



The Drive for **Engineering Education Leadership**

New Center to Introduce
and Contribute to
Latest Approaches to Learning

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It has been an exciting and rewarding 15 months following my appointment as Dean of the School of Engineering (SENG). During this time, SENGL has continued to excel on a world scale, with strong showings in numerous international rankings. The School has increased its profile as a key destination for top international students, with applications from the mainland and overseas up 130% from the previous year and the quality of applicants rising to even higher levels. We have also been boosting our exchange program for SENGL students to go out and see the world, rising from 7% in 2005 to 27% by 2009. Such a figure is extremely encouraging and well on our way to our target of enabling 50% of students to enjoy the eye-opening experience of life in another society to turn them into global citizens and boost their employability.

The School's success in the first recruitment exercise for the Research Grants Council's PhD Fellowship Scheme has added to our international diversity. The School carried out an aggressive campaign to bring these top-flight young minds to HKUST and Hong Kong, resulting in SENGL receiving the largest batch of students of Schools within HKUST and among engineering schools in the city.

I intend to continue this drive for development and global impact. The forthcoming year will be a critical one in our preparation for the Hong Kong-wide New Academic Structure education reform, which sees the start of a four-year degree system across the city's higher education institutions in 2012. Following the change, our students will come to us at a younger age, after six rather than seven years at secondary school. In 2012, we will also face the double cohort – accommodating the last year of the A-Level/three-year degree students alongside the first year of the Hong Kong Diploma of Secondary Education/four-year degree students.

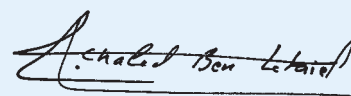
To meet these challenges, we are re-inventing our undergraduate curriculum and student experience underpinned by an outcome-based approach to learning. We are boosting our co-curricular activities, and expanding our facilities, all of which will enable us to produce the all-round engineers equipped to face the challenges of the 21st century. We are also increasing our scope, with the addition of academics who will assist the School in pursuing a wider range of high-impact fields, for example, energy and healthcare.

The establishment of SENGL's Center for Engineering Education Innovation, or E²I, is another pioneering move for Hong Kong. Along with the School's leading

reputation for research, the Center will help to position the School at the forefront of engineering education scholarship and student development, as explained by Prof Edmond Ko, head of the new center, in this issue of *In Focus*. We are extremely fortunate to have Prof Ko to lead this venture given his expertise in the field, and the Center will surely assist the School in reaching a new level of excellence by propelling forward engineering education and all our students as well as pedagogical research in Asia.

Other moves include encouraging a multidisciplinary approach to bring our world-class faculty together to seek transformational solutions to what I call the "grand challenges" facing humanity, such as healthcare as populations age, the development of megacities and environmental protection; SENGL's new annual Research Excellence Awards, which recognize outstanding junior and distinguished senior faculty members; international partnerships between east and west, including three-way collaboration with mainland institutions; and a website revamp to communicate more fully how engineering drives change and to demonstrate the exhilarating potential that an engineering career can have.

It has always surprised me that the national and global recognition HKUST receives as a world-class university is still not totally reciprocated in its home town. However, such perceptions are changing as our alumni successfully make their presence felt in a wide range of areas. As the University enters its 20th anniversary year, here at the School of Engineering we are determined to play our part by building a technology and engineering powerhouse that is fully recognized as a leading global education and research institution here in Hong Kong and beyond.



Prof Khaled Ben Letaief
Dean of Engineering



Faculty Members

- **Prof Baoling Huang**
 Assistant Professor, Mechanical Engineering
 PhD – University of Michigan
- **Prof Joseph Lee**
 Chair Professor, Civil and Environmental Engineering
 Vice-President for Research and Graduate Studies, HKUST
 PhD – Massachusetts Institute of Technology
- **Prof Wei Shyy**
 Chair Professor, Mechanical Engineering
 Provost, HKUST
 PhD – University of Michigan
- **Prof Kam Tim Tse**
 Assistant Professor, Civil and Environmental Engineering
 PhD – The Hong Kong University of Science and Technology

Adjunct Faculty

- **Prof Raymond Leung**
 Professor, Civil and Environmental Engineering
 PhD – The Chinese University of Hong Kong
- **Prof Neil Mickleborough**
 Professor, Civil and Environmental Engineering
 PhD – University of Tasmania
- **Prof Po Chi Wu**
 Professor, Mechanical Engineering
 PhD – Princeton University
- **Prof Wenwen Zhou**
 Assistant Professor, Civil and Environmental Engineering
 PhD – National University of Singapore

Visiting Faculty

- **Prof Emily Au**
 Assistant Professor, Industrial Engineering and Logistics Management
 PhD – The Hong Kong University of Science and Technology
- **Prof James She**
 Assistant Professor, Electronic and Computer Engineering
 PhD – University of Waterloo
- **Prof Charles Sodini**
 Professor, Electronic and Computer Engineering
 PhD – Purdue University
- **Prof Ming Ting Sun**
 Professor, Electronic and Computer Engineering
 PhD – University of California, Los Angeles
- **Prof Patrick Yue**
 Professor, Electronic and Computer Engineering
 PhD – Stanford University

Boosting the Telecom Industry



With demand for radio spectrum booming in the advent of 3G and WiFi, pioneering research by Prof Qian Zhang, Computer Science and Engineering, looks set to fuel future development of the telecommunications industry.

Prof Zhang and her team are at the forefront of explorations into “cognitive radio”, intelligent

technology that can flexibly manage dynamic spectrum resources and enhance usage by searching out idle spectrum. Currently, most countries employ a system where licensed users operate allocated spectrum. But only 10%-20% of the world's radio spectrum is being used, according to Prof Zhang. In addition, licensed users often do not use their spectrum all of the time, which is a waste of resources when others are keen to have access to it. How to enhance the effectiveness of radio spectrum usage to enable other users to gain access to idle spectrums in different places and at different times has thus become a major global issue.

In explaining the challenge of radio spectrum allocation, Prof Zhang likened it to highway traffic control. “Highways usually have several lanes, but if some lanes are restricted for special use, there may be traffic congestion during peak hours,” she said. “When the number of vehicles increases radically, we not only need more traffic lanes but an effective method of managing traffic.”

The cognitive radio technology developed at HKUST has the capability to search for the optimal level of spare radio spectrum among primary users, who are licensed, to determine the appropriate ‘lane’ for secondary users, who are not licensed, to use for cost-effectiveness and to make sure they do not interfere with primary users. Secondary users can have stability of service as the cognitive radio device keeps on searching out usable spectrum among primary users.

“We are talking about a potential ‘spectrum market’” Prof Zhang said. “For instance, mobile phone companies (a secondary user) may buy extra spectrum from TV stations (a primary user) during the Spring Festival when phone connections are the busiest in China. Users of mobile phones would then get stable services due to efficient traffic control. It creates a win-win situation for all.”

The innovative academic and her researchers have also designed a model to enable wireless service operators to participate in double-tier spectrum auctioning, helping to boost income for these operators, and carried out an unprecedented survey and comprehensive analysis of spectrum usage in China.

The next challenge for Prof Zhang and her team is to extend their research on their cognitive radio device. When fully developed it should be the size of a small chip, allowing it to be installed in mobile phones and other mobile devices.

Cognitive radio is an active research area at HKUST with pioneering contributions from a number of faculty members in the Departments of Electronic and Computer Engineering as well as Computer Science and Engineering.

New Weapon Unveiled in Fight Against Infection

A smart anti-microbial coating that is set to recharge the battle against infection and achieve new standards in public health has been developed by an interdisciplinary team of HKUST researchers, including a School of Engineering faculty member.

A world first, the revolutionary coating has a range of features that puts it ahead of other substances of its kind. The coating is transparent, colorless and odorless and can be sprayed on a variety of surfaces ranging from glass to cloth. It is quick and easy to apply and effective for at least 30 days. The coating also disinfects practically a full spectrum of microbes in body fluids, including saliva and blood. It does so by using chemical methods to kill microbes by attacking their cell envelope, causing cell lysis and death, rather than employing biological or pharmaceutical methods as most conventional sanitizers do.

The pioneering invention is the work of Prof King Lun Yeung, Chemical and Biomolecular Engineering, Prof Joseph Kwan, Director of the Health, Safety and Environment Office and Adjunct Professor in the Division of Environment, Prof Arthur Lau, Division of Environment, and their research team. Prof Yeung said that the coating offered a superior way to control disease transmission. "This is particularly significant as there are more and more antibiotic-resistant, pathogenic micro-organisms appearing. The use of a smart surface coating coupled with good hand hygiene



Seeing the Big Picture

With high-quality printing, it would take up a football field. Using standard printing, it would be twice that size. What is it? The world's largest digital photograph, and another record-breaking global achievement for a School of Engineering academic.

