian Students' Society, becoming a peer mentor for the School of Engineering and International Students Association, joining the Robotics Smart Car team and HKUST programming team, playing in the Computer Science and Engineering Department badminton team, and active participation in various community service projects co-organized by HKUST Connect and external organizations.

Along with leadership and communication skills gained through these activities and strong technical skills achieved through advanced computer science courses, HKUST helped me secure an internship at Goldman Sachs, one of the world's leading investment banks. Working as a Summer Technology Analyst gave me deep insight into the practical, day-to-day work at the company and utilized technical skills gained at the University. I also received a job offer at the end of my internship and have now started work there!

Science

Sunena Kharbanda

BEng, Computer Science (2016)
Technology Analyst, Goldman Sachs

I felt honored to be admitted to HKUST where I have pursued Computer Science and Engineering, together with Business and Social Science minors. The School of Engineering has helped me gain maturity, knowledge, and broadened my horizons through delivering a range of experiences that can be used to tackle the challenges in life. The multicultural environment that complemented the undergraduate education assisted my overall character development and provided a competitive advantage with regard to career opportunities. The University has also been supportive in financial assistance.

Apart from the wonderful academic programs, I have had numerous out-of-class learning opportunities that I will cherish throughout my life. I joined a student exchange to the University of British Columbia in Canada, which allowed me to find out about an entirely different culture and meet people from many countries. I believe this exchange semester provided a once-in-a-lifetime adventure, one that is not to be missed. I found it life-changing, enhancing my inner self and character.

I also completed two internships during my four years at the School of Engineering, working as a Summer Technology Analyst at British Telecommunications (BT) and Goldman Sachs. These were really challenging experiences but taught me about practical work issues, communication skills and leadership and helped complete my university education by providing insight into future careers.

I am really proud to have joined HKUST, fulfilling my dream of studying at a world-class university for my undergraduate degree. The journey has been inspiring, challenging, exciting and rewarding and has prepared me to be courageous in facing the ups and downs in life.

Adarsh Saraff

BEng, Computer Science (2016)
Technology Analyst, Deutsche Bank

The word "engineering" has always fascinated me and I have had a keen interest in what makes devices work – from simple telephones to sophisticated aircraft – since an early age. I often used to spend time researching robotics and other technologies and wondering about the how and why of things. It thus seemed natural and necessary to pursue my interest by studying Computer Science and Engineering.

Why HKUST? The University is highly ranked globally and has the infrastructure to deliver a world-class education, providing experiential learning and a holistic education as well as numerous student societies and clubs. As HKUST is located in Hong Kong and the city is a global financial center, there are tremendous career opportunities here. It was also a top choice for me due to its relative proximity to India.

I feel that pursuing my undergraduate education at the School of Engineering has been one of the best decisions of my life as it fostered my all-round development in so many different ways. The final year project played an integral role in this. You start from scratch, knowing barely anything. Yet by the end of the year, the project is ready and you have gained a great deal of skills – both technical and social – by working as part of a team (See also "What's More..."). My semester abroad at the University of Wisconsin-Madison in the US was another very good experience, enabling me to explore a different culture and make new friends.

When it was time for job-hunting, the University's Career Center proved a great resource, organizing many workshops and company visits. I am happy to have found a job at Deutsche Bank where I can leverage what I learned at HKUST. I aim to work in my current role to the best of my potential and have no plans to move out of Hong Kong at the moment.

What's More...

- Dhruv, Sunena and Vibhor served as Engineering Student Ambassadors in 2014-15.
- All four students worked as a team for their final year project, an innovative undertaking far removed from the investment banking careers they ended up securing. The team walked and taped hiking trails in Hong Kong using a 360-degree camera in order to create an interactive website for walkers (used for assessment only and not publicly available). The project is one illustration of the creative mindset encouraged and developed at the School of Engineering and how being able to think out-of-the-box is appreciated by leading employers.

Three More SENG Faculty Receive
Named Professorships

Three leading faculty members of the School of Engineering were recognized with prestigious named professorships at HKUST's third inauguration ceremony for such honors in March 2016.

The School's latest awardees were Prof Guillermo Gallego, Chair Professor and Head of Industrial Engineering and Logistics Management (IELM), who became Crown Worldwide Professor of Engineering; Prof Kei May Lau, Chair Professor of Electronic and Computer Engineering, who was named Fang Professor of Engineering; and Prof Qian Zhang, Chair Professor of Computer Science and Engineering, who became Tencent Professor of Engineering. The trio were among a group of eight academics across the University to receive named professorships.

All named professors excel in their respective fields and their outstanding capabilities in teaching and research set an inspiring example to students and assist the University in retaining and extending its world-class standing.

Prof Gallego joined HKUST in January 2016 and as Head of IELM is seeking to bring additional flexibility to the undergraduate program and to foster collaboration with companies in Hong Kong, Mainland China and other areas of Asia. He is an INFORMS Fellow, a Manufacturing and Service Operations Management Society Fellow, and has received many awards, including the INFORMS Revenue Management Section Prize, the Revenue Management Historical Prize, the Revenue Management Practice Prize, and the INFORMS Impact Prize.

Prof Lau is a global expert in semiconductor devices, including LEDs, transistors and lasers. She largely focuses on experimental research, in particular novel materials and nanostructures for device and system integration. Collaborating with groups at University of California, Santa Barbara and Harvard University, her team recently had a major global breakthrough by achieving microscopically small lasers directly on silicon (see also P4). Prof Lau is an IEEE Fellow. Among other recognitions, she is a recipient of the US National Science Foundation Faculty Awards for Women Scientists and Engineers and Hong Kong Croucher Senior Research Fellowship.

Prof Zhang initially specialized in cognitive radio networks at HKUST, making significant contributions to mobility and spectrum management of wireless networks and mobile communications. She is now moving out of "crowded" cognitive networks research and building a remote digital healthcare monitoring program. She is an IEEE Fellow and has received a MIT TR100 world's top young innovator award. Prof Zhang is also Founder and Co-Director of the Huawei-HKUST Innovation Lab and inventor of about 30 international patents.

The three appointments were made possible by the generosity of community and corporate supporters of HKUST, namely: Crown Worldwide Group, Fang Brothers Group, and Tencent Charity Foundation Limited.

The most recent awards bring the total number of named professors in the School of Engineering to eight. The other five are: Dr William M W Mong Professor of Nanotechnology Prof Hoi-Sing Kwok, Electronic and Computer Engineering; Cheong Ying Chan Professor of Engineering Prof Chung-Yee Lee, Industrial Engineering and Logistics Management; New Bright Professor of Engineering Prof Qiang Yang, Head of Computer Science and Engineering; Swire Professor of Aerospace Engineering Prof Xin Zhang, Mechanical and Aerospace Engineering; and Hari Harilela Associate Professor of Electronic and Computer Engineering Prof Matthew McKay.

ECE Academic Awarded

National Engineering Honor

Prof Patrick Yue, Electronic and Computer Engineering (ECE), has been awarded a Guanghua Engineering Science and Technology Prize by the Chinese Academy of Engineering in Beijing, becoming one of the first Hong Kong scholars to receive such an honor.

The biennial national prizes recognize outstanding performance and achievements by Chinese engineers and scientists in engineering technology and engineering management. They were established in 1996 and extended to include candidates from Hong Kong, Macau and Taiwan for the first time this year. A total of 34 recipients received an award in one of the three categories of Achievement, Engineering, or Youth. Two from Hong Kong were honored, including Prof Yue who received a Youth Award.

Prof Yue, who came on board at HKUST in 2010, is an expert in high-speed wireless and optical communication integrated circuit (IC) design, contributing to over 120 technical papers, including one of the most cited papers to date in the *IEEE Journal of Solid-State Circuits*. He also holds 14 US patents and has been a start-up high achiever, co-founding Atheros Communications in 1998. The company went public on NASDAQ and was later acquired by Qualcomm Inc. In 2002, he joined Aeluros, another new Silicon Valley enterprise, to develop 10-Gb/s CMOS serial link ICs for optoelectronic modules.

Along with his professorial appointment in the School of Engineering, Prof Yue is the Founding Director of the School's Center for Industry Engagement and Internship and Director of the HKUST-Qualcomm Joint Innovation and Research Laboratory. He also served as HKUST's first Associate Provost for Knowledge Transfer between 2014 and 2015. Prof Yue is an IEEE Fellow and a Senior Member of Optical Society of America. Prior to joining HKUST, he has served at Stanford University, Carnegie Mellon University and the University of California, Santa Barbara.

Faculty Honors, Awards & Achievements

Prof Guanghao Chen, Chair Professor of Civil and Environmental Engineering, has been elected a Distinguished Fellow of the International Water Association (IWA), becoming one of only 30 honored with this prestigious accolade out of 10,000 IWA members and the first from Hong Kong. The recognition is given to IWA Fellows or other professionals for their uniquely significant contributions over the long term to water science and management advances. Prof Chen is a global specialist in sustainable sewage treatment systems, sludge minimization, and waste water technologies. He has been an IWA Fellow since 2011.

Prof Guohua Chen, Head of Chemical and Biomolecular Engineering, has been elected a Fellow of the American Institute of Chemical Engineers (AIChE), the organization's highest grade of membership. Prof Chen is a world-renowned expert in electrochemical technologies for environmental and energy applications, and solid drying. He has published over 240 journal papers, and holds three US patents and six Chinese patents. He is the President of the Asian Pacific Confederation of Chemical Engineering, editor of *Separation and Purification Technology*, and serves on the editorial boards of other eminent journals. AIChE is the world's leading organization for chemical engineering professionals, with more than 50,000 members from over 100 countries.

Prof Huamin Qu, Computer Science and Engineering, was recognized with the Merit Award in the e-learning category of the Asia Pacific ICT Alliance (APICTA) Awards 2015 for his work on visual analysis of Massive Open Online Courses (VisMOOC). His system is the first visual analytic tool to offer user-friendly analysis of e-learning behavior for MOOCs, enabling instructors to better assess video materials and improve teaching quality.

SENG Awards Celebrate Faculty Research Excellence

Three faculty members at different stages of their careers have been honored in the latest SENG Research Excellence Awards, the School of Engineering's prestigious accolades that highlight the world-class accomplishments of its faculty members.

