IN FOCUS

SENG
SCHOOL OF ENGINEERING

LIQUID ASSET

HKUST ENGINEERING
| Spring 2013 |
Newsletter No.23

Water Treatment Breakthrough Heralds Global Change of the Century

Dean's Message

I have been traveling to many different parts of the world in the past six months. Not only have I participated in leading global conferences related to wireless communication – my specialist area. I have also been delighted to take part in forums focused on frontier work in engineering education.

From Asia to South America and the Middle East, I have been explaining the transformation at our School and how we have utilized Hong Kong's move to a four-year undergraduate degree system to introduce our original "Engineering PLUS" education. This was launched in September 2012, bringing an innovative and flexible curriculum together with a range of enrichment, advisement and pioneering support activities such as our "clan" system, all of which you can read about in this *In Focus*.

It is rare that a school of engineering has the chance to so completely revitalize its approach. So there has been great interest and excitement internationally about what HKUST is doing. Typically, most educators only get to make incremental adjustments. What is so special at the School of Engineering is that we have advanced the complete package.

This includes not only our undergraduate education but also the research postgraduate experience we offer. We are currently exploring how to assist such students in developing their communication and presentation skills and the enterprising spirit that will benefit them whether they continue in academia or head for business and industry.

In addition, we are set to redouble our efforts in internationalization as we believe that an international student body is critical in terms of educational and personal development for undergraduates and postgraduates alike.

The reaction I receive when I go overseas and discuss all this? "Wow!" It reinforces my belief that the School has had an opportunity that most institutions don't usually have, and this rare occurrence really gives us an edge in providing a truly enjoyable, truly excellent, and truly outstanding engineering education.

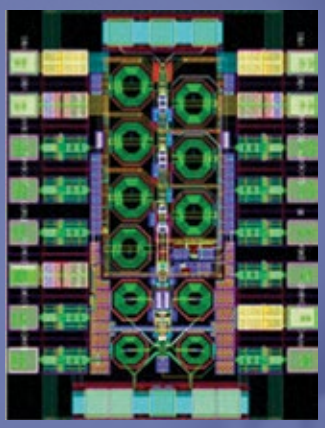
This year is special for me in another way, as it marks my 20th year at HKUST. When I joined in 1993, little did I think I would be spending so many years of my life here. It is what many find at HKUST. Starting out as a junior faculty member during the University's founding years, over the past two decades I have been immersed in an environment that celebrates initiative, achievement and an international outlook, become a distinguished global research scholar, and since 2009 had the honor of taking great colleagues and students forward as Dean of the School.

I have also really enjoyed living and working in Hong Kong, which is perfectly located for engineering academics and students to study and engage with the immense social and economic changes occurring in Asia, and a wonderfully tolerant, go-getting international city.

As I and all at the School of Engineering enter a new era, it is appropriate our magazine does too. I hope you enjoy the new-look format and content as together – students, faculty, staff, and *In Focus* readers in Hong Kong and beyond – head toward a fresh chapter of dynamic development.

Prof Khaled Ben Letaief
Dean of Engineering

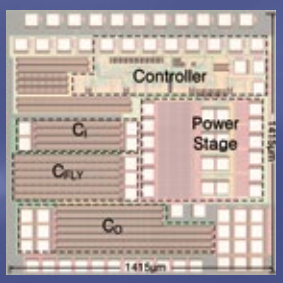
Four Studies Showcased at ‘Chip Olympics’ 2013



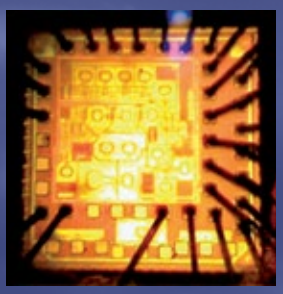
A remarkable four papers from the Department of Electronic and Computer Engineering were presented at the prestigious IEEE International Solid-State Circuits Conference ISSCC 2013 (also known as the “Chip Olympics”), held from February 17-21 in San Francisco, US.

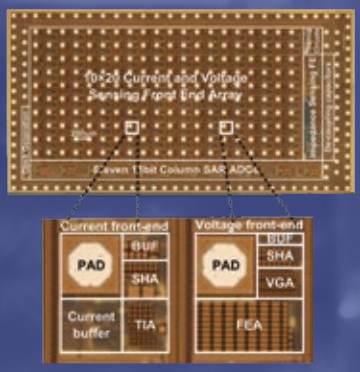
The conference is the premier forum for the presentation of advances in solid-state circuits and systems-on-a-chip. It is regarded as an honor for a university to have one paper accepted at this event where global industry leaders, including Intel, IBM and Sony, discuss their latest chips and designs. To have two Digest and two Student Research Preview papers accepted in a single year is an unprecedented demonstration of the quality of work being carried out by the Department.

PhD student Cheng Huang’s paper showcased “An 82.4% Efficiency Package-Bondwire-Based Four-Phase Fully Integrated Buck Converter with Flying Capacitor for Area Reduction”. This is the first converter of its kind to achieve high current density and high efficiency without any additional off-chip inductors and capacitors. On-chip capacitor reduction is achieved by a novel flying capacitor technique. The paper was supervised by Prof Philip K T Mok.