To create the massive shot, Prof Pedro Sander, Computer Science and Engineering, and his team of researchers stitched together 11,000 18-megapixel photos, creating a picture of the Brazilian city of Rio de Janeiro with a resolution of 150 billion pixels. The pictures were taken from the famous Sugar Loaf Mountain landmark using a

GigaPan robotic arm over a period of four hours. Stitching and final processing followed over a number of weeks, with many solutions tried to reduce the seam artifacts across images. It took another week to upload the photograph to the website <www.gigapan.org/gigapans/58857/>.

Setting the world record, announced in December, was an exciting challenge, Prof Sander said, and the first step in the team's research into capturing and analyzing giant photographs. "There are numerous applications in a wide



Christ the Redeemer

can help to curb the spread of these deadly micro-organisms.”

Contaminated surfaces are common ways for microbes to spread. Most disinfectants, including alcohol and bleach, can kill virus and bacteria when they are applied but are no longer effective after they become dry, Prof Yeung said. This means if an infected person touches a lift button five minutes after it has been sanitized, those subsequently pressing the button may pick up the germs left behind until the next time the button is disinfected.

Keeping surfaces clean in public areas is therefore essential in controlling the spread of infections through physical contact, Prof Kwan noted. Test results have shown that the HKUST-developed smart coating can kill 99.9% of bacteria within one minute, 99% of H1N1 Human Swine Flu virus in three minutes, and 99% of bacillus spores within 30 minutes. It is also able to sense when someone touches it, releasing a larger amount of disinfectant to inactivate the disease-causing microbes and protecting other people touching the same surface.

The ingredients of the coating are similar to those used in cosmetics and anti-acne cream, are approved by the US Environmental Protection Agency and US Food and Drug Administration, and are non-toxic and biodegradable. The coating can be washed off simply by using a solution of water and detergent.

With a billion people affected by influenza annually and 500,000 fatalities in an average year it is hoped that the coating will make a significant contribution to addressing this and other public health issues. Research began in 2003, the year Hong Kong was hit by SARS. Funding support has come from the William Mong Institute of Nano Science and Technology and the Hong Kong government's Innovation and Technology Fund.

Patent applications are now underway in the US, Mainland China and Taiwan. In addition, clinical field tests of the coating started in mid-January 2011 at Queen Elizabeth Hospital's intensive care unit and Tuen Mun Hospital. Both are public hospitals located in Hong Kong.



range of fields, such as tourism, heritage preservation, scientific research, medicine and astronomy,” he explained. “For example, an annotated image can be used for tourists to navigate their way to potential tourist destinations. Scientists have used these techniques to create highly detailed images of tiny insects, and even detailed representations of the human body.”

Prof Sander's fellow researchers were Dr Diego Nehab and Dr Luiz Velho from the Instituto Nacional de Matematica Pura e Aplicada (IMPA) in Rio de Janeiro, with the stitching managed by IMPA graduate student Mr Rodolfo Lima.

The team first broke the world record in July with a 67 billion pixel photo of Rio de Janeiro taken from the statue of Christ the Redeemer, a record that was later broken by another research team. To assist with cultural heritage preservation, Prof Sander and his co-researchers are now investigating how to map gigantic images to 3D model representations of landmarks such as Hong Kong's Big Buddha.



Prof Pedro Sander's home in Rio de Janeiro

Strong Showing in Global Rankings

A series of global rankings have demonstrated the quality of teaching and research at the School of Engineering, with top tier standing accorded to HKUST by surveys carried out by several different organizations.

HKUST engineering was ranked in the world's top 20 in engineering and technology by the 2010 Times Higher Education World University Rankings. HKUST was placed joint 20th with Tsinghua University, with rankings based on teaching, research, citations, industry income and international mix. HKUST was particularly strong in the citations category. This refers to published work cited by other academics, a recognized indicator of research impact. The top five places in the league table were taken by US institutions, led by California Institute of Technology.

In the Engineering and Technology league table published by the 2010 QS World University Rankings, HKUST had the No.1 engineering school in Hong Kong and came in 26th worldwide. The survey encompassed research quality, teaching quality, graduate employability and internationalization.

2010 Times Higher Education World University Rankings - engineering and technology

Institution	World Ranking
California Institute of Technology	1
Massachusetts Institute of Technology	2
Stanford University	3
University of Cambridge	6
University of Oxford	8
Cornell University	12
HKUST	20
Tsinghua University	20

SENG's outstanding capabilities were further highlighted by Shanghai Jiao Tong University's Academic Ranking of World Universities (ARWU), which put HKUST at No.1 in Hong Kong in Engineering/Technology and Computer Sciences and 39th overall, ahead of Harvard (42nd), Tsinghua (45th) and Oxford (49th). In Computer Science alone, the ARWU ranked the University best in the Far East and 26th in the field globally. ARWU ranking indicators include numbers of Nobel Prize and Fields Medal winners, highly cited researchers, and articles published in top journals.

HKUST was placed 29th globally in Chemical Engineering in 2010 rankings carried out by the Higher Education Evaluation & Accreditation Council of Taiwan and based on the quality and quantity of research papers.

"All these rankings show that SENG is playing a leading role in driving forward global change in line with our standing as one of the best engineering schools in the world," Dean of Engineering Prof Khaled Ben Letaief said.

2010 QS World University Rankings - engineering and technology

Institution	World Ranking
Massachusetts Institute of Technology	1
Stanford University	2
University of California, Berkeley	3
University of California, Los Angeles	15
Princeton University	21
Harvard University	22
HKUST	26
Purdue University	28

Environmental Research Secures National Award

An environmental project involving the research of Prof Joseph Hun Wei Lee, HKUST Vice-President for Research and Graduate Studies and Chair Professor of Civil and Environmental Engineering, has received a 2010 State Scientific and Technological Progress Award (Second Class) from the Chinese State Council.

Prof Lee's project, "Buoyant Jets in Complex Environments – Theory, Innovative Technology and Application", makes it feasible to predict the mixing and dilution of wastewater in complex ocean currents, leading to the development of software that has worldwide applications in the design of facilities involving multiple sewage discharges into the marine environment.

His team carried out theoretical and experimental research to unravel the complicated mechanisms underlying the fate and transport of pollutants in complex ocean currents and environmental conditions. They also developed a 3D virtual reality computer modeling system called VISJET to predict and visualize the pollutant concentration and trajectory of wastewater released from a submarine ocean outlet no matter what the weather conditions.

The team's research is of global importance as quantitative assessment is essential to control water pollution in an economical and sustainable manner. The other core team members are Prof Wenping Wang, Prof Yuguo Li and Dr Valiant

Turning the Spotlight on Hong Kong

It has been an eventful few months for Prof Charles WW Ng, Associate Dean of Engineering, whose expertise in geotechnical engineering and active participation in academic and social development work has led to wide-ranging recognition that will help to enhance the visibility of HKUST and Hong Kong nationally and globally.

In June, Prof Ng, also Director of the Geotechnical Centrifuge Facility and Professor of Civil and Environmental Engineering, became the first Hong Kong academic to be appointed a Board Member of the International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE), the world's largest professional body in this field. ISSMGE was established in 1936 and it now has 86 member societies worldwide representing 18,000 individual members.

An international award-winner and frequent speaker at major conferences, Prof Ng was also invited to deliver one of the 2010 Zeng Guoxi Lectures at Zhejiang University in Hangzhou in November. His topic was "The State-of-the-Art



Centrifuge Modeling of Geotechnical Problems". The prestigious series, set up in 2007, features distinguished lectures by world-renowned scholars from China and overseas. Six such lectures have been presented so far by leading global scholars including two Chinese academicians, one member of Canadian Academy of Engineering, one Fellow of the Royal Society of Canada, the immediate Past President of ISSMGE and one Fellow of the Royal Academy of Engineering, UK.

In addition, Prof Ng was honored locally when he became one of the first recipients of the 40+ Distinguished Award 2010 presented by the 40+ Association, a non-profit-making organization formed by members of the business community and dedicated to supporting the well-being of people over 40. The award is based on four areas of achievement: career, social, character and direction of life in middle age. Dr John Cho Chak Chan, the former Council Chairman of HKUST, was the Head of the Judging Panel. Secretary for Justice Mr Yan Lung Wong was the Guest of Honor at the presentation ceremony.



Cheung of the Faculty of Engineering at the University of Hong Kong, and Prof Hongwu Tang of Hohai University, Nanjing.

The jet theory and computer models developed by Prof Lee's team have also been effectively applied to projects in Hong Kong. For example, they have been used for environmental impact assessment of the Hong Kong Harbor Area Treatment Scheme, the Yuen Long Bypass Floodway Project, and to help in understanding the airborne transmissions in the Amoy Gardens SARS outbreak in 2003 and isolation room ventilation design in hospitals.

The award-winning project is based on environmental

hydraulics and engineering research funded by the Croucher Foundation, the Hong Kong Research Grants Council and the Innovation and Technology Commission. There were more than 680 nominations for the state awards in 2010.