New Bright Professor of Engineering Prof Qiang Yang, Chair Professor and Head of the Department of Computer Science and Engineering, received the Distinguished Research Excellence Award, presented to an established academic with exceptional research achievements and substantial international and local impact and the highest honor awarded. Prof Yang is a world-leading authority on transfer learning, a significant area of research related to machine learning, data mining and big data. Transfer learning is the ability of a system to recognize and apply knowledge and skills learned in previous tasks to novel tasks (or new domains). While this is straightforward for humans, it is very difficult for a machine. Significant publications have included a 2007 International Conference on Machine Learning paper, written together with his students and proposing the TrAdaboost system; and "A Survey on Transfer Learning". Prof Yang is a Fellow of the Institute of Electrical and Electronics Engineers (IEEE) and Association for the Advancement of Artificial Intelligence, among other eminent bodies, and has a Google Scholar citation record of 30,000.

This year's winner of the Research Excellence Award was Prof Daniel P Palomar, Electronic and Computer Engineering. The award recognizes an outstanding faculty member with a proven record of research excellence. Prof Palomar is a specialist in optimization. He solved a long-standing open problem through the pioneering use of majorization theory, gaining numerous awards for this 2003 paper. He has subsequently worked on distributed optimization methods for big data systems, receiving the 2015 Young Author Best Paper Award from the IEEE Signal Processing Society. He has published three books, over 70 journal papers, has attained around 9,000 citations, and is an IEEE Fellow. Prof Palomar is now applying his insights to financial engineering.

Prof Zhiyong Fan, Electronic and Computer Engineering, collected the Young Investigator Award, which highlights a rising star on the School's faculty team. Prof Fan's expertise lies in solar energy and nanotechnology innovation, providing valuable steps forward in the challenging quest for sustainable development. Using three-dimensional nanostructures, he has created a series of technologies to harvest sunlight more efficiently and significantly improve solar cell performance. A further technology that has attracted industry interest offers a potential self-cleaning capability for solar panels. Prof Fan has published over 60 peer-reviewed papers since joining HKUST in 2010 and in total has published over 100 journal articles with 9,000 Google Scholar citations, a remarkable achievement for a young academic.

Nominees undergo rigorous review by the Engineering Research Award Selection Committee, comprising senior faculty members. Criteria include originality, academic and social impact, provision for training research students and leadership in collaborative partnerships.

Top Educators Recognized

In the School of Engineering Teaching Excellence Appreciation Awards 2014-15, two faculty members received accolades for their contribution to undergraduate education.

The Distinguished Teaching Award was presented to Prof Marshal Liu, Chemical and Biomolecular Engineering, a versatile teacher who seeks to enable those in his classes to maximize their individual potential. Outside class, Prof Liu strives to build close bonds between students, alumni, and employers through industrial talks, plant visits, and internships. The Teaching Award went to Prof Francesco Ciucci, Mechanical & Aerospace Engineering and Chemical & Biomolecular Engineering. Prof Ciucci has been keenly involved in student mentorship and education development at the School, initiating a highly popular University Common Core course on energy systems in a sustainable world.

The School views recognition of the work of outstanding educators as an important way to keep advancing students' learning and encourage faculty to innovate and move forward in their teaching.

PhD Award-Winners Lead Way to the Future

The School of Engineering PhD Research Excellence Awards ceremony took place in March with two innovative recent graduates receiving honors for their significant contributions to their field during PhD studies at HKUST.

Dr Langston Wai Leung Suen, 2016 Chemical and Biomolecular Engineering, was selected for the award for his research into ultrasound technology focused on ocular drug delivery. Such technology will enable drugs to be delivered without pain to the eye, providing an exciting new method that avoids the invasive injection treatment currently used to treat retinal diseases. Dr Suen has published four papers in top journals and been granted one US patent. He also founded Sonikure Technology Ltd in 2014 to commercialize his work, becoming a Kairos Society Top 50 Global Startup in 2015 and had his work accepted as a "moonshot" (a radical solution to a global problem affecting millions of lives involving breakthrough technology) in Google's Solve for X project.

Dr Edwin Chi Yan Tso, 2015 Mechanical Engineering, focused on nanofluids, heat transfer and adsorption cooling systems, undertaking research and technology development that can assist in energy-efficient strategies for smart green buildings. During his PhD research, he developed a mathematical model for estimating the cooling performance of adsorption cooling systems and built a prototype model utilizing a novel composite adsorbent and high-performance adsorbate (nanofluids). He has published eight articles in leading journals, has been cited over 80 times in the past five years, and had five patents accepted, in the US (one), Mainland China (three) and Hong Kong (one). Edwin became a Research Assistant Professor at HKUST in September 2016.

Summing Up a Thesis in 180 Seconds!

PhD student Liwen Jing, Electronic and Computer Engineering, became the winner of the annual SENG Three Minute Thesis Competition (3MT®), which challenges research students to succinctly sum up their research and ideas for a non-academic audience. Second and third places went to doctoral students Feng Ni and Daniel Villaroman, both Mechanical and Aerospace Engineering. The People's Choice Award was won by Syed Mohsin Abbas, PhD student of Electronic and Computer Engineering. Eight students were selected to compete in the final round. The concept for the competition originated at the University of Queensland and was organized at SENG by the Center for Engineering Education Innovation (E²I).

Postgraduate Joint Degrees Widen Horizons

It has been a productive year for postgraduate dual-degree partnerships at the School of Engineering (SENG), with three programs at top international institutions added to the growing list of collaborations arranged with leading global universities. Dual-degree programs enable SENG postgraduates to broaden their academic and personal horizons and networks through studying overseas; and provide valuable recognition of their studies through the awarding of dual degrees from both HKUST and their host institution. Such programs also add to SENG's diversity, with students from partner institutions studying at HKUST.

A dual doctoral program in engineering has been established with the University of Waterloo in Canada that enables students to simultaneously earn a PhD from each institution. Since January 2016, selected students have had the opportunity to receive engineering doctoral supervision from both universities and spend around equal time at each campus. Students must meet the requirements of both institutions but only need to prepare one thesis and one thesis defense.

On successful graduation, candidates will receive a degree from each institution showing it was carried out *in cotutelle*, a French term indicating the PhD program was offered jointly. In the summer, a memorandum of understanding was agreed between HKUST and the University of Waterloo, expanding the arrangement of the dual-degree PhD program in engineering to cover other disciplines.

In March 2016, CentraleSupélec in France signed a cooperative agreement with HKUST that allows students to earn a master's level dual degree in engineering from each institution. The program got underway this Fall. CentraleSupélec is a leading French science and technology institution and a founding member of the Université Paris-Saclay. CentraleSupélec was formed by the 2015 merger of two of France's prestigious grandes écoles, École Centrale Paris and Supélec, and has 4,700 students of which 3,500 are engineer-students and 32% are international students. The dual-degree agreement enables students nominated by CentraleSupélec and HKUST to study at each other's campus.

Also in March 2016, the School and Politecnico di Milano in Italy established an academic collaboration under which students from both universities can earn a dual degree in engineering at master's level. Politecnico di Milano is Italy's largest science and technology university, with a student population of more than 41,000. The highly ranked institution trains engineers, architects and industrial designers, placing emphasis on quality and innovation in teaching and research.

The three latest programs bring the School's total number of postgraduate joint degrees with leading global institutions to six. Other dual-degree university partners are based in Korea, Mainland China and Iran.

Disney Grant Inspires Student

School of Engineering students unveiled their first inventions created under the Disney-HKUST Grant for Technology and Well-being in May 2016. The community-oriented program was launched in October 2015 to encourage students to develop innovations that could improve the lives of those with physical disabilities, support local productivity or promote health and wellness in affordable ways. The three projects highlighted included a real-time sign language translation device, a gaze and mind-controlled robot car, and an unmanned "crop doctor" airship, all inspired by aspects of the *Star Wars* film series.

Avalanche of Funding Support

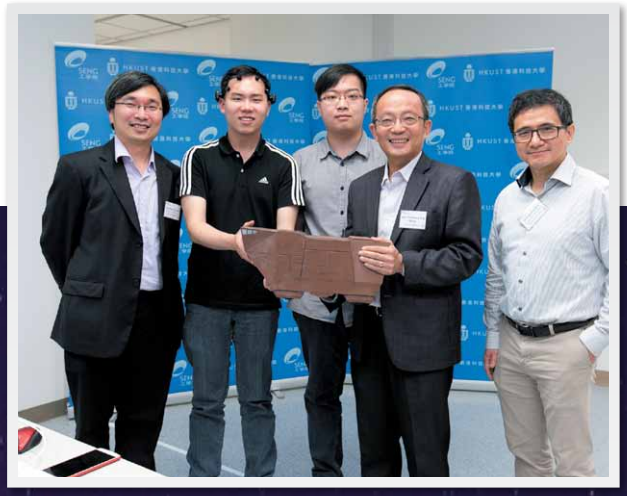
for Landslide Mitigation Research

A major School of Engineering landslide mitigation project that won support from the Hong Kong Research Grants Council's Theme-based Research Scheme in 2015-16 has had another boost, receiving additional funding from the Institute of Mountain Hazards and Environment under the Chinese Academy of Sciences and two private donors.

The Institute has provided matching funds of RMB13 million and Mr Ringo Yu, Managing Director of Fraser Construction Company and former Geotechnical Division Chairman of the Hong Kong Institution of Engineers, has given matching funds of HK$1 million. Ir Ting Kam Cheung, Projects Director of Geotech Engineering Limited, has pledged HK$1.9 million over five years.

The cutting-edge research to mitigate risks and damage of landslides in Hong Kong is led by principal investigator Prof Charles W W Ng, Associate Vice-President (Research and Graduate Studies) and Chair Professor of Civil and Environmental Engineering. The multidisciplinary team of researchers from a number of universities and institutions will develop a world-leading in-situ testing facility to investigate the interaction mechanisms between debris and multiple barriers, to simulate debris flows using HKUST's state-of-the-art geotechnical centrifuge, and novel multi-scale multi-physics numerical and reliability-based debris flow vulnerability models to develop a multi-hazard framework for establishing reliability-based world-class design guidelines for multiple flexible barrier systems.

It is expected the research will enhance cost-effectiveness and make slope maintenance and remediation more eco-friendly, impacting both local and international practice. The new funding will be used to build a 120-meter debris multiple-barrier interaction testing facility for the project.