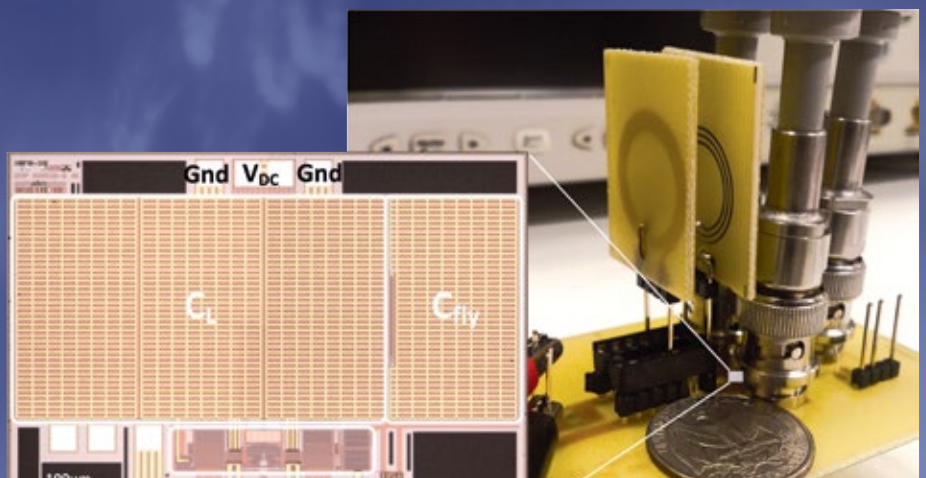
Another paper, “A 13.56MHz Fully Integrated 1X/2X Active Rectifier with Compensated Bias Current for Inductively Powered Devices”, by PhD students Yan Lu and Xing Li, presented the first fully integrated 13.56 MHz 1X/2X active rectifier in the 30mW range with all capacitors fabricated on-chip. It employs a novel switching arrangement that effectively reduces capacitor area, and an innovative biasing scheme that helps to reduce reverse current to enhance efficiency. Prof W H Ki, Prof C Y Tsui and Prof Patrick Yue co-supervised the paper.





In addition to the Digest presentations, two Student Research Preview papers were delivered at the conference. The first paper was by Li Sun (visiting PhD student), Yipeng Wang (PhD), Alex Pan (PhD), Robin Hou (MPhil), Yan Lu (PhD) and Prof Patrick Yue and focused on “A 26-Gb/s Optical Receiver Front-End in 65nm CMOS”. The second was by PhD student Jing Guo and Prof George Yuan in the area of bio-medical sensing circuitry. Preview sessions are organized as short presentations of works-in-progress in conjunction with a poster presentation and optional demo.

Prof W H Ki also gave a tutorial on “Design of Voltage References” at the conference.



CLEANING

For many people, a career spent working with sewage would be a challenge. For environmental engineer Prof Guanghao Chen, it is the adventure of a lifetime that has seen the leading international researcher and his team develop pioneering wastewater treatment technology to help solve one of the world's major issues on sustainable living

As a native son of Jiaxing, a picturesque canal water town around 100km from Shanghai, Prof Guanghao Chen has always felt an affinity for rivers, lakes, streams and seas, and respected the essential role that water has played in human civilization. Now the School of Engineering professor and his research team are set to make a revolutionary contribution of their own to development through their Sulphate reduction, Autotrophic denitrification and Nitrification Integrated (SANI) Process – one of the most remarkable technological breakthroughs in wastewater treatment in over 100 years.

More than 10 patents related to the ideas and technology have been received or applied for, and the groundbreaking nature of the research brought a clutch of international awards in 2012. The team received three International Water Association awards, Germany's International Huber Technology Prize (second prize) and a finalists' award in Spain's World Smart Cities Awards. Prof Chen was also the first Hong Kong scholar to be elected a Fellow of the prestigious International Water Association in 2011.

Such achievements follow 18 years of strenuous research efforts, which have engaged Prof Chen since he arrived at the Department of Civil and Environmental Engineering in 1995. But they also mark a watershed where Prof Chen can now place his dream of advancing the world's capabilities for sustainable water resources within a 10-20 year realizable framework.

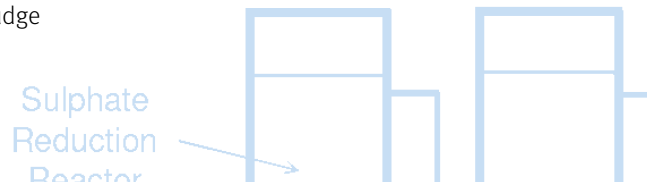
"I had witnessed the impact of the pollution that went together with industrialization and development in China and destroyed plants and people's lifestyle," said Prof Chen, explaining his drive to explore the field.

"When I finished high school, I knew without hesitation I wanted to study water. I applied for postgraduate studies in this area, also without hesitation. I worked as a water engineer for three years. I am fascinated by how you can turn dirty water into clean water. I feel it is my destiny, my mission, to work in this field, to change the world to have a better future – like Steve Jobs."

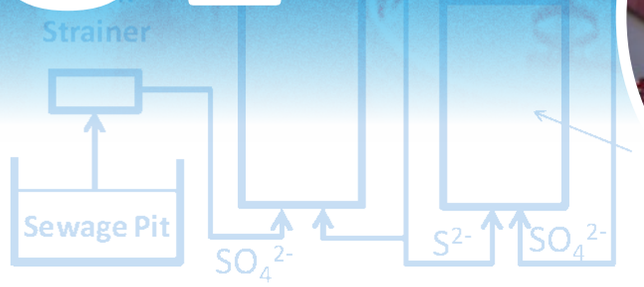
The task is growing more urgent by the day. The sewage sludge produced by conventional wastewater treatments is a costly, difficult item to eliminate. In Hong Kong, for example, landfills taking sewage sludge are close to capacity and sludge incineration will be unpopular with nearby residents and further impact on air quality in the city.

SANI – known as "sludge killer" in Chinese – is a novel technology that minimizes the environmental impact of sewage treatment plants by getting rid of 90% of the sludge. The idea for such a technology was inspired by Hong Kong's globally pioneering seawater