Faculty Honors, Awards and Achievements

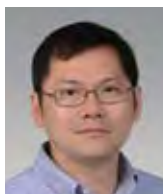
- Dean of Engineering Prof Khaled Ben Letaief received the 2010 Outstanding Electrical and Computer Engineer Award from Purdue University in the US. The prestigious annual award is bestowed upon Purdue Electrical and Computer Engineering alumni who have made extraordinary contributions to economic development, prosperity, and technological advancement. About 180 individuals worldwide to date have received this distinction out of more than 20,000 alumni and Prof Ben Letaief was the only 2010 recipient from outside the United States. Prof Ben Letaief gained a BS with Distinction, MS and PhD degrees in Electrical Engineering from Purdue. He joined HKUST in 1993.



- Prof Vijay Bhargava, Electronic and Computer Engineering, has been elected to serve as the IEEE Communications Society President-Elect during 2011 and as President during 2012 and 2013. The IEEE Communications Society is one of the largest societies in the IEEE family, with over 50,000 members in 150 countries.



- Prof Chak Keung Chan, Chemical and Biomolecular Engineering, became founding Head of the Division of Environment on December 1, 2010 following a competitive international search and rigorous selection process. Prof Chan had been Acting Head of the newly established Division of Environment and the Director of the Institute for the Environment since September 2009. He is renowned for his work in the area of aerosol chemistry and air pollution, and is the executive editor of the major journal *Atmospheric Environment*.



- Two articles published by the research group led by Prof Mansun Chan, Electronic and Computer Engineering, are among the top 10 articles published in the same domain, according to BioMedLib. The articles are: "Modulatory Action of Potassium Channel Openers on Field Potential and Histamine Release From Rat Peritoneal Mast Cells" by C K Yeung, J K Law, S W Sam, S Ingebrandt, H Y Lau, J A Rudd, M Chan (*Canadian Journal of Physiology and Pharmacology*, August 2009) and "The Use of Microelectrode Array (MEA) to Study the Protective



Effects of Potassium Channel Openers on Metabolically Compromised HL-I Cardiomyocytes" by J K Law, C K Yeung, B Hofmann, S Ingebrandt, J A Rudd, A Offenhäusser, M Chan (*Physiological Measurements*, February 2009). The BioMedLib search engine finds the best response to queries from millions of biomedical articles in the US National Library of Medicine's MEDLINE database.

- Prof Vladimir Chigrinov, Electronic and Computer Engineering, participated as a panel speaker in the 3rd Russian Nanotechnology Conference 2010, organized by the Russian Corporation of Nanotechnologies (Rusnano). The conference is a key annual event combining topics such as nano-electronics, nano-photonics, and nano-diagnostics, among others. During the conference, Russian officials, in particular Rusnano president Anatoly Chubais, expressed great interest in collaborating with Mainland China and Hong Kong.



- Prof Mounir Hamdi and Prof Bo Li, Computer Science and Engineering, have been elected Fellows of the prestigious Institute of Electrical and Electronics Engineers (IEEE). Prof Hamdi and Prof Li are experts on networking and communications. Fellowship of IEEE is one of the most prestigious honors bestowed on individuals with an outstanding record of accomplishments in the field of engineering. The Institute currently has 395,000 members in more than 160 countries and is the world's largest professional association of its kind.



- The Shanghai Stock Exchange has appointed Prof Jeff Hong, Industrial Engineering and Logistics Management, as Visiting Senior Financial Economist. While there, Prof Hong will conduct research on risk identification and management.



- Prof Xijun Hu, Chemical and Biomolecular Engineering, was elected to the Board of Directors of the International Adsorption Society in May 2010 in recognition of his outstanding achievements. Prof Hu was the first globally to propose using micropore size distribution to study multicomponent adsorption equilibrium and kinetics.

■ Prof J S Kuang has been elected President of the International Society for Computing in Civil and Building Engineering (ISCCBE), one of the world's leading international professional societies for computation in civil, construction and structural engineering.



■ Prof Chung Yee Lee, Industrial Engineering and Logistics Management, has received an Excellence Service Award from the Production and Operations Management Society. In November, he also delivered a keynote speech on "Ocean Container Transport: Making Global Supply Chain Management Effective" at the Institute for Operations Research and the Management Sciences annual conference in the US.



■ Prof Ricky Lee, Mechanical Engineering, has won the IMAPS-2010 John A Wagon Technical Achievement Award. The International Microelectronics And Packaging Society (IMAPS) is the largest society dedicated to the advancement and growth of microelectronics and electronics packaging. The achievement award is presented to a member of the Society who has made outstanding technical contributions related to microelectronics technology. IMAPS currently has more than 8,000 members around the world.



■ Prof Christopher Leung, Civil and Environmental Engineering, has been elected Honorary President of the International Union of Laboratories and Experts in Construction Materials, Systems and Structures (RILEM) for 2011. RILEM, established over 60 years ago, promotes the development and application of sustainable construction materials through organizing/sponsoring international conferences and the formation of technical committees. RILEM members come from over 70 countries worldwide and RILEM committee reports often become the foundation of local codes or testing standards in various countries.



■ Prof Matthew McKay and his PhD student Yueping Wu, Electronic and Computer Engineering, received the Best Paper Award at the IEEE Global Communications Conference



(Globecom) 2010, sponsored by Qualcomm. Globecom is an IEEE flagship conference on telecommunications with over 3,000 paper submissions. Only 11 papers are selected for Best Paper Awards.

■ The IT Hong Kong Chapter has elected Prof Daniel P Palomar, Electronic and Computer Engineering, as its Chairman with effect from January 2011.



■ A paper by Prof Huihe Qiu, Mechanical Engineering, published in the *Journal of Micromechanics and Microengineering* in 2009, has been selected as a 2009 Highlight and one of the most frequently downloaded papers. The paper was entitled "Bubble Dynamics Under a Horizontal Micro Heater Array" and co-authored by Mechanical Engineering PhD 2010 graduate Xiaopeng Qu.



■ Prof Li Qiu, Electronic and Computer Engineering, has been elected a Fellow of the International Federation of Automatic Control (IFAC), a prestigious international honor in the area of automatic control and systems engineering. Only 17 people in the world were elected IFAC Fellows in 2010 and Prof Qiu was the only one from Hong Kong. There are only two other IFAC Fellows in Hong Kong, including Prof Xiren Cao, Chair Professor of Electronic and Computer Engineering at HKUST.



■ Prof Man Wong, Electronic and Computer Engineering, has been elected Chairman of the Society for Information Display (SID) Hong Kong Chapter. SID provides a platform for industry collaboration, communication and training in the latest electronic-display technologies. It has more than 6,000 professional members around the world.



■ The Association for Computing Machinery (ACM) has elected Prof Jiang Xu, Electronic and Computer Engineering, to be a Distinguished Speaker. ACM is the world's first and largest computing society. It has over 100 chapters and 97,000 members worldwide.



Top Teachers Recognized

All-round dedication to teaching and learning excellence saw Prof Ying Chau, Chemical and Biomolecular Engineering, take top honors in the SENG Teaching Excellence Appreciation Awards 2009-10. Prof Chau was awarded the Distinguished Teaching Award for her clear, insightful delivery of course materials which consistently earn her strong results in student evaluations, her enthusiasm for experience-sharing with colleagues, and her involvement in departmental activities such as teaching quality assessment and the intern program.



The award scheme focuses on rewarding undergraduate teaching which shows continuous excellence and fosters students' interest in the subject and their ability to learn. Two other academics were recognized with Teaching Awards. Prof Kam Tim Woo, Electronic and Computer Engineering, has played a leading role in supporting undergraduate students in external project competitions, student recruitment and mentoring, and course development. Prof Huihe Qiu, Mechanical Engineering, has devoted great energy to the development of new courses, and

keeping class and lab teaching at the cutting edge.

Students

First PhD Fellowship Awardees Take to Life at SENG

The School of Engineering (SENG) got off to an outstanding start in the Research Grants Council's (RGC) PhD Fellowship Scheme which encourages top young minds from around the world to study in Hong Kong. SENG attracted 19 of the 32 students that joined HKUST in the scheme's first batch of awardees, the most among schools at HKUST and the top number for all engineering schools in the city. HKUST attracted more than one-third of the total awardees, including 11 different nationalities.

For Indian-born Ankit Garg, Civil and Environmental Engineering, the reputation of SENG's Geotechnical Group and its cutting-edge global research drew him to Hong Kong. The high-flying Indian Institutes of Technology (IIT) graduate decided to apply for the RGC's Fellowship Scheme rather than take the traditional US or European route of many of his fellow graduates after discovering through his own reading of international research papers that many of the leading names and studies in the geotechnical field were connected to HKUST. Ankit explained, "My IIT professor said to me, 'You have read many research

papers. Which part of the world concentrates on new research?'" The answer was Hong Kong and HKUST.

Danhui Cheng, Bioengineering, is looking to not only further her knowledge at SENG but to broaden her network through social activities. She extends her great passion in singing at HKUST. "Within the first month, I had joined the HKUST choir," she said. "I was in the choir at Tsinghua University, where I took my undergraduate degree in Chemical Engineering. I hope to find new friends and good memories here."