Creativity on Behalf of the Community

A spokesperson from The Walt Disney Company Hong Kong said that the company was "incredibly impressed by the level of creativity and hard work that the young engineer teams have put into their projects". Prof Tim Kwang Ting Cheng, Dean of Engineering, said he was highly appreciative of the Disney grant, which helped to diversify students' learning and enabled them to contribute to society. The total grant was US$75,000 (HK$580,000).

MSc Degrees to Boost

Big Data and Aeronautical Industry Talents

To address evolving workforce needs as the local and regional economy advances and adjusts to changes in the business environment, the School has developed three pioneering Master of Science programs, which commenced in Fall 2016.

As the amount of digital information burgeons, understanding and techniques for handling different aspects of big data are becoming increasingly important across a wide range of sectors. The MSc in Big Data Technology marks the first degree program of its kind to be launched in Hong Kong. Organized jointly by the Department of Computer Science and Engineering and Department of Mathematics, the program focuses on access, integration, computing and visualization solutions for big data applications. The degree program explores infrastructure, storage, modeling and management, analytic and mining systems, security, policy and social implications and is offered in full-time (one year) and part-time (two years) modes.

In addition, the MSc in International Air Transport Operations Management and MSc in Aeronautical Engineering are set to boost the pool of aeronautical engineering professionals available for the booming local air transportation industry. The programs are run by the Department of Mechanical and Aerospace Engineering in partnership with École Nationale de l'Aviation Civile (ENAC), France's only aviation-oriented university and Europe's largest aeronautical university.

The International Air Transport Operations Management program combines technical, economic and managerial skills specifically related to air transport, enabling students to gain international perspectives through teaching and internship activities as well as exposure to core aspects of the industry and how they are integrated into on-going technology development. Students on this two-year full-time program study in both Hong Kong and France and graduates will receive a joint institutional degree certificate from ENAC and HKUST while a separate certificate will also be issued by ENAC, indicating that the program is recognized and accredited by the French Ministry of Higher Education. Courses for the Aeronautical Engineering degree include aerodynamics, propulsion, and aircraft design. Full-time and part-time modes are available.

Further details at *https://www.sengpp.ust.hk/programs/list/en/index.html*

First-Hand Learning About Logistics

Department of Industrial Engineering and Logistics Management (IELM) students studying on the Logistics and Freight Transportation Operations course were able to deepen their understanding and links with industry through a series of insightful guest lectures and company visits in Spring 2016.

Talks arranged by course instructor Prof Chung-Yee Lee, Cheong Ying Chan Professor of Engineering and IELM Chair Professor, included an introduction to container shipping and logistics by OOCL CEO Mr Andy Tung and the key to success in logistics management by DHL Global Forwarding Asia Pacific CEO Dr Kelvin Leung. On-site tours took place at Hongkong International Terminals (HIT) and Hong Kong Air Cargo Terminals Limited (HACTL).

Alumni Brothers Contribute **HK$2 Million to Establish Emergency Fund**

Alumni brothers and entrepreneurs Terry Tsang, 2004 BEng in Civil and Structural Engineering and 2006 MPhil in Civil Engineering, and Terence Tsang, 2006 BEng in Computer Science (Information Engineering), have donated HK$2 million to establish a Student Emergency Fund. The generous gift will provide financial assistance for HKUST students facing unforeseen financial emergencies that could disrupt their studies.

The two brothers know at first hand how unexpected personal tragedy can impose financial difficulties. Their father, the sole breadwinner of the family, passed away while they were studying at HKUST. Despite immediate financial hardship, they were able to continue their university education through the assistance of the Student Affairs Office emergency fund, and have been keen to support other students in need since finding success in the business world. Terry is the Co-Founder and CEO of mobile game developer Madhead while Terence is Co-Founder and Chief Technology Officer of the same company.

The contribution, made to the HKUST Alumni Endowment Fund, brings the brothers' accumulated donations to HK$3 million.

Green Way to Utilize Coal

Twenty Chemical and Biomolecular Engineering (CBME) undergraduates, led by Prof Marshal Liu, undertook an eye-opening two-week summer internship in June-July 2016 at a Towngas-owned coal liquefaction plant in Inner Mongolia. Coal liquefaction entails the conversion of coal to liquid chemicals (methanol) or hydrocarbons (gasoline), a relatively clean and green process that has drawn great attention, especially in China.

The placement enabled participants to gain in-depth understanding of the production process and major facilities involved, receiving positive feedback from both students and senior management at the plant. Students also had the opportunity to see the local sights and learn more about the culture and history of Inner Mongolia.

Given the internship's valuable outcomes, Towngas and the CBME Department have agreed to continue organizing the program.

Xiaomi President Shares Entrepreneurial Vision

The Dual Degree Program in Technology and Management Executive Forum, held in March 2016, was delighted to welcome Mr Bin Lin, Co-Founder and President of Xiaomi Corporation as its guest speaker. Over 100 students listened to Mr Lin's remarkable entrepreneurial story that saw him rise from Microsoft software engineer to leader of his own multibillion-dollar hi-tech company.

Since Mr Lin founded Xiaomi in 2010 together with angel investor Mr Jun Lei, the company has taken the world by storm through its innovative low-cost, high-spec approach to smartphone technology and consumer electronics. In keeping with his dynamic outlook, Mr Lin came out on stage on a Ninebot Segway!

The Executive Forum series is an enrichment activity held exclusively for students of the Dual Degree Program in Technology and Management to enable them to learn from business leaders and entrepreneurs and hear first-hand accounts of the impact of successfully combining technology and management in the marketplace.

The Multidisciplinary Road

Prof Tim Kwang Ting Cheng became Dean of Engineering in May 2016. Here, he sets out his vision for developing the School's world-leading contributions

How will you seek to ensure and advance the School of Engineering's standing?

I think the School and University have done an amazing job in the past 25 years to achieve what has been accomplished. I really admire that and it is one of the reasons I wanted to join HKUST. Now I feel the School needs to build out from the "ad hoc" dynamic mode of a start-up and seek long-term sustainability and stability. I see it as evolution rather than revolution as we are doing well. One of the key elements is to remove boundaries between departments and even Schools. I am a strong believer in the 1-HKUST spirit.

Why do you see a one-university mindset as important?

I learned the value of such an approach at the University of California, Santa Barbara, where I previously worked. Santa Barbara is renowned for its multidisciplinary research. At HKUST, the School of Engineering is showing strong leadership and participation in institutes which draw together multiple departments and fields – big data, robotics, energy. We need to continue to advance this kind of culture as the nature of the problems we face as a society will demand solutions across disciplinary boundaries.

It may need determination and encouragement to first get involved in such research. However, I can confidently tell my faculty that I have done this, benefited from it, and enjoyed it, and I hope everybody can do the same. A well-designed infrastructure for executing multidisciplinary research will be one of the most important elements for a top-tier university in the next 10 years.

What are the main challenges facing the School?

HKUST is a small-sized, compact university compared with many other leading institutions globally. At the School of Engineering, we need to have our goals clearly defined and to work strategically to utilize our resources efficiently. In one word, our goal must be excellence. Anything we do or invest in has to be done with the confidence that in a few years we will become stronger or have become the best in that area. We need to exercise the discipline to cut some of the nice-to-have activities and invest in those we must have.

A well-designed infrastructure for executing multidisciplinary research will be one of the most important elements for a top-tier university in the next 10 years.

Even though I am an engineer and love numbers, this does not mean bean-counting but evaluation at a deeper level of analysis. Excellence can be seen, can be felt, but it cannot necessarily be quantified in numbers. For example, we want our students to succeed in society. While short-term goals such as starting salary are important, true success will be graduates who 10 or 20 years later have become world leaders in some way and the best in their profession.

to Excellence

How will you seek to build the faculty team?

Academics are the key to all institutional excellence in education and research. Thus, I place high priority on recruitment, retention and development. An outstanding faculty team will in turn inspire other top academics to join the School and can attract the best students. Developing and maintaining a highly intellectual environment is crucial for recruitment and retention of talents. Marketing the School, advocating the impact of faculty research and education results, and developing resources are all part of such development. Partnerships with other top-tier global institutions will also be important to broaden reach and resources and fire up creativity.

How do you view the relationship between fundamental and applied research in today's innovation-focused world?

A strong engineering school must maintain a portfolio of long-term fundamental research, preserve its core scientific strengths and support curiosity-driven projects. These are crucial elements and without them the pipeline for scientific discoveries and translating them into engineering capabilities will essentially be broken. Thus, engineering research cannot simply be driven by societal challenges and applications. The balance between applied and fundamental research must be maintained.

What are your goals in education?

The quality of an institution's primary product – students – defines the institution. Our postgraduate recruitment is worldwide and, given the School and University's global reputation for research, is doing really well. Undergraduates are mainly local, in line with HKUST's mission to assist Hong Kong's development, and we need to work harder with sister institutions and the government to alter the cultural climate in the city and move engineering, technology, and innovation from second and third choice to the frontline for young people and their families.

In addition, the School's serious commitment to teaching innovation, such as e-learning, blended learning and hands-on education, must continue to help our students acquire the skills that will enable them to prosper over the long term. Given the accelerated pace of technology advances and shrinking lifecycle of an individual engineer's knowledge, it is unlikely that graduates today will work for decades for a single company, or even in a single field. This means students must have the ability to learn independently and think about what to learn; a well-rounded view of engineering and life; and the passion to continue to evolve.

How will you build bonds with alumni and industry?

Developing strong links with industry in Hong Kong, Mainland China and globally, and engaging alumni are critically important for the School's development. The most important avenue for gaining such support is to excite alumni and industry about the research agenda of our faculty, our students and the development of next-generation leaders, and the positive differences we are making to society.

Why is there such an emphasis on diversity these days?

I strongly believe that diversity is one of the most important elements in innovation and a key ingredient for excellence. When people come from different fields, training, backgrounds, and have different first languages, their brains are wired in different ways. If you put them together and they start communicating, new ideas are formed.

Moreover, faced with the large-scale resources that stand behind institutions in Japan, Korea, and Mainland China, and their large job markets to absorb graduates, Hong Kong's truly international, English-speaking, and culturally diverse society is one of its outstanding competitive advantages in attracting global talent.