While at Tsinghua, Danhui was selected for internship by Dow Chemical Company, going into the field every day to learn about production from the engineers. She also feels fortunate to be one of the first awardees in the Fellowship Scheme. "I like the environment in Hong Kong and feel proud to attend a high-ranking institution such as HKUST. It is my dream that one day I can become a faculty member in Hong Kong."

For more information on the Fellowship Scheme, visit www.ust.hk/hkpfs/. The application deadline is usually early December.



ROBOTICS

Reveals Way to Individual Enterprise and Team Spirit



With all-round development an integral part of a HKUST education, School of Engineering (SENG) students are encouraged to take part in a variety of activities outside the regular curriculum, including competitions. Such contests are important as they enable students to apply what they learn at HKUST, encourage independent thought and widen their perspectives by associating with peers in other local and overseas institutions.

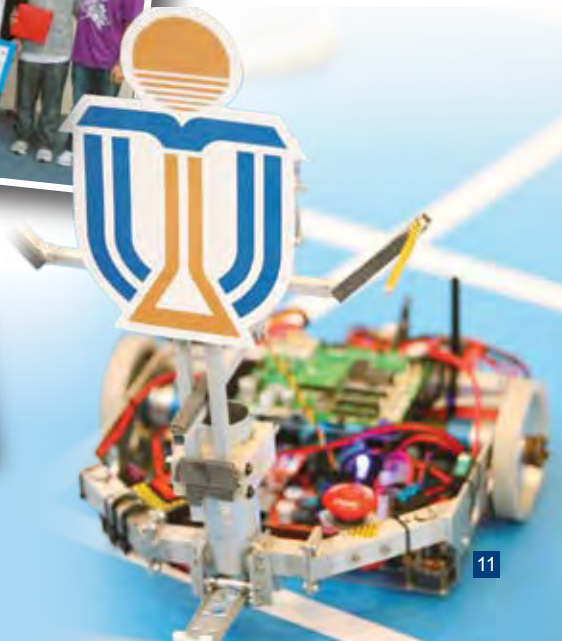
The annual Robocon Hong Kong Contest is one such popular event. The inter-institutional competition for higher education students encourages the design and construction of robots which must then complete a task. This provides students with real experience of a challenging project, including cooperating with others, problem-solving and time management.

The strong capabilities of SEN G students to succeed in such a challenge can be seen in the School's high-performing track record in the contest's seven-year history. Since 2004, SEN G teams have won the Hong Kong Championship twice, First Runner-up once and Second Runner-up four times. They have represented Hong Kong in the international final in 2005 and 2008 and brought home the Second Runner-up award in 2005.

Participants are enrolled in the credit-bearing Engineering Special Project course, run by SEN G professors, to enhance their skills in robotics. In addition, a tradition of experienced Robocon team members coaching newcomers has developed, boosting team management skills and personal development as well as helping fellow students.

However, it is also emphasized to students that success is not simply a matter of winning or losing but should be judged on dedication, determination to tackle problems and the drive for excellence.

Preparations for the 2011 Robocon contest are already underway, with recruitment of students in September followed by coaching in the form of tutorial classes. The numbers of students signing up have shown a major increase and now encompass all SEN G departments and the School of Science, an indication of the enthusiasm for robotics at HKUST and the benefits that participating in such contests can bring. To give students a taste of the competition and gain hands-on experience, an internal contest was held in November in the Atrium on campus. The event also captured the attention of other HKUST students and increased their interest in how to build robots.





Learning to Teach, Teaching to Learn

Prof Edmond Ko, Director of the School of Engineering's new Center for Engineering Education Innovation (E²I), sets out the exciting plans for the pioneering unit, the first of its kind in Hong Kong.

Why has E²I been established now?

An engineering school should be strong in two major activities: education and research. That is the starting point. This is already a very strong engineering school and we feel we could be a leader in engineering education. Engineers are always interested in education and have a history of leadership in the education field in general. In fact, *the Journal of Engineering Education* will be publishing its centennial issue in 2011. With the recent research advances on learning, Hong Kong's mix of western and eastern values, our position as a young, dynamic and forward-looking engineering school, this seemed the right time to build on our existing strengths and do something special. That's why we established E²I in Fall 2010.

What does the Center seek to achieve?

There has been a great deal of exciting research in recent years on "engineering learning". How do engineering students learn? What attributes do we want our graduates to have? How do we help them to acquire those attributes? We hope to bring the latest research findings to our educational practice. The initial focus is to try to do what we call research-informed practice and to contribute to the body of knowledge through our own research from working with our students. This scholarship-driven approach makes E²I different from other support units. We are trying to contribute to the literature on engineering education.

How does E²I intend to advance learning?

We are focusing first on "helping people in transition". For students, the transition from secondary school to university is known to be very difficult. Another transition that can be stressful is the move from being a postgraduate student or post-doctoral researcher to a faculty member. We would like to provide support for these two groups of people. The theme also allows us to show how the Center encompasses both students and faculty and works directly with them both on their learning and development.

In what form is such learning and development support offered to students?

Our vision is ambitious but we are a small unit and realistic as to what we can accomplish initially. We have started a peer mentoring program to provide support for incoming students admitted under the School-based Admission Scheme. This type of support is especially important in 2012 when all students taking the first four-year degrees will be admitted this way. Research has shown that peer learning, including peer instruction, peer mentoring, and peer advising, is an extremely important component in a university experience. We also see peer mentoring as a great opportunity to empower our mentors through assisting in the learning of other students. If we put our students in the position to teach, they have to think what they want other people to learn and why. How can they help that learning to happen? And in the process they will become self-regulated learners themselves.

And for faculty?

We have started by running a course co-facilitated by the Center for Enhanced Learning and Teaching (CELT), HKUST's university-wide faculty development unit, looking at the basic principles of teaching and learning. What we are trying to do is make early career engineering faculty feel more comfortable in the classroom and therefore more effective in helping their students learn. With time, I hope faculty will see E²I as a place where they can find support in their practice by being kept up to date with the latest engineering education developments, and other aspects of their career such as career planning and balancing different work demands.

What are the long-term benefits for both groups?

For our faculty, they learn to teach. Then through teaching, they teach to learn. It is the same for our students. They learn to teach through our developmental program and through teaching their peers they learn. It is this synergism between

Center for Engineering Education Innovation (E²I)

Rooms 6581-6583



teaching and learning that contributes to their personal growth. I cannot teach you how to be a self-regulated learner. But if I give you the opportunity to teach others and provide you with support along the way, then through teaching, you learn. That is why our slogan is “learning to teach, teaching to learn”.

What is E²I’s relationship with the University’s Center for Enhanced Learning and Teaching?

In terms of our work with CELT, E²I is not here to compete but to collaborate. E²I can offer what I call discipline-specific expertise whereas CELT can provide generic teaching and learning insights. To have a university-level unit working closely with a discipline-based unit is inspiring and very special. There is international discussion over whether support for students and faculty should be centralized or distributed and I think our model suggests it is not either/or; it is synergy.

How can E²I contribute to engineering education research?

Much of the research is currently being done in western societies: North America in particular, Europe, Australia. We are not just bringing what is happening elsewhere into Hong Kong but trying to develop it for the local context. We are dealing with Chinese learners with different learner characteristics. This gives us a window of entry to the worldwide

community of researchers given the huge population of Chinese students in the west. Hong Kong’s unique history, the students we have, the education reform and new curriculum coming up offer wonderful experimental ground for us to contribute back to the literature. We also want to establish an international network and see E²I as a great opportunity to collaborate with similar centers in other locations.

How do you envisage the future?

As I said earlier, we are a small unit and will roll out different programs with time. We are starting to look at support for postgraduates and currently undertaking a training needs analysis. Eventually, we would like to include training programs for the School’s staff as well. We have a vision that learning and development underpins all that we do and E²I has been established to build that culture of learning. I want people to learn because it is fun. If you enjoy learning, you will pursue it throughout your life. That to me is the goal of education: life-long learning.



Event That Is Out of This World



A School of Engineering (SENG) student has had a minor planet named after him becoming the second SENGL student to be accorded such an honor.

Michael Chun Hei Lam, Year I, Mechanical Engineering, gained the accolade for research carried out while a secondary student at Shun Tak Fraternal Association Yung Yau College in Tin Shui Wai. The young innovator was nominated by Hong Kong Astronomical Society President William Kwong Yu Yeung for his enthusiasm for scientific research, which led him to develop a novel approach to recycling plastic. Chun Hei learned the naming had been accepted by the International Astronomical Union in October.

Chun Hei's achievement was to come up with a method that saves the manpower costs involved in separating out the various kinds of plastic by recycling them together. The environmentally conscious student was inspired to find a solution after watching a television program and learning how expensive it was to recycle plastic. One water bottle, for example, may contain different plastics for cap, bottle and label. Chun Hei's idea was to use heat to control the melting point of plastic. Mixing the plastics together also formed a new and tougher type of plastic.

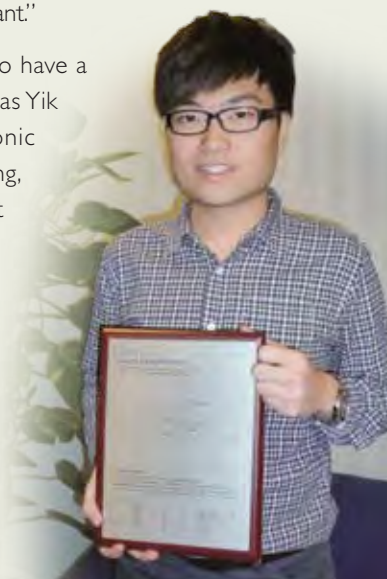
To undertake some of his research, the then Secondary Four student had to travel from Tin Shui Wai to a downtown university at weekends for a year to use a mechanical engineering laboratory.

The journey alone took one hour and 45 minutes per trip. But the hard work and determination eventually paid off, with awards for his "Self-reinforced Polymer Composite From Postconsumer Waste" research project in local, national and international competitions in the past few years, including the 2010 Intel International Science and Engineering Fair in California.

The official name of Chun Hei's planet, located between Mars and Jupiter, is 110074 Lamchunhei. Fellow secondary student On Ki Lee had a separate planet named after her for research on oolong tea and its role in inhibiting cancer cell growth. Both planets were discovered in 2001 by William Kwong at the Desert Eagle Observatory in the US state of Arizona.

"I was very happy to hear the news of my honor," Chun Hei said, "and so were my parents. We hope this will open the way for other opportunities, such as working with SENGL professors on research as a student assistant."

The first SENGL student to have a planet called after him was Yik Hei Chan, Year 3, Electronic and Computer Engineering, who created an intelligent security robot when still a school student, among many other innovative ideas.



Winning Approach to Innovation

School of Engineering (SENG) students triumphed again in this year's President's Cup 2010 taking all three prizes in the prestigious HKUST undergraduate research and innovation competition. The overall winners were a team from the Department of Chemical and Biomolecular Engineering comprising Kit Yi Leung, Ho Yan Tse, Nok Kwan Wong and Hok Ting Yau, who focused on ultrasound-mediated delivery of macromolecules to the eye. Second and third places went to students from the Department of Electronic and Computer Engineering. Yangyang Liu won the Gold Award with an investigation of optothermal manipulation of microparticles while Xiaoyu Li took the Silver Award for his exploration of hand-eye coordination for visual targets by Hebbian learning using neural networks.

SENG students have swept the awards in the President's Cup since 2007, demonstrating the enterprise and creativity of its undergraduates. Key factors in assessing entries are the projects' objectives, originality and innovation. The winners received their awards from HKUST President Prof Tony Chan at the University's 18th Congregation on November 10.



Printing Out a Better Future for the Visually Challenged



While many people do not realize how important engineers are in helping to change people's lives for the better, Patrick Kwan Pak Lee and Matthew Kin Man Ting know from direct experience during their time as SENG undergraduates what a difference they can make. Under the guidance of Prof Tim Woo, Electronic and Computer Engineering (ECE), the Class of 2010 duo set their skills and knowledge to work to assist the visually challenged. The Braille printer they came up with dramatically reduces the usual cost as well as the turnaround time for printing.

Regular Braille embossers sell for HK\$30,000 whereas the ECE students' machine, based on recycling dot-matrix and ink-jet printers, costs just HK\$1,000. The students adapted the old printers for embossing and developed a program that turned text in a word file directly into Braille. Such machines can print 80 Braille characters per minute and enable the visually challenged to print materials themselves rather than going to social centers where demand means it can take up to a week for a job to get done. The project had special significance for Patrick whose parents are among the visually challenged.

The students' invention went on to win numerous engineering design awards including the Gold Award and Most Innovative Award in the 2010 Amway Pan-Pearl River Delta Region Universities IT Project Competition, and a Merit Award in the 10th

International Asia Pacific ICT Alliance Awards 2010. Their win in the Pan-Pearl contest against 50 other teams from nine provinces, plus Hong Kong, Macau and Taiwan, brought them congratulation letters from the Hong Kong government's Secretary for Commerce and Economic Development Mrs Rita Lau Ng Wai-lan. In addition, the project was showcased at the Hong Kong Rehabilitation Power Carnival in November.

More than 200 ECE students have entered rehabilitation and other tools into engineering design competitions in recent years, winning many local and overseas awards. "We encourage engineering students to make use of their professional knowledge and to contribute by developing useful devices for those in need," Prof Woo said. "As engineers, we do not only develop leading-edge technology, but also improve people's lives through technology."



Final-year IELM Students Shine

Celebrations were in order in the Department of Industrial Engineering and Logistics Management (IELM) as two undergraduate teams took major prizes at the Institute of Industrial Engineers (Hong Kong) Final Year Project Competition 2009-10, including the top award.

Wing Lam Au, Man Lung Liu, On Lee Sun and Tsz Wan Wong received the Champion award for their project on corporate revenue management of advertising. The study seeks to help companies allocate their advertising budgets effectively through developing an optimization model and Media Planning Analyzer computer program to provide insight on advertising planning decisions for multiple media.

Ye Gong, Long He, Hiu Ping Ng and Yang Yang gained the Second Runner-up prize for their study of "Decision Making in

Mass Vaccination Through Epidemic Modeling". The innovative project puts forward a vaccination deployment model with the help of optimization and simulation techniques.



Student Honors, Awards and Achievements

- Four Computer Engineering students have created a highly useful HKUST Library Catalog Android App as part of their Year 2 course on Embedded System Software. The application developed by Ian Chan, Vincent Chan, Alan Si and Sheung On Tsai enables those with Android-powered smartphones to search the books and other materials available in the HKUST Library. The app can be downloaded free from the Android Market.
- MPhil student Kewei Chen, Mechanical Engineering, received the Cisco Best Student Paper Award (third place) at the ICEPT-HDP 2010 conference in Xian. The award is sponsored and awardees selected by a panel from Cisco in the US.
- PhD student Brian Xinqing Chen, Chemical and Biomolecular Engineering, was recognized with a certificate of excellence at the 2010 Young Scientist Awards in Engineering Science, organized by the Hong Kong Institution of Science. The annual awards are presented to postgraduate research students or recent graduates who have demonstrated research excellence in science or technology and shown themselves to be promising scientists or engineers.
- Yuncong Chen, Year 3, Electronic and Computer Engineering, had his Final Year Thesis accepted by the 23rd International Conference on Computational Linguistics, which has a 19% acceptance rate for oral papers. Yuncong was the first author of the paper, a remarkable achievement for an undergraduate.
- Pui Sie Chong, Ho Ki Ma and Chun Hang Wong, Electronic and Computer Engineering, won the Varitronix 30th Anniversary Scholarship for the Best Final Year Project (FYP) on Display Technology 2009-10 for their study on "Photo-Aligning Materials and Technology: Physics and Application in Liquid Crystal Devices". Varitronix Limited, a leading Hong Kong LCD manufacturer, donated a total of HK\$150,000 to the Department to establish the annual Best FYP Award on Display Technology from 2008-12.
- PhD candidate Weiwei Cui, Computer Science and Engineering, has been awarded an IBM PhD Fellowship for the 2010-11 academic year. Weiwei received his Bachelor degree in Computer Science from Tsinghua University. His research interests include visualization and visual analytics. IBM PhD Fellows are matched with an IBM mentor and encouraged to intern at IBM.
- PhD student Ning Guo and MPhil student Yun Man Lau, Civil and Environmental Engineering, have been awarded scholarships by the Association of Geotechnical & Geoenvironmental Specialists (Hong Kong).
- Computer Science and Engineering PhD student Gabriel Yik Keung received the Best Paper Award at the IEEE ICC 2010, held in South Africa, for work on "The Base Station Placement for Delay-constrained Information Coverage in Mobile Wireless Networks". The IEEE International Communications Conference (ICC) is the IEEE Communications Society flagship conference.
- MPhil student Tom Yu Ting Ko, Computer Science and Engineering, won second place in the 4th IEEE Hong Kong Signal Processing Postgraduate Forum with his paper on "Automatic Estimation of Decoding Parameters Using Large-Margin Iterative Linear Programming". The event was organized by the IEEE Hong Kong Chapter of Signal Processing.
- A Mechanical Engineering final year design project (FYP) team won the Energy Institute's Best Energy FYP Project Competition. The winning project, "Development of LED Backlighting for McDonald's Logo Signs", was completed by Chi Yeung Li (team leader), Ka Chun Hon, Chuan Keat Low and Jun Ma, all 2010 BEng graduates. The Energy Institute contest is an inter-tertiary institution event that seeks to recognize energy-related achievements of final-year students.
- PhD student Jian Li, Industrial Engineering and Logistics Management, enjoyed double success for his research in 2010. He won the First Prize in the IBM Best Student Paper Award at the 2010 INFORMS Service Science Conference in Taipei, Taiwan for his paper "Directional Monitoring Schemes for Multivariate Categorical Processes". He also received a Best Student Paper Finalist Award in the Quality, Statistics and Reliability Section of the INFORMS Annual Meeting for his paper "Multivariate Categorical Charting Techniques via Log-Linear Models". Both papers were co-authored by Prof Fugee Tsung and Dr Changliang Zou. The Institute for Operations Research and the Management Sciences (INFORMS) is the largest professional society in the world for those in the field.
- Yangyang Liu, Electronic and Computer Engineering, and Yang Yang, Industrial Engineering and Logistics Management, were named First Runners-up in the Mr Armin and Mrs Lillian Kitchell Undergraduate Research Award. Ho Yee Poon, Chemical and Biomolecular Engineering, was named Second Runner-up. A total of six students out of 250 across HKUST were selected for awards. Recipients were chosen from those who participated in HKUST's Undergraduate Research Opportunities Program, which enables students to actively engage in research under the guidance and supervision of professors. All three School of Engineering awardees were 2010 graduates.