Where do you get your own passion for engineering?

My father was a civil engineer, my two sons are engineers, so it runs in our family. From childhood, I have loved maths and physics and since elementary school becoming an engineer was never in doubt. My father was the chief engineer for the landmark Penghu Great Bridge in Taiwan. We were all proud of this but it meant he was away from home for eight years. That's why I decided to choose a different field. Initially, I focused on electronic and computer engineering, working on semiconductors. I worked at AT&T Bell Laboratories for five years, before moving to the University of California, Santa Barbara, where I set up the System-on-Chip (SoC) Design and Test Lab. In the late 1990s, I established my second lab, the Learning-Based Multimedia Lab, focused on mobile computer vision, and served as the University's Founding Director of the Computer Engineering Program. Right now, I am 50:50 involved with electronic and computer engineering and computer science and engineering.

What has kept you motivated over the years?

I love teaching, working with and learning from my students, and having the opportunity to be at the cutting edge of technology. Indeed, if life becomes too comfortable, I become uncomfortable. Having new multidisciplinary research projects, fresh courses to teach and different students to get to know keeps me constantly interested and happy in my career. Nine years ago, for example, I developed a smartphone course based on the Android platform. At the time, this operating system held 2% of the market. The last year I taught that course, Android's market share was 80% and many of the undergraduates and graduate students who had taken the course had gone to become early Android developers.

In the past, engineering has not enjoyed the same stature as a career as medicine, law and finance in Hong Kong. Why is it important to change this?

As is common in Asian culture, I also came under pressure about my study and career choice. I was doing well in high school and the first question was always: 'Are you going to do medicine?' But I was bold enough to go with my heart. Now it is certainly time for more of today's younger generation to do the same. It is obsolete to think of medicine or business as a better career than engineering: financially, stability-wise, or in terms of success. It is such an exciting, fast-moving field with immense impact on shaping society. Engineers build sensors to monitor areas as diverse as health and climate. They create scanning machines to enhance security. Every single day and for every age, from a baby to 99 years old, engineering is impacting people's lives. It is essential for Hong Kong to have a strong footprint in engineering discovery, innovation and technology.

If life becomes too comfortable, I become uncomfortable. Having new multidisciplinary research projects, fresh courses to teach and different students to get to know keeps me constantly interested and happy in my career.

About Tim Cheng

Education
BS in Electrical Engineering, National Taiwan University
PhD in Electrical Engineering and Computer Sciences, University of California, Berkeley

Current
Dean of Engineering
Chair Professor of Electronic and Computer Engineering
Chair Professor of Computer Science and Engineering

Previous
Bell Laboratories, New Jersey, 1988-1993
University of California, Santa Barbara, 1993-2016

Academic
Founding Director, Computer Engineering Program, 1999-2002
Department Chair, Electrical and Computer Engineering, 2005-2008
Associate Vice-Chancellor for Research, 2014-2016 (also acting in 2013), overseeing US$200 million extramural funding

Research
Main interests: Design automation of electronic, photonic, and flexible circuits and systems; hardware security; mobile computer vision; computer-aided medical image analysis

Director, US Department of Defense Multidisciplinary University Research Initiative Center for 3D Hybrid Circuits, 2011-2016

Published over 400 technical papers
Co-authored five books
Received over 10 Best Paper Awards from IEEE and ACM journals and conferences
Supervised 40+ PhD dissertations

Teaching
University of California, Santa Barbara, College of Engineering Outstanding Teaching Faculty, 2004-2005

Technology Transfer
Holder of 12 US patents
Several inventions transferred and successfully integrated into commercial products
Co-founded two companies in design verification and multimedia content analysis

Professional
IEEE Fellow
Editor-in-Chief, IEEE Design & Test of Computers
Board Member, IEEE Council on Electronic Design Automation Board of Governors
Board Member, IEEE Computer Society Publications Board

Proudest achievements
Teaching his students and seeing them succeed, and his family – his wife and two sons, both engineers

The Versatility of a 21st Century Engineer

When Prof Siu Wing Cheng was choosing what to study at university, he elected to take computer science because it was an exciting new field with huge potential for innovation and impact on society. Now, decades on in a world transformed by the information technology revolution, he continues to feel that way about his engineering career and, as Associate Dean of Engineering (Undergraduate Studies), is seeking to pass this passion on to young people and the community at large.

One of Prof Cheng's main goals during his three-year term is to bring greater recognition to the amazing spectrum of engineering fields and jobs that await today's potential School of Engineering (SENG) applicants. It is a timely task given the growing impact of technology and innovation locally and globally on areas from biomedicine to smart green cities to communications and climate change. And the setting up of the new Local (Undergraduate) Recruitment and Admissions Committee, chaired by Prof Cheng, is an indication of SENG's commitment to raising awareness.

On his visits to local high schools, Prof Cheng certainly has a lot to share with SENG's six departments offering the most comprehensive range of engineering disciplines in Hong Kong. Moreover, gone are the days of studying one major engineering subject largely through lecture-based study. At HKUST, there are minor programs, interdisciplinary degrees, cutting-edge independent study options in emerging fields, research projects with the University's world-class academics and summer research programs at top US institutions. Overseas exchanges, internships, and mentoring programs are available. Confidence and communication abilities can be boosted in high-profile local and international student competitions and entrepreneurial endeavors while students can also use engineering know-how to benefit others through community service projects in and outside Hong Kong. Teaching and learning may include e-learning, groupwork and self-initiated projects.

In line with such a dynamic approach, SENG is seeking to draw in the high-flyers, independent thinkers and live wires, and leaders of the future. "We look for young people who are motivated to innovate," Prof Cheng said. "We don't want our students just to go to class. We want them out of the lecture hall, trying to build something or working in a team on an initiative of their own. The School really has a huge variety of activities to cater for students' individual interests and characters."

Greater diversity in students' background is another key focus, especially encouraging more young women to see the social significance and career potential in engineering. SENG's current percentage of 20% compares well internationally, but Prof Cheng is setting out to grow this further. It also means adding to the international intake through overseas trips to build knowledge of the School's far-sighted bachelor programs and what Hong Kong as a city has to offer for non-local students, including the chance to remain for up to 12 months following graduation to look for work.

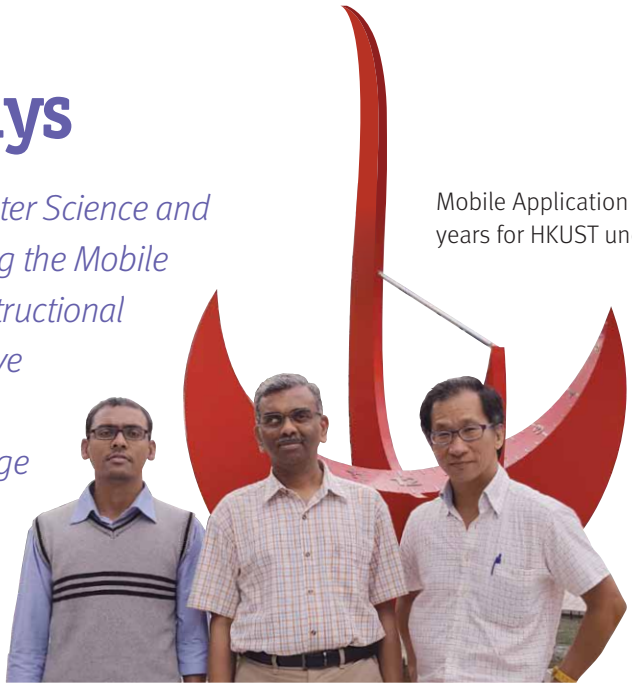
As one of HKUST's earliest faculty members, Prof Cheng is well-suited to sharing the joys of innovation and first-time enterprise. He joined the now Computer Science and Engineering Department in 1992, one year after the University was established. It was a time when initiative was in much demand in setting up a department, education program, and the University overall, and he knows at first hand the exhilaration and satisfaction of being such a pioneer.

Hand-in-hand with diversity and adventurous programs, quality assurance is another of Prof Cheng's domains to ensure that excellence remains embedded along with an enterprising outlook. Currently, he is overseeing preparations for the stringent Hong Kong Institution of Engineers (HKIE) accreditation exercise of the School's programs at the end of the year, but vigilance on quality is on-going, he noted. SENG was the first in Hong Kong to be granted HKIE provisional accreditation for its four-year programs under the outcome-based education approach in 2014.

On graduation, the SENG student experience of formal training in mastering technology, rigorous mathematics and logical and analytical skills, together with the development of global perspectives, self-starter capabilities, and a drive for lifelong learning, forms a highly valuable foundation on which a variety of careers can be built, Prof Cheng said. "We have had students who have become academics, entrepreneurs, who have climbed the company ladder, or actually changed profession," he pointed out. "In my time, there were a few specific routes to take on graduation. These days, you are definitely not slotted into a particular job or narrow career path."

The MAD Guys

Prof Jogesh Muppala, Computer Science and Engineering, has been leading the Mobile Application Development instructional team at HKUST for the past five years. Here, he explains the significance of such knowledge for students and Hong Kong



The MAD team: Prof Jogesh Muppala (center), Dr Subrota Mondal (left), and Mr Ka Wing Lo (right).

When the School of Engineering launched Hong Kong's first undergraduate course on Mobile Application Development in 2011, it caught the beginning of a trend that has turned into a huge new area of academic, technology and business interest.

The University has continued to set the pace, with the Mobile Application Development (MAD) team adopting a multi-pronged approach to highlight the exciting potential of this technology to students. The team is led by myself, together with teaching associate Mr Ka Wing Lo and instructional assistant Dr Subrota Mondal.

There is now a set of three courses available: Introduction to Mobile Application Development using Android (COMP 1029A); Mobile Application Development Projects (COMP 2521), an experiential learning course aimed at drawing together teams of students from various departments to conceptualize, design and implement a mobile app-based solution to a real-world problem; and Mobile Application Development (COMP 4521), providing in-depth coverage of mobile application development and concentrating on technical aspects.

In addition, with the support of the Computer Science and Engineering Department (CSE), the MAD team has organized the Mobile Application Design Contest for the past two years for HKUST undergraduates, postgraduates and alumni. The most recent contest in March 2016 attracted over 20 teams. The champion app, PlexVibe, was created by undergraduates Kenta Iwasaki, CSE, and Mahian Maksud, Mechanical and Aerospace Engineering, and billed as a music discovery and music promotion platform. The duo also won the best business idea and best user interface design and poster prizes. Other winning ideas included an instant Q&A platform for social media and a platform for transportation sharing.