- Mechanical Engineering 2010 graduates Tung Lu, Man Ka Wong and Wing Yin Wong gained the First Runner-up award in the 2010 Schneider Electric Energy Efficiency Cup while studying for their Bachelor degree.
- PhD student Kwan Ting Ng, Electronic and Computer Engineering, received the Best Student Paper Award at the IEEE International Symposium on Circuits and Systems (ISCAS) 2010 for his paper "A Frequency-Based Signature Gas Identification Circuit for SnO₂ Gas Sensors". At the same conference, MPhil student Xinxin Wang, Electronic and Computer Engineering, won the Best Paper Award in the Neural Systems and Applications track with his paper "GPU Implementation of Fast Gabor Filters". ISCAS is the world's premier networking forum for leading researchers in the fields of theory, design and implementation of circuits and systems.
- PhD student Sujiang Rong, Electronic and Computer Engineering, won an AMD/CICC Student Scholarship Award at the 2010 IEEE Custom Integrated Circuits Conference (CICC), held in California, US, for his paper "V-Band Varactor-less Interpolative-Phase-Tuning Oscillators with Multiphase Outputs". CICC is the premier conference focused on integrated circuit development. Sujiang's paper "A 0.05-to-10GHz, 19-to-22GHz, and 38-to-44GHz SDR Frequency Synthesizer in 0.13um CMOS" has also been accepted for the 2011 International Solid-State Circuits Conference (ISSCC), known as "the Chip Olympics", in San Francisco in February. The ISSCC is the foremost forum for presentation of advances in solid-state circuits and systems-on-a-chip.
- Class of 2010 graduate Chak Fong Sun, Electronic and Computer Engineering, won the Bronze Award at the Creating Mobile Applications for Smart Phones Competition for World Telecommunication and Information Society Day – Hong Kong. The competition was organized by the Communications Association of Hong Kong and Pui Ching Academy. Chak Fong received his award for his Wireless CCTV surveillance security system, an application that uses a smartphone as a mobile home security system.
- PhD student Yange Suo, Chemical and Biomolecular Engineering, received a poster award at the 1st International Fuel Cell Summer Seminar for Young Scientists 2010 held in Yamanashi, Japan. Yange won the award for her paper "Impedance Based Mechanistic Understanding of Formic Acid Oxidation on Pd/C and Synthesis of Bimetallic Pd-Au Nanoparticles for Direct Formic Acid Fuel Cell Application".
- PhD student Lu Wang, Computer Science and Engineering, has been selected for the Microsoft Research Asia Fellowship Program out of 95 PhD candidate nominees from 45 leading research universities/institutions from Mainland China, Hong Kong, Taiwan, Australia, Japan, South Korea, and Singapore. Lu's research interests include algorithms on wireless sensor networks and other similar environments.
- Ka Yeung Wong, Year 3, Mechanical Engineering, received a gold award from the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Hong Kong Chapter for his outstanding academic achievement.
- Computer Science and Engineering PhD student Yu Zhang received the Best Paper Award at the Proceedings of the 26th Conference on Uncertainty in Artificial Intelligence for his study on "A Convex Formulation for Learning Task Relationships in Multi-task Learning". The paper was co-authored by Prof Dit Yan Yeung. The conference was held in California, US.
- PhD student Chunhua Zhou, Electronic and Computer Engineering, received the Charitat Award at the 22nd International Symposium on Power Semiconductor Devices and ICs (ISPSD) 2010. The award is granted to the most outstanding oral paper at ISPSD, the leading forum in its field, in which the first author and presenter is a young researcher. Chunhua's winning paper was entitled "Self-protected GaN Power Devices with Reverse Drain Blocking and Forward Current Limiting Capabilities".
- Generating creative proposals for developing viable new business opportunities for the free media industry was the order of the day for two teams from Dual Degree Program in Technology & Management (T&M) in the AM 730 Media Limited-HKUST Corporate Project 2010. Two four-person groups spent three months analyzing and researching the business sector, then presented the proposals they came up with to a judging panel. The winning team's idea focused on building new value for existing and new customers and advertisers through the use of social media. The Corporate Project is a key enrichment activity in the high-flying T&M Program to boost students' entrepreneurial spirit and practical business knowledge.

Setting a Constructive Example

Acting President of the Students' Union Ivan Yik Ching So, Industrial Engineering and Logistics Management, has received the Stephen Cheong Kam-chuen Medal for Distinguished Service in recognition of his constructive leadership and commitment to his fellow HKUST students during his term in office in 2009-10.

The Year 3 undergraduate, also the Student Union's Internal Vice-President, took on the top position when the President stepped down for personal reasons shortly after being elected into office.

Since then, Ivan has greatly assisted in advancing students' interests within HKUST, including becoming the first student member to be elected on to the University Council. He has boosted internationalization by organizing visits to counterparts in universities in the mainland and receiving student union representatives from overseas. Inspiring students to help others and build

a caring culture on campus, Ivan also successfully mobilized students to organize a campus-wide charity concert, "Pass the Love". Funds raised by the show were donated to Sowers Action to help to re-build schools following the Sichuan earthquake. Ivan received his medal from HKUST President Prof Tony Chan at the University's 18th Congregation on November 10.



Learning How to Work on Behalf of Others

Daisy Sihui Li, Year 2, Dual Degree Program in Technology & Management, enjoyed an exciting summer when she was nominated to represent HKUST at the University Scholars Leadership Symposium held in Malacca, Malaysia in August. At the Symposium, Daisy joined delegates from Oxford University, Cambridge University and many other world-renowned higher education institutions, all of whom shared a passion for humanitarian service.

Along with other representatives, the Industrial Engineering & Engineering Management and General Business Management student took part in the thought-provoking five-day training program focusing on management of service projects. The program sets out to help young leaders of tomorrow acquire the planning, management and implementation skills to undertake humanitarian projects locally and globally and to inspire them to be agents of change. Capabilities ranged from screening of volunteers to innovative ways of fund-raising.



Learning How to Lead

The benefits of listening to top business people and academics share their insights on what it takes to be a good leader saw MPhil student and Li & Fung exchange scholarship recipient Henry Chi Ming Lee, attending the annual Fung Scholars Leadership



Conference for his third consecutive year. "I find the event is a great way to absorb the best from the best leaders," the Electronic and Computer Engineering student said.

At this year's conference, organized by the Victor and William Fung Foundation and held in Hong Kong on October 3, MIT Professor of Management and Political Science Richard Locke gave an inspiring speech on "Changing Leadership: The Role of Young Leaders in the Context of Globalization". This was followed by a wide-ranging discussion which even students outside the conference could participate in as it was broadcast live over the web. Mr Po Chung, co-founder of DHL, and Dr Victor Fung, chairman of the Li & Fung Group also attended the conference.

Henry was awarded his scholarship in the scheme's inaugural year of 2006-07, spending one year at the Royal Institute of Technology of Sweden. Some 99 HKUST students have received Li & Fung scholarships to date. The scheme was established to commemorate the Group's centenary.

Lighting Hong Kong's Way to a Bright Future



Electrical and Electronic Engineering 2002 PhD graduate David Guo Wei Xiao is a great example of how HKUST's world-class reputation can draw talents to Hong Kong who subsequently helps to boost the city's economy and innovation.

Dr Xiao is founder of light-emitting diode (LED) chip company, Advanced Photoelectronic Technology Ltd (APT), now a leader in its field in Hong Kong and Mainland China. He established APT a year after graduating from HKUST. Starting with just two staff and using offices and equipment from HKUST's Entrepreneurship Center, APT grew rapidly. It has currently attracted HK\$400 million in investments from overseas and Greater China and is expanding its 35,000sq m factory and production line in Nansha.

The company's LED chips are used for purposes ranging from indoor illumination to a light source for LED televisions. With quality comparable to the US and Europe but costing 20% less, APT has established a strong niche for itself. It has more than 10 patents in China and the US and sales volume of US\$15 million.

Many Electronic and Computer Engineering graduates have also joined Dr Xiao's company, including BEng and MPhil graduates Yin Hing Lai, now Associate Manager of LED Chip Development at APT and Chi Wing Keung, who is R&D Project Supervisor.

Dr Xiao, originally from Xian, first chose to come to Hong Kong rather than study elsewhere because of HKUST's reputation for semiconductor studies. On graduation, instead of moving to Singapore, he decided to stay in Hong Kong, making use of the Quality Migrant Admission Scheme. "There are plenty of talents, resources, funding and a sound system in Hong Kong. This is a good place for developing IT," he said.

SENG Graduates Develop First TD-LTE Terminal Chipset



A group of School of Engineering graduates, who work at the Hong Kong Applied Science and Technology Research Institute (ASTRI), have created the world's first Time Division-Long Term Evolution (TD-LTE) mobile phone chipset for pre-4G cellular technology. The next-generation telecommunication technology allows users to enjoy swift and ubiquitous internet coverage, even on high-speed trains moving at 350km per hour.

The chipset received the Technological Achievement Award at the 2009 Hong Kong Awards for Industries and was chosen by China Mobile, the world's largest telecom operator, to represent state-of-the-art technology at the Shanghai World Expo 2010. LTE is seen by most mobile carriers as the way to seamless migration from 3G toward 4G mobile communications.

The ASTRI team of School of Engineering graduates working on the technology comprises Yan Wang, 2003 PhD, Peter Chan, 2006 PhD, Elva Wang, 2007 PhD, Michael Cheung 2000 MPhil, Bob Wong 2000 MPhil, Cheong Yui Wong 1999 MPhil and Tao Li, 2006 PhD, all Electronic and Computer Engineering, Kim Hung Wong, 2007 MSc in IC Design Engineering, Zu Yuan Fang, 2004 PhD and Meng Yao Ma, 2009 PhD, both Computer Science. "I believe together we can make a remarkable impact in this niche," Dr Zu Yuan Fang said.

The team has successfully conducted inter-operability tests with cellular base station vendors including Motorola, ZTE and Alcatel-Lucent.



A 3D Trip Round Your Future Home

For those planning to remodel their living environment and wanting to get a feel for how their apartment or house will look ahead of time, Vecoord Technology (HK) Ltd, has just the answer: an easy-to-use 3D interior design application that offers the virtual experience of walking around your new home.

Vecoord was set up by a group of HKUST alumni in July 2009 to pursue 3D technology and internet application development. Among its first products is IDesign Home, which allows home owners and professional designers to draw up plans for renovations in 2D then convert it to 3D.

"Our competitive edge is the walkthrough, a great advance for the sector," said company co-founder Nickle Zhu, 2006 BEng and 2008 MPhil Computer Science and Engineering. "Current software is expensive, difficult and time-consuming to use. Our application offers a terrific way to see and feel what a place will be like with its new decoration and furniture." A website, www.3djiayuan.com, allows work using IDesign Home to be published so plans can be shared with friends.

The other alumni involved are Mo Ma, 2007 MPhil, Electronic and Computer Engineering, Ally Wang, 2006 BSc Economics and Finance, and Simon Fang, 2006 BBA Accounting.

Nickle, Ally and Simon all come from Shenzhen. In his last year as an undergraduate, Nickle won the best final year project award for his 3D game engine "Soul Envoy", a project he

devised himself and completed alone rather than in a group. He also received a Hong Kong ICT Award and went on to represent Hong Kong in the Asia-Pacific ICT Awards. Mo had experience of running his own company but decided to join the exciting new venture while Simon and Ally both resigned from their financial sector jobs to participate in Vecoord.

The quartet's dedication is further reinforced by the fact the company has had no income for the past two years while the software has been under development. However, plans

are now underway to market the product, with arrangements that offer users different packages depending on their needs in a similar way to mobile phones. In March 2010, Vecoord also joined the three-year Incu-Tech Program.

Organized by Hong Kong Science and Technology Parks Corporation, the program offers assistance to early-stage start-ups and has proved highly useful for the team in terms of facilities and networking opportunities.

Keeping the team going through the early days was their strong entrepreneurial spirit and belief in the project, even when others, including family members, felt taking a job would be the safer route. "For me, the greatest part of being an entrepreneur is to try to turn ideas and technologies into business success," Nickle said, "and the learning experience and satisfaction achieved in the process."



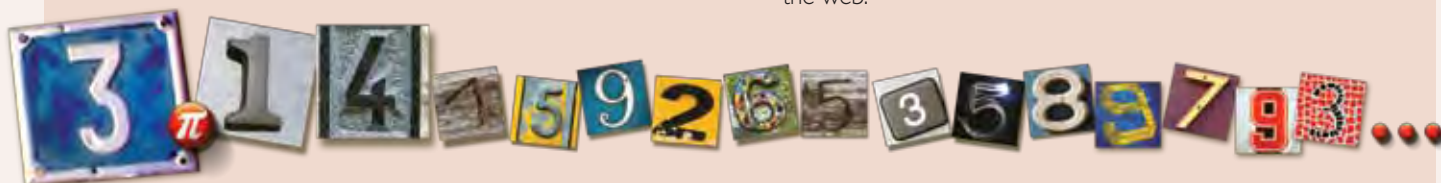
Pi Digit Calculation Sets Record

Nicholas Tsz Wo Sze, 1999 BEng and 2001 MPhil, Computer Science, and now a computer scientist at Yahoo in California, has made a record-breaking calculation of the digits of pi using his company's computers.

The breakthrough saw Nicholas's program calculate the two quadrillionth (2,000,000,000,000,000) binary digit, or bit, of pi. Using Yahoo's Hadoop cloud computing technology, he was thus able to double the previous record. The calculation

required 23 days to complete and 1,000 of Yahoo's computers, each equipped with eight processors. A regular PC would have needed 500 years to finish it.

Both BBC News and *New Scientist* magazine reported on the achievement in September. Nicholas stated in the *New Scientist* that companies such as Yahoo and Google can bring such computing power to mathematical calculations due to their need to rapidly process huge amounts of data related to the web.



Well Prepared for the Ivy League

Yong Lin Kong, 2010 BEng Mechanical Engineering, reflects on his current life as a PhD fellowship student in the Department of Mechanical and Aerospace Engineering at Princeton University and how his time at HKUST prepared him for such a move.



“My first few months at Princeton have been exciting. Studying and cycling around this traditional, beautiful and lively campus (with lots of cute squirrels) is certainly enjoyable!

Like HKUST, Princeton University provides ample support for graduate students. There are more than 10 libraries on campus with access to millions of books and papers from Ivy League universities. Just as importantly to me, there are also state-of-the-art sports facilities and hundreds of clubs so we can enjoy a well-balanced and happy campus life.

“Graduate students at Princeton are provided with the resources and freedom to get a taste of different fields before we have to decide to work with a particular professor. This flexibility is crucial as it gives us time to understand and examine our own interests before we decide to commit ourselves to a field. There are also entrepreneurship workshops with successful Princeton alumni that allow us to gain insight into career prospects outside academia.

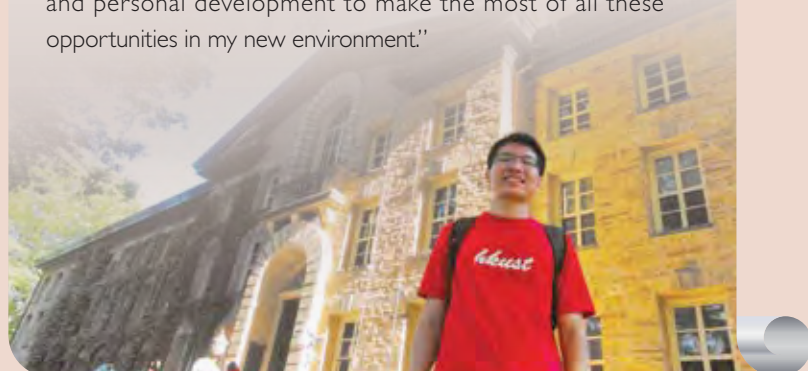
“The transition from undergraduate to graduate life is not without its challenges. We are expected, not only to understand but to be very fluent in our chosen field. Oral skills are strongly emphasized as logic and understanding will be critically examined until the presenter convinces their audience.

“Princeton also welcomes students from all around the world, which I think is one of its best features. Exchanging ideas and making friends with people from different cultural and educational backgrounds is not only fun but also helps you to see issues from multiple perspectives.

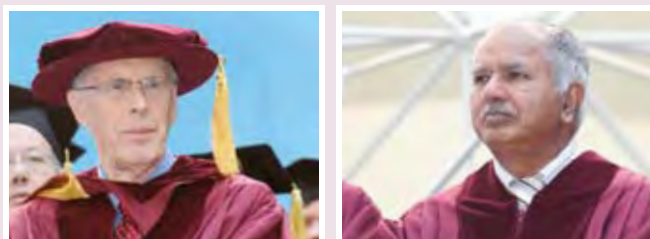
“I am very glad and grateful that the undergraduate education I received at young, energetic and global HKUST provided me with a strong foundation both academically and in terms of social skills and personal development to make the most of all these opportunities in my new environment.”