We MAD guys have also been working closely with non-governmental organizations (NGOs) in identifying suitable community projects that could benefit from mobile applications. Several student groups from MAD courses and undertaking final year projects have been developing concepts ranging from a Tai O tourism app, sponsored by the YWCA, to a depression detection gaming app, with LULIO, and a Tung Chung community app, with Kerry Group Kuok Foundation. Further projects we are currently involved in include an attention deficit hyperactivity disorder (ADHD) research platform with Hong Kong Polytechnic University Rehabilitation Sciences Department, a management information system for the Hong Kong UNICEF Club, and elderly outpatient escort services for the Chinese YMCA of Hong Kong.

All these MAD activities are based on the common goals of: equipping students with mobile development-related knowledge and skills; cultivating budding entrepreneurs to pursue their passion and realize their dreams; and motivating students to use their technical capabilities to serve society.

Clean Water Triumph

A postgraduate Civil and Environmental Engineering team won the championship at the 2016 Engineering Case Competition on Clean Water Treatment held at Chulalongkorn University in Thailand.

The team comprised Li Ling, Jiajian Liu, Yingying Xiang and Dapeng Zhang, supervised by Prof Chii Shang, Civil and Environmental Engineering. Members visited a Thai village, analysed the water quality, and created a device to provide safe drinking water at a much lower cost than many alternatives on the market. The device was inspired by student projects from a blended learning Common Core course at HKUST taught by Prof Shang. Team members served as teaching assistants on the course.

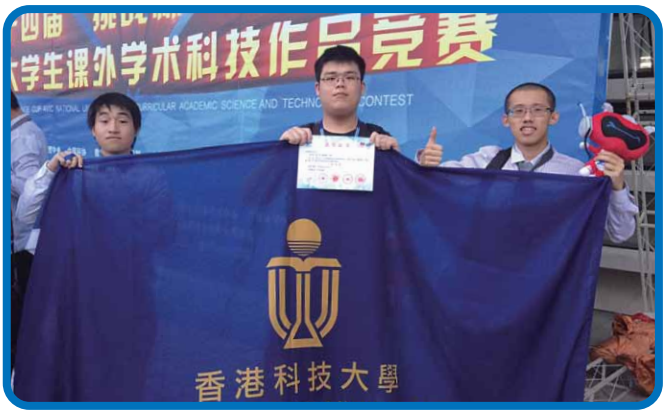
Novel Technologies Recognized at
National Challenge Cup

A team of Chemical and Biomolecular Engineering undergraduates became multiple award-winners at the 14th National Challenge Cup. The nationwide contest, known as "The Olympiad for University Students", is one of the leading contests for young innovators in China.

Renjing Huang, Po Sang Lo and Chun Ki Yeung received a Grand Prize, First Prize in the new Theme-based Competition focused in its inaugural year on "Smart Green Cities", and Second Prize in the Hong Kong Regional Competition for their novel "Graphene Membrane for Seawater Desalination" invention. The students were supervised by Prof Zhengtang Luo.

The team's project involved designing and fabricating graphene-based membranes through filtration-facilitated assembly. Their prototype for desalination also sought to overcome problems associated with other technologies, including biofilm formation and low permeate flux.

The 14th National Challenge Cup attracted 100,000 project entries from around the country, with less than 750 chosen to appear in the Grand Final and only 38 receiving the highest award of Grand Prize. The contest was co-hosted by Guangdong University of Technology and HKUST, the first time a university from Hong Kong had been involved in this way.



Three other HKUST teams received honors in the competition. Undergraduate Xiyuan Liu, Electronic and Computer Engineering, gained a Second Class Award for his "Remotely Operated Vehicle Based on Robot Operating System", PhD student Zengshun Chen and undergraduate Hoi Yin Yung, Civil and Environmental Engineering, received a Second Class Award for "A New Pressure-Aeroelastic Hybrid Wind Tunnel Test Device and Technique" and undergraduates Xinzhu Liu, Dual Degree Program in Technology and Management, Zhiyu Chen, Finance, Yangyang Duan, Life Science, secured a Third Class Award for "Real-Time Display of Machine Status".

Leading-Edge Enterprise to the Fore

The 6th Annual HKUST One Million Dollar Entrepreneurship Competition brought triple success for the School of Engineering (SENG), with all three top winning teams featuring SENG students or alumni.

Sundial Technology, comprising three SENG students and a HKUST Business School student, won the President's Prize for their anti-reflection and self-cleaning film to enhance the performance of solar panels. The team also collected the Innovation Prize and Student Prize. First runner-up NeoForest, involving two SENG alumni and a Shanghai Jiao Tong University student, developed an air purifier providing forest-grade air to indoor environments.

Second runner-up Perfuso set out a novel technology that reduces the side effects of dialysis, lowers bio-waste, and halves treatment time and cost. The five-member cross-disciplinary SENG team also won the Trade Show award.

For the first time, the top prize-winning teams then had the opportunity to compete in a Grand Final at the HKUST Fok Ying Tung Research Institute in Nansha, Guangzhou, following this year's extension of the One Million Dollar Entrepreneurship Competition to cover a total of five cities in China. More than 500 teams joined the contest from Beijing, Guangzhou, Shenzhen, Macau and Hong Kong, with the three winners in each city participating in the final.

ASME Medal Winner

Fuels Environmentally Friendly Marine Industry

Recent graduate Karen Ka Long Leong, Mechanical and Aerospace Engineering, received the prestigious ASME Arthur L Williston Medal at a ceremony at the ASME Mechanical Engineering Congress & Exposition in Arizona, US, in November. She was honored by the American Society of Mechanical Engineers (ASME) for her paper on "Fuel Choice Regulation – The Way to Narrow the Gap Between Current IMO Marine Standard and 2025 Greenhouse Gas Emission Target". Karen submitted her paper and heard the news of her success earlier this year while still a final-year undergraduate at HKUST.

The Arthur L Williston Medal is presented annually to the student or recent graduate who writes the best paper in the area of civic service. This year's theme was "Achieving 2025 Greenhouse Gas Emissions While Creating Economic Growth and Quality of Life Benefits".

Karen's paper examined carbon dioxide reduction in the marine industry. She looked at biodiesel, natural gas and nuclear power as potential alternatives for ships, assessing their feasibility using a range of parameters, including technology maturity, lifecycle cost and environmental performance.

Reflecting later on her choice to study engineering, Karen said she felt such a program would enable her to apply scientific knowledge to daily life. She had wanted to join HKUST School of Engineering given its reputation and the opportunities offered. She is now working as a Graduate Trainee at ATAL Engineering Ltd.

Up, Up and Away

The HKUST Unmanned Aerial Vehicle (UAV) team soared to fresh heights when it collected the First Prize at the International Aerial Robotics Competition 2015 (Asia/Pacific Venue), held in Beijing.

The renowned competition challenges university student teams globally to advance the technical capabilities of autonomous flying machines. It was first held at Georgia Institute of Technology in the United States in 1991 and is the longest running contest of its kind in the world. The event was brought to Asia in 2012 by the Chinese Society of Aeronautics and Astronautics, with American and Asia-Pacific venue contests now held simultaneously each year.

The mission facing the HKUST team of Electronic and Computer Engineering PhD and MPhil students and an alumnus was to design a single autonomous aerial robot to drive as many ground robots as possible across a boundary within a certain time span. In doing so, team members had to overcome three main challenges: navigating an unfamiliar environment without external negotiating aids or large stationary points of reference; autonomously avoiding moving obstacles; and interaction between aerial robots and moving targets.

Members also had the opportunity to meet up with students from other universities in the Asian region, gaining further insight into aerial robotics as well as making useful connections with others in the field (see also P6-7). The HKUST team was led by Prof Shaojie Shen, Electronic and Computer Engineering.

HKUST is a global leader in UAV technology, and Autonomous Systems and Robotics is one of the University's strategic areas for development. The multidisciplinary HKUST Robotics Institute was established in late 2015 to encourage University-wide engagement.

HKIE Innovation Award Success

A School of Engineering team won the Grand Prize in the HKIE Innovation Awards for Young Members (Category I). PhD candidate To Hung Tsui and postdoctoral research fellow Dr Tian Wei Hao, both Civil and Environmental Engineering, won the 2016 prize for developing cost-effective technologies for wastewater treatment.

The award initiative is open to all young engineers and Hong Kong Institution of Engineers (HKIE) members across all engineering fields in Hong Kong. The two researchers broke through past limitations to devise a simple yet effective method to reengineer conventional anaerobic bioreactors. Their invention increases operational flexibility but reduces complications in building bioreactors.

Student & Researcher Honors, Awards & Achievements

A cross-disciplinary undergraduate team secured first place at the inaugural Fishackathon, held in Hong Kong. The 48-hour hackathon, a public-private partnership involving the US State Department, private sector, and civil society, has been held since 2014 to develop technology solutions to address overfishing. In 2016, the event was held in over 40 cities worldwide, including Hong Kong for the first time. In winning the local competition, **Pranesh Balekai**, **Jainam Mehta**, both Electronic and Computer Engineering, **Kenta Iwasaki**, School of Engineering, **Arvind Iyer**, Computer Engineering Program, **Don Dyu Kim**, Mathematics, and **Soo Yeon Seo**, Industrial Engineering and Logistics Management, developed an integrated software and hardware solution to ease the economic and environmental impact of fishing equipment lost or disposed of in the sea (also known as “ghost gear”).

Undergraduates **Yin Cheung Chan**, **Kok Ho Lai**, **Mei Yuk Tsang** and **Ka Lok Tsui**, Industrial Engineering and Logistics Management (IELM), won the championship at the HKSQ Company Based Student Project Competition 2016. The competition, organized by the Hong Kong Society for Quality (HKSQ), gave students the opportunity to gain problem-solving experience on an industry-based case. The 2016 contest was sponsored by LSG Sky Chefs, with participants asked to propose practical solutions to improve the company’s internal delivery procedures. The IELM team first identified problems with the existing system, then suggested the development of a new information system and automated railway system that could reduce manual processes by up to 50%. Judging criteria included approach, effectiveness and practical applicability.