Honors and Achievements

- Lai Chun Chan, 2009 Dual Degree Program in Technology & Management, received the Award of Merit in Structures and Materials Discipline in the Paper Competition 2009 organized by the Institution of Civil Engineers (UK) Hong Kong Association. Lai Chun won the honor for his “Critical Review of the Hong Kong New Code of Practice for Structural Use of Concrete 2004”.
- Owen Ka Fai Luk, 2005 BEng Chemical and Biomolecular Engineering and 2007 MPhil, Bioengineering, won the Trainee of the Year Award from the Hong Kong Institution of Engineers.
- Wenjing Zhang, 2005 MSc Material Science and 2009 PhD Chemical and Biomolecular Engineering, has been awarded the renowned Oronzio de Nora Industrial Electrochemistry Fellowship 2010 by the Electrochemical Society, a leading international non-profit and educational organization for solid-state and electrochemical science and technology. The award is granted to one recipient on an annual basis. Dr Zhang is currently a faculty member of the Department of Chemical and Biomolecular Engineering at Vanderbilt University, US.
- Kany S Y Zhou, 2009 MPhil Mechanical Engineering, has been selected to be one of 10 Hong Kong Institution of Engineers (HKIE) President's Protégés. The prestigious scheme trains young engineers to be leading figures in society, working directly with the HKIE president on activities involving high-level leadership and management training. Kany, who gained a patent during her studies at the School of Engineering, is now working for the Hong Kong Productivity Council, where she specializes in optical design.



Distinguished Lectures Discuss Fresh Directions in Computer Science Research



The Department of Computer Science and Engineering hosted the well-received Trends and Challenges in Computer Science Research Distinguished Lecture Series on November 11. The two speakers, Prof John Hopcroft and Prof Raj Reddy, were both HKUST 2010 honorary doctorate recipients and Turing Award winners.

Prof Hopcroft, Professor of Engineering and Applied Mathematics at Cornell University, launched the lecture series with a talk entitled "Creating a Science Base to Support New Directions in Computer Science". This included discussion of initial work to build a science base to support the latest activities in the field, such as the merging of computing and communication, the enormous amounts of information now available in digital form, and the advent of social networks such as MySpace and Facebook.

Prof Reddy, Professor of Computer Science and Robotics at Carnegie Mellon University, focused on the "Grand Challenge Research Problems in Computer Science and Artificial Intelligence", ranging from algorithm design to human computer interaction and information infrastructure.

The event drew an audience of more than 120 students and faculty. Students also had the opportunity to ask questions and exchange ideas with the two eminent academics.

All Eyes on the Greater China Programming Contest

Undergraduates from Tsinghua University in Mainland China, National Tsing Hua University in Taiwan and HKUST's Computer Science and Engineering Department tested their skills against each other at HKUST in the annual Tsinghua-HKUST Programming Contest 2010 in August.

It was the second time the Greater China collegiate team competition had been held in Hong Kong, with Team One from Tsinghua University in Beijing eventually taking home the Championship from amongst seven teams.

The competition seeks to foster creativity, teamwork and innovation among computer science students.

Mainland Manufacturing Leadership Workshop Looks Ahead



With China becoming the manufacturing powerhouse for the world, there is a growing demand for its industries to upgrade and transform. Working with the local government in Zhejiang Province, HKUST's Advanced Manufacturing Institute (AMI) recently organized a well-received two-week workshop for mainland manufacturing industry leaders. Attending the workshop were CEOs and COOs from companies with revenues of 100 million RMB to 1 billion RMB.

The program content covered five modules: Strategic Planning, Decision Making, Human Resource Development, Operation Management and Internet of Things. It also provided a variety of teaching and learning methods, combining classroom lectures, hands-on lab sessions, case discussion, project competition, small group discussion, and site visits.

Prof Mitchell Tseng, Industrial Engineering and Logistics Management (IELM) Chair Professor and AMI Director, launched the workshop with a lecture on "Advanced Manufacturing and Global Competitiveness". IELM Head of Department Prof Fugee Tsung and Profs Jeff Hong, Otto Lin, Xiangtong Qi and Jiheng Zhang also gave presentations on a range of current topics.

Professor Derick Wood

With deep sadness, we report that Professor Emeritus Derick Wood passed away on October 4, 2010, in Ontario, Canada. Prof Wood joined the Department of Computer Science in 1995 and was made Chair Professor in January 2006. He became Professor Emeritus following his retirement in June 2006. From September 2001 to June 2002, Prof Wood was Acting Head of the Department. Prof Wood was highly respected by his colleagues and students who knew him as a dedicated and caring teacher. His warmth, generosity, and great sense of humor will never be forgotten.

Setting Young Minds to Work on Hospital Hygiene

A dynamic collaborative project between a Chemical and Biomolecular Engineering (CBME) professor and his researchers and Christian Alliance S W Chan Memorial College, a local secondary school, has set out to produce a fluorescent pen to monitor cleanliness in hospitals and to encourage students to find out more about engineering. The marker would be the first of its kind in Hong Kong.

Prof King Lun Yeung's project began in September and runs until March. During this time, the school students will need to find a suitable dye, which is both safe and reasonably priced, to make the pen. When the pen is run over any surface in the hospital, it should show if the area is up to standard in terms of hygiene.

As part of the study, a CBME postgraduate student from Prof Yeung's team has given a lecture to students at the College, with a follow-up lecture and lab visit to HKUST's Institute of NanoMaterials and NanoTechnology in November. Twenty-one students are participating in the project.



ECE Graduates' Dinner Celebration

The Department of Electronic and Computer Engineering (ECE) invited all of its 2010 BEng, MPhil and PhD graduates to a highly enjoyable dinner gathering at the HKUST campus on October 31. The reunion provided a great opportunity for graduates to take photographs in their gowns with friends and professors before the Congregation in November, to share their work experience, and provide suggestions and feedback for the Department's future development.

At the event, certificates were awarded to graduates with outstanding achievements in project competitions or significant academic improvement. Undergraduate Patrick Lee and postgraduate Xinxin Wang also shared their experiences in studying in the Department and discussed their current career plans. Over 80 graduates, faculty and family members came to the gathering, which proved a memorable evening.

To keep in touch and find out the latest information on alumni events, ECE alumni are encouraged to join Facebook group "HKUST ELEC Alumni".



Understanding More About Engineering



Eight students from St Paul's Co-educational College (SPCC) gained an early taste of engineering and university life when they undertook research with School of Engineering (SENG) professors and classes with SENG students for five days in November.

The school students joined SENG as part of the SPCC Study Program, coordinated by the University's Undergraduate Recruitment and Admissions Office. Other activities arranged by SENG included a welcome and briefing by Prof Edmond Ko, Director of the Center for Engineering Education Innovation, sharing by peer mentors, a talk by a SPCC alumna Dr Jeffery Lo who gained his Bachelor, Master and Doctorate degrees from HKUST and is now a researcher at the University's Electronic Packaging Laboratory, and a campus tour.

"We had a lot of freedom which was very different from secondary school," said SPCC student Jeff Chun Fu Choy, who was interested in Computer Science and Engineering. "But I also felt very well looked after by my adviser, Prof S W Cheng, who was very relaxed and informative. He even looked after me with food at tea time!"

Kathy Ho joined the Department of Mechanical Engineering and was advised by Prof Moses Ng. She was able to engage in research on different kinds of batteries, carrying out performance tests which she found fun and interesting. "I really learned about the field from Prof Ng," she said.

Other SPCC students gained useful introductions to Chemical and Biomolecular Engineering, and Civil and Environmental Engineering as well as the scale and scope of being a university student and campus life.

High-School Students Explore World of Engineering

HKUST-IBM Technology Exploration Camp 2010, a series of successful summer day camps held over a two-week period in July, attracted over 700 secondary students from 40 schools and over 40 teachers. The day camps introduced students and teachers to the world of engineering to fire up their enthusiasm for its different fields and learn about the latest advances.

Activities ranged from visiting research facilities to hands-on engineering lab sessions. "We were delighted to see that this exciting, fun-filled learning experience helped to develop stronger interest among students in technological advancement and the work of engineers," said Prof Roger Cheng, Associate Dean of Engineering. The camps were the latest collaboration between IBM and the School of Engineering after the 2008 Exploring Interests in Technology and Engineering (EXITE) Camp and Engineering Week programs in 2009.

Calendar of Events

March 18-19, 2011

The Making of the World's Largest Digital Photo Workshop
HKUST Campus

April 8, 2011

HKUST Grand Celebration for the 20th Anniversary
The Hong Kong Convention and Exhibition Center

May 2011

School of Engineering Alumni Homecoming Dinner
HKUST Campus

June 1-3, 2011

International Conference on Technologies Beyond 2020
Sheraton Hong Kong Hotel & Towers

The above events are subject to change without prior notice.

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!

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