A Civil and Environmental Engineering undergraduate team, comprising **Siu Kwan Choi** (team leader), **Ho Fai Chung**, **Po Hon Wong** and **Chi Fai Yuen** won the first prize in the Undergraduate Division at the 2015 Introducing and Demonstrating Earthquake Engineering Research in Schools (IDEERS) competition in Taiwan. Civil and Environmental Engineering postgraduates **Nan Zhang** (team leader), **Chunyang Du**, **Yang Liu** and **Cheng Ning Loong** received the second prize in the Postgraduate Division and third prize for Best Presentation. The contest was held at the National Center for Research on Earthquake Engineering in Taipei.

Industrial Engineering and Logistics Management undergraduates **Sze Yin Chung**, **Yiu Wang Ho**, **Alpha Lai**, **Ming Ho Li**, **Ching Man Lo** and **Chun Sing Yu** secured the HKIE-MI Young Engineers Programme 2014/15 championship. After joining the initiative, participants went on a series of technical visits. Teams then had to give a 15-minute presentation on their experiences and how they would inspire future students to join the program. The endeavor is jointly organized by the Manufacturing and Industrial Division of the Hong Kong Institution of Engineers (HKIE-MI) and HKIE Young Members Committee to encourage interest in manufacturing and industrial engineering as a career.

Postdoctoral fellow **Dr Youzhe Fan** and MPhil students **Ji Chen** and **Chenyang Xia**, all Electronic and Computer Engineering, won a Gold Medal at the first 5G Algorithm Innovation Competition. The 5G event, held as part of the InnovateAsia FPGA Design Contest, attracted over 180 teams. The ECE participants were one of only three teams to receive a Gold Medal. The competition was sponsored by Intel, Huawei and Spreadtrum and took place at Xidian University, Xi’an.

Student & Researcher Honors, Awards & Achievements

Visiting Scholar **Dr Wei Han**, Chemical and Biomolecular Engineering, received Innovation and Technology Support Programme funding of HK$1.15 million for his project exploring an "Ionic Liquid Filtration System for Air Purification and Disinfection". His co-investigators are Prof King Lun Yeung, Chemical and Biomolecular Engineering, and Prof Joseph K C Kwan, Director of HKUST's Health, Safety and Environment Office.

MSc students **Lixie Hu**, **Xiaoyang Liu** and **Hao Lu**, all Mechanical and Aerospace Engineering, received the Global Youth Innovator Award at the 2016 iCAN Consumer Electronics Show in Las Vegas, US, for their De-snore invention. The students' innovative system uses a low-cost MEMS microphone to collect audio signals from people suffering from obstructive sleep apnea. The smart sensor system can detect the severity of the disease, monitor sleep quality, and send email and SMS alerts to sufferers should dangerous obstructive sleep apnea situations be tracked. It was the second year that School of Engineering students won this award.

Three papers by Electronic and Computer Engineering (ECE) PhD students and other members of ECE were given at the IEEE International Solid-State Circuits Conference (ISSCC), the premier forum for presentations on advances in solid-state circuits and systems-on-a-chip. The papers were titled "A 4.2μs-Settling-Time 3rd-Order 2.1GHz Phase-Noise-Rejection PLL Using a Cascaded Time-Amplified Clock-Skew Sub-Sampling DLL" by PhD student **Zhiqiang Huang** and Prof Howard Luong, "An 86.0GHz-94.3GHz Transmitter with 15.3-dBm Output Power and 9.6% Efficiency in 65nm CMOS" by PhD alumnus **Yue Chao** and Prof Luong, and "A 6.78MHz 6W Wireless Power Receiver with a 3-Level 1X/½X/0X Reconfigurable Resonant Regulating Rectifier" by PhD student **Lin Cheng**, computer engineers Yat To Wong, Tak Sang Yim, Prof Wing Hung Ki and Prof Chi Ying Tsui.

PhD student **Wei Jiang**, Electronic and Computer Engineering, received the Best Paper Award at the Fourteenth Asia Pacific Bioinformatics Conference in San Francisco. The paper, co-authored by Prof Weichuan Yu, focused on "Power Estimation and Sample Size Determination for Replication Studies of Genome Wide Association Studies". The conference is the leading annual gathering for international research, development and novel applications in bioinformatics.

PhD student **Liwen Jing**, Electronic and Computer Engineering, won first place at the 2016 IEEE MTT-S International Wireless Symposium Student Paper Competition for her paper on "Fabrication and Measurement of Millimeter-Wave On-Chip MIMO Antenna for CMOS RFIC's". The symposium takes place annually in China providing a platform for the latest technical accomplishments in microwave circuits, hardware and radio frequency (RF) systems focused on physical layer aspects of current and emerging wireless systems.

PhD student **Yu Li**, Electronic and Computer Engineering, won the Best Paper Award at the Asia Communications and Photonics Conference in Hong Kong. Her winning paper, supervised by Prof Andrew Poon, was titled "Actively Stabilized Silicon Microrings Integrated with Surface-State-Absorption Photomonitors at 1310nm Using a Slope-Detection Method". The significance of Yu's work saw the award upgraded from Best Student Paper to Best Paper. The conference is the largest in the region on optical communication, photonics, and relevant technologies.

Student & Researcher Honors, Awards & Achievements

PhD student **Saber Soltani**, Electronic and Computer Engineering, received a Computer Simulation Technology (CST) University Publication Award 2015. His award-winning paper was entitled "A Compact Planar Printed MIMO Antenna Design" and co-authored by supervisor Prof Ross Murch. The article appeared in *IEEE Transactions on Antennas and Propagation* in March 2015 and became the journal's most downloaded paper that month. The award provides an annual grant for researchers exploring the application of 3D electromagnetic field simulation.

Undergraduates **Anny Hiu Yan Mok**, **Mick Hon Ming Tse**, both Mechanical and Aerospace Engineering, and **Eddie Wing Tai Yeung**, Electronic and Computer Engineering, won the championship at the Pit Crew Challenge – Intercollegiate Speed Engine Assembly and Disassembly Competition. The contest was one of the activities at Hong Kong Classic 2015, a weekend festival focused on vintage cars and motorbikes at Central Harbourfront Event Space. The competition, which drew 16 student teams from HKUST, University of Hong Kong, Chinese University of Hong Kong and Hong Kong Polytechnic University, required students to put together and take apart a motorcycle engine within a set time limit, demanding speed, accuracy and efficient teamwork. The students are all members of the HKUST Solar Car Team.

HKUST Aeronautics Interest Group achieved a place in the top 25 at the prestigious international 2016 American Institute of Aeronautics and Astronautics Design/Build/Fly Competition. The HKUST students ranked second in Asia and first in Hong Kong. The contest, held in Kansas, US, attracted 80 teams from around the world, including many elite universities. Students were required to design and build two radio-controlled aircraft – a manufacturing support aircraft and production aircraft – that could complete different tasks (see also P6-7).

MPhil student **Zhenfei Yang**, Electronic and Computer Engineering, received the Best Theoretical Paper Award at the 2015 IEEE International Symposium on Safety, Security, and Rescue Robotics. The symposium took place at Purdue University, Indiana, US. Zhenfei's winning paper, co-authored by Prof Shaojie Shen, explored "Monocular Visual-Inertial Fusion with Online Initialization and Camera-IMU Calibration". The forum seeks cutting-edge papers on the theory and practice of robotics and automation for all types of safety-related applications.

A School of Engineering student team won the Energy Efficient Design Award at the New Energy New Generation Solar Car Competition. The contest was organized by the Hong Kong government's Environment Bureau and Electrical and Mechanical Services Department. Eight teams from local institutions participated in the tertiary education section. Each team had to design and build an environmentally friendly and innovative solar car. The competition sought to raise students' interest in renewable energy and energy efficiency and to take their ideas from drawing board to practical prototype (see also P6-7).

Photo credit: Bhawat Traipattanakul

Five-Axis Machine Donation
to Assist Aerospace Advances

A leading machine manufacturer in Mainland China has donated a state-of-the-art high-precision machine to HKUST that is set to play a key role in aerospace engineering education and research in the Department of Mechanical and Aerospace Engineering.

Beijing Jingdiao Co Ltd officially presented the five-axis machine, which costs around RMB1 million at market price, and CAD/CAM software to the Department in March 2016. The company will also collaborate with the University on studies involving tool path generation, cutting force, and kinetic and kinematic performances in five-axis machining. The machine is expected to be widely used in teaching, research activities, and for demonstration purposes.

Generating Young Electronic Engineers

A three-day electronic winter camp was jointly organized by the Department of Electronic and Computer Engineering (ECE) and IEEE Hong Kong Education Chapter to give school students the opportunity to learn more about electronic design and university life. Participants included primary and secondary students aged from 10-15 years.

The camp was coordinated by Prof Mansun Chan, Electronic and Computer Engineering, with ECE undergraduate students serving as instructors to the 50-plus attendees. Among the activities, participants were tasked with building fun gadgets, such as electronic pianos and running lights. They also visited the University's laboratories. ECE students also benefited by building their presentation and organizational skills. It was the fourth time the camp had been arranged.

Robotics Team Rolls On

Members of the HKUST Robotics Team have continued to garner awards in local and international competitions over the year.

The Remotely Operated Vehicle (ROV) team, comprising students from various engineering fields and different countries, made a splash in underwater robotics competitions by winning the Explorer Class championship in the 11th Hong Kong/Asia Regional IET/MATE Underwater Robot Challenge. Overseas, the team secured the third runner-up overall in the MATE International ROV Competition as well as the Guts and Glory Award for overcoming hardships with determination and resolve.

Team CEO Albert Tanoto, a Chemical and Biomolecular Engineering undergraduate, also received a Product Presentation Most Valuable Person Award. This year's contest theme was outer space exploration and deep-water investigation.

The University's Robocon Fiery Dragon and War Dragon teams won the first and the second runner-up prizes respectively in the Robocon 2016 Hong Kong Contest.

The ABU Robocon is held across Asia-Pacific to encourage university students to design robots to perform given tasks in a competitive setting. The theme for Robocon 2016 was "Clean Energy Recharging the World".

In addition, the Smart Car team received three second class awards and a certificate of merit at the 11th NXP Cup Intelligent Car Racing Competition (South China Region). The students gained the accolades in the Balance, Beacon, Camera and Chasing groups respectively. Over 300 teams competed in the event, which was held at Central South University in Changsha.

iSTEAM on Show at Underwater Robot Contest

A fun and thought-provoking competition was organized by the School of Engineering's Center for Global & Community Engagement in Spring 2016, promoting Science, Technology, Engineering, Arts and Mathematics as well as inclusiveness (iSTEAM) among Hong Kong students.

The Underwater Robot Competition called for primary and secondary school students to work in teams to create robots that would compete against each other to complete a series of underwater tasks. The Center recruited 42 HKUST student mentors to teach basic robot-making skills to the 25 participating student teams during a one-day workshop and to help organize the two-day competition.

Over 120 students from Primary 4 to Form 3 joined the event. With participants from different backgrounds and with differing abilities, some with special needs, the project created multiple learning opportunities in science, technology, creativity and social inclusion.

Prof Tim Woo, Director of the Center for Global & Community Engagement, said the initiative provided an excellent platform to raise students' awareness of iSTEAM. He said participants could gain robotics knowledge on the one hand and get to know what STEAM was all about on the other. Understanding the values and needs of students with different abilities further extended the competition's reach. At least 20% of the teams included special education needs participants, he said.

HKUST Wu Zhi Qiao Team Honored

Eighteen members of the HKUST Wu Zhi Qiao team, including 11 from the Civil and Environmental Engineering Department and four from the Mechanical and Aerospace Engineering Department, have been awarded honors by the Wu Zhi Qiao (Bridge to China) Charitable Foundation for their exemplary work over 2014/15.

The awardees were recognized with the Best Community Project and Best Wu Zhi Qiao Project accolades for their bridge construction work in Dawazhe Village, Yunnan Province.

The team also received the Outstanding Performance Gold Award (Hong Kong Team) for their efforts throughout the year.

Gold Award for Web Accessibility

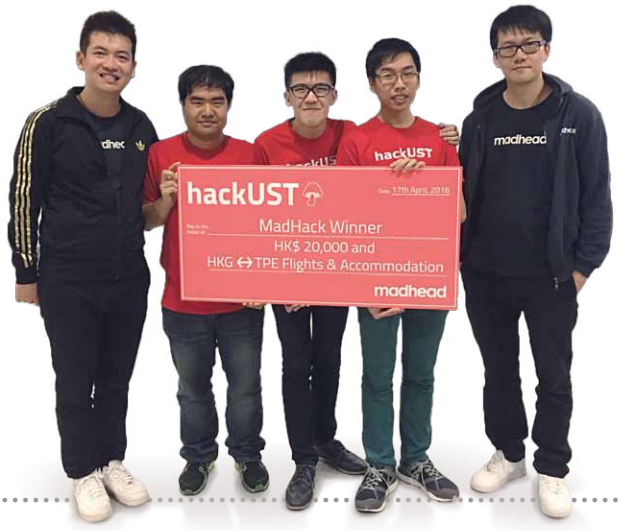
For the third consecutive year, a combined research team from the Departments of Electronic & Computer Engineering and Computer Science & Engineering received the Gold Award in the Web Accessibility Recognition Scheme, jointly organized by the Office of the Government Chief Information Officer and the Equal Opportunities Commission.

The 2016 team comprised Prof Tim Woo, Prof Albert Wong, and research assistant Kobe Lam, Electronic and Computer Engineering, together with Prof Brian Mak and PhD student Yingke Zhu, Computer Science and Engineering. Since 2013, team members have developed two Android mobile apps to enhance hearing-impaired children's ability to communicate. Both apps are available from Google Play.

HackUST 24-Hour Challenge Doubles Participants

Around 440 students and alumni in over 90 teams from eight local universities took part in Hackathon@HKUST (hackUST) 2016 in April. The highly successful student-led event saw the number of participants double from the previous year and served as the grand finale to HKUST's Entrepreneurship Week, organized by the University's Entrepreneurship Center.

Those taking part could focus on any of four areas: mobile gaming, financial technology (FinTech), applications for women consumers (WomenTech) and creative. The aim was to identify a problem in a particular area, form a team, and come up with innovative ideas to solve the difficulty. Teams had to design and build the software and/or hardware prototypes within 24 hours. Prizes totaling HK$150,000 were shared between 12 winning teams.



During the Hackathon, industry experts and entrepreneurs served as mentors to the teams. Time-out activities, such a yoga class and meditation session, were also organized to revitalize participants.

Sponsors included Madhead (mobile gaming), which contributed a total of HK$100,000, Bank of East Asia (FinTech), Google (WomenTech) and Microsoft (creative). Madhead was founded by School of Engineering alumni brothers Terry and Terence Tsang.

Turning Ideas into Educational Toys

Engineering students demonstrated their award-winning ingenuity in the finals of the Science Toy Design Competition, which calls for knowledge learned in class to be applied to the creation of an educational toy. The contest, organized by the Department of Industrial Engineering and Logistics Management and sponsored by NSI International Inc, a leading designer and manufacturer of educational toys in the US, was open to students from all academic fields at HKUST.

The gold award went to Xiaohan Du, Dual Degree Program in Technology and Management, and School of Science student Jie Qi for their Paper Robot. Hiu Ling Cheung, School of Science, Chui Ting Leung, Civil and Environmental Engineering, and Lai Ying Mok, Industrial Engineering and Logistics Management, won the silver award while Luv Kalpesh Sheth, Mechanical and Aerospace Engineering, took the bronze award with toys titled The Weather Master and Color Mixer respectively.

This was the second time the competition had been held at HKUST. The 10 finalists were selected from a pool of high-quality entries by a judging panel comprising 11 design professionals, including Prof Ravindra Goonetilleke, Industrial Engineering and Logistics Management, Mr Brian Waldman, Senior Vice President, NSI, Mr Farra Chan, Director, NSI, and Mr David Chu, President, Tai Nam Industrial Company Ltd. A subsidy was provided to finalists to turn their abstract idea into a physical prototype.

Less Paper, Greater Sustainability

The Department of Industrial Engineering and Logistics Management decreased paper consumption by an astonishing 59% over the course of 2014-15 to win the SENG Inter-Departmental Paper Reduction Challenge. The initiative was organized by the University's Sustainability Unit to encourage the School's departments to minimize use of paper and printing, raise individual awareness of sustainable practices, and build a greener campus.

Civil Engineers
Hold Mega Infrastructure Forum and Commemorative Dinner

The Department of Civil and Environmental Engineering staged two major events in conjunction with each other at the end of April, co-organizing the Asia-Pacific Forum on Mega Infrastructure and Urban Development Construction and holding the Department's 25th Anniversary Dinner.

The two-day Forum, arranged together with the Hong Kong Institution of Engineers Civil Division and the Civil and Environmental Engineering Alumni Association, featured keynote presentations from well-known academics and guests, encompassing infrastructural technology and new developments in Greater China, especially in relation to sustainability and green practices. Also included were site visits to the Central-Wan Chai Bypass and the MTR Shatin to Central Link.

The Anniversary Dinner, held on the first evening of the Forum on April 29, drew University senior management, Dean of Engineering, department faculty and advisory board members,

and around 400 alumni. Outstanding Alumni Awards were presented to Ir Derrick Leung, Executive Director, Yee Hop Holdings Ltd, and Prof Qiang Meng, National University of Singapore, in recognition of their achievements in micro-tunneling and transportation & logistics respectively and their dedicated service to fellow alumni. The Outstanding Young Alumni Award was given to technology entrepreneur Mr Terry Tsang, Co-Founder and CEO, Madhead, for his leading example as a start-up innovator and contribution to HKUST students' welfare (see also P17).

Inaugural Homecoming Day for CSE Alumni

Eighty alumni and their families, students, faculty and staff enjoyed the first Computer Science and Engineering (CSE) Alumni Family Homecoming Day. The day began with a welcome speech by Department Head Prof Qiang Yang, who brought attendees up to date with the latest CSE developments, including big data initiatives, and emphasized the importance of alumni to the department. Other activities included "Hour of Code" sessions, with current students teaching children of alumni about basic programming concepts. Badminton and a tea party were also arranged.

The event, organized by the CSE Department and the Computer Science and Engineering Alumni Association, provided a great way for students to meet and talk to alumni to gain insight into career pathways and development after graduation, and for alumni to renew old friendships and establish new ones.

Grand 25th Anniversary Reunion in San Francisco

A major global alumni event, organized by the School of Engineering (SENG) and HKUST, was held in San Francisco in February 2016 as part of the University's worldwide commemorative activities for its 25th Anniversary. Of the 150 alumni, friends, faculty and students who attended the special seminar and dinner, around 70% of alumni came from SENG.

The celebration was led by HKUST President Prof Tony F Chan, who spoke on the latest developments at the University, including tri-modal education and new facilities such as the Water Sports Center, and its on-going high rankings in different international surveys. Prof Tim Kwang Ting Cheng, then Dean of Engineering Designate, spoke on the School's milestones and latest success stories while guest speaker Dr Christopher Nguyen, Co-Founder and CEO of Arimo (see also P34) and former SENG faculty member, gave a talk on "Innovation: Silicon Valley vs China – What It Means for HKUST". Three SENG faculty members also gave presentations on aviation education and research, artificial intelligence and data science, and robotics.

Joining the grand occasion were Mr Bill Coughran, Partner, Sequoia Capital, and Prof Cindy Fan, Vice Provost for International Studies and Global Engagement, University of California, Los Angeles, among other guests, as well as a number of ex-faculty members, including Drs Emily Au, Aaron Buchwald, Paul Chang, Yang Leng, Curtis Ling and K C Smith.

The event was one of four HKUST global gatherings arranged in different parts of the world to enable alumni and friends to share the University's 25th Anniversary. In addition, members of SENG made visits to alumni now based in San Francisco, including those at Google Inc, Apple Inc, Facebook, Stanford University and University of California, San Francisco.

Renewing Ties at IELM Gala

Over 100 Industrial Engineering and Logistics Management (IELM) alumni, faculty, current students and staff congregated on campus in February 2016 for the IELM Alumni Dinner cum Annual Gala 2016. The lively occasion brought together friends and enabled participants to meet new people.

Prof Siu Wing Cheng, Associate Dean of Engineering (Undergraduate Studies), and Prof Guillermo Gallego, Head of IELM, both spoke at the gathering. Saxophone and piano performances by IELM students, a lucky draw, and group photo-taking were also on the program. The memorable evening saw alumni catch up with professors and staff and helped students to network with alumni mentors to learn more about professional life.

Strengthening School Ties in Shenzhen

Engineering alumni in Hong Kong and Shenzhen enjoyed a joint gathering at the HKUST Shenzhen Research Institute to mark the University's 25th Anniversary and strengthen bonds between the School's graduates.

The reunion, attended by around 100 alumni, got underway with a welcome speech from Associate Dean of Engineering (Undergraduate Studies) Prof C Y Tsui. This was followed by a tour of the research facility and experience-sharing from SENG alumni entrepreneurs. They included Mr Anik Dey, 2010 BEng in Electronic Engineering and 2015 MPhil in Electronic and Computer Engineering, and now Chief User Experience Officer of Ivo Technologies, and Mr Liang Cheng, 2009 MSc in Mechanical Engineering, now General Manager of Zhuhai Yunzhou Intelligence Technology Co Ltd.

Later, participants enjoyed a sociable dinner, with School management providing updates on the latest University developments and 25th Anniversary celebrations. Alumni also gave further talks at the event. These included sharing on intellectual property by Mr Dennis Tang, 1998 MPhil in Mechanical Engineering, now an Attorney Partner at Yingke Law Firm in Shenzhen, and other topics.

ECE Graduates Enjoy Dinner Gathering

2015 Electronic and Computer Engineering graduates at bachelor and postgraduate levels celebrated their achievements at a joint Congregation and Alumni Dinner gathering on campus. Graduates dressed for the occasion in their gowns and friends and professors joined the event. The enjoyable get-together also enabled graduates to share their experience of the working world and offer suggestions and feedback on the Department's future development.

Party Time for Dual Degree Program

One hundred Dual Degree Program in Technology and Management students and 30 alumni attended the program's Annual Party on campus in March 2016. At the event, Mr Ivan Pang, President of the Technology and Management Alumni Association, encouraged current students and alumni to join the association to enlarge their network and build links to boost future career development opportunities.

Program Co-Director Prof Chi Ming Chan pointed out that the party was a great opportunity for students and alumni from different years to get to know each other and that everyone should try to mingle and make the most of the gathering.

In addition, souvenirs were presented to high school ambassadors and class representatives of each cohort as a token of appreciation.

Nurturing High-Flying Innovation

Two companies with founding members associated with the School of Engineering have been ranked among the most creative in their respective fields globally by *Fast Company* magazine, a highly regarded US business publication focused on innovation.

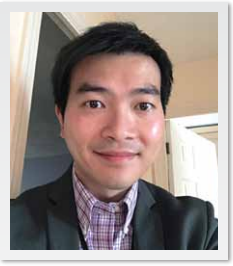
In the World's Most Innovative Companies of 2016 by sector, unmanned aerial vehicle (UAV) industry leader DJI, founded by Electronic and Computer Engineering BEng and MPhil alumnus Mr Frank Wang, was ranked No.1 in the Drones category. Behavioral artificial intelligence start-up Arimo, co-founded by former Electronic and Computer Engineering faculty member Dr Christopher Nguyen, was placed at No.10 in the Data Science list.

Frank built early groundbreaking UAV prototypes at HKUST with the assistance of his supervisor Prof Zexiang Li. DJI, founded in 2006 in Shenzhen, has gone on to become a worldwide market leader, lauded by *Fast Company* for "consistently introducing genre-defining technology for a growing audience of professional and amateur users". Dr Nguyen started Arimo in 2012, providing big data analysis in user-friendly products as well as tools to assist collaboration among users. He worked at HKUST from 1993-96 and launched several other successful hi-tech enterprises prior to Arimo.

Fast Company organizes annual lists of the most dynamic new and established ventures in a range of areas, with editors and writers assessing firms around the world to highlight disruptive pioneers. In 2016, machine intelligence was also used to help with selection for the first time. The rankings included many large-scale public companies, such as Google and IBM, as well as smaller ventures.

Alumni Honors, Awards & Achievements

Ir Dr Derrick Pang, 2014 PhD in Civil Engineering, received a Young Industrialist Award of Hong Kong 2015 from the Federation of Hong Kong Industries in recognition of his contribution to industry and the society. Dr Pang is Deputy Chairman of Chun Wo Development Holdings Limited and has helped lead the Group to become one of the largest local construction firms in Hong Kong. Dr Pang also founded the Young Members Society within the Hong Kong Construction Association to raise young people's interest in the sector; and Lifewire, which is an online crowdfunding platform to raise money for children with medical needs.



Electronic and Computer Engineering alumnus **Prof Kai Kit Wong**, currently at University College London, has been elected a Fellow of the Institute of Electrical and Electronics Engineers (IEEE). Prof Wong received his BEng, MPhil, and PhD degrees from HKUST in 1996, 1998, and 2001 respectively. The IEEE Fellow grade is one of the Institute's most prestigious honors, with the total number of recipients each year not exceeding 0.1% of the total voting IEEE membership. Prof Wong was recognized for his contributions to multiuser communication systems.

Dr Da Yan, 2014 PhD in Computer Science and Engineering, won the 2015 Hong Kong Young Scientist Award in the Physical/Mathematical Science category for his research work on "Efficient Systems and Algorithms for Big Data Processing". Dr Yan is continuing his big data studies as a tenure-track Assistant Professor at the University of Alabama at Birmingham in the United States. The award scheme is organized annually by the Hong Kong Institution of Science to recognize outstanding young scientists and engineers.

New Appointments

as of July 2016

Administrative

Prof Tim Kwang Ting Cheng
Appointed Dean of Engineering
Chair Professor, jointly by Electronic & Computer Engineering and Computer Science & Engineering

Prof Siu Wing Cheng
Appointed Associate Dean of Engineering (Undergraduate Studies)
Professor, Computer Science and Engineering

Prof Guillermo Gallego
Appointed Head of Department of Industrial Engineering and Logistics Management
Chair Professor, Industrial Engineering and Logistics Management

Faculty Members

Prof Ningyuan Chen
Assistant Professor, Industrial Engineering and Logistics Management
PhD – Columbia University

Prof Xun Huang
Associate Professor, Mechanical and Aerospace Engineering
PhD – University of Southampton

Prof Yangqiu Song
Assistant Professor, jointly by Computer Science & Engineering and Mathematics
PhD – Tsinghua University

Prof Desmond Tsoi
Lecturer, Computer Science and Engineering
PhD – Nanyang Technological University

Prof Michael Yu Wang
Professor, jointly by Mechanical & Aerospace Engineering and Electronic & Computer Engineering
Founding Director, HKUST Robotics Institute
PhD – Carnegie Mellon University

Prof Tao Wang
Assistant Professor, Computer Science and Engineering
PhD – University of Waterloo

Prof Xin Wang
Assistant Professor, Industrial Engineering and Logistics Management
PhD – Carnegie Mellon University

Prof Jinglei Yang
Associate Professor, Mechanical and Aerospace Engineering
PhD – University of Kaiserslautern

Research Faculty

Prof Frankie Chiu
Research Assistant Professor, Electronic and Computer Engineering
PhD – City University of Hong Kong

Prof Ji Dai
Research Assistant Professor, Civil and Environmental Engineering
PhD – The Hong Kong University of Science and Technology

Prof David Morales-Jimenez
Research Assistant Professor, Electronic and Computer Engineering
PhD – University of Malaga

Prof Di Wu
Research Assistant Professor, Civil and Environmental Engineering
PhD – The Hong Kong University of Science and Technology

Adjunct Faculty

Prof Ricci Ieong
Assistant Professor, Computer Science and Engineering
PhD – The University of Hong Kong

Prof Chung Nin Ko
Associate Professor, Mechanical and Aerospace Engineering
PhD – Imperial College London

Prof Wenbin Song
Associate Professor, Mechanical and Aerospace Engineering
PhD – University of Southampton

Prof Jun Wang
Professor, Computer Science and Engineering
PhD – Peking University

Prof Yu Zheng
Professor, Computer Science and Engineering
PhD – Southwest Jiaotong University

Photo credit: Kong Man Yin Ryan

Looking Back, Looking Forward

It has been a great year for reunions and strengthening the 1-HKUST spirit with the School of Engineering (SENG) Alumni Fun Day and the HKUST 25th Anniversary Celebration Banquet providing memorable occasions to renew ties between old friends and establish new bonds.

The Fun Day in May brought together more than 330 SENG alumni to enjoy a day of sports competitions, lectures, and exhibition tours. Alumni with start-ups ranging from mobile games to music showcased their ideas at an Entrepreneurship Fair. On the social front, a 25th Anniversary thematic happy hour and homecoming dinner enabled alumni to reminisce about past times, celebrate the School's and HKUST's highly successful quarter century, and look forward to the achievements ahead.

Many thanks to the Fun Day sponsors: Terry Tsang and Terence Tsang of Mad Head Ltd, Prof Jack Lau, Ir Dr Kevin Kin Lam So, Hong Kong Disneyland, Hong Kong Optical Company Ltd, Philips Electronics Hong Kong Ltd, Princeton Custom Tailors, Regal Enterprises Ltd, Tencent, The Barn, Toy2R Group Ltd, UA Cinemas, Unilever Hong Kong, Version 2 Ltd, and Wong's F&B Ltd.

The University's 25th Anniversary Celebration Banquet took place at the Hong Kong Convention and Exhibition Centre in June, attended by many distinguished guests as well as members of the HKUST family.

Don't be the Missing Link...

Alumni relationships are invaluable assets to the School and alumni. To foster the growth of our alumni network, please keep us informed of your recent news and send us your updated contact information via email to seng@ust.hk.

Stay connected and keep in touch!

Editors: Diana Liu, Dorothy Yip
Contributing Editor: Sally Course
Address: School of Engineering
The Hong Kong University of Science and Technology
Clear Water Bay, Kowloon, Hong Kong
Phone and Fax: (852)2358 5917/(852)2358 1458
Email: seng@ust.hk
Website: www.seng.ust.hk
Facebook: www.facebook.com/SENG.HKUST

FSC MIX Paper FSC™ C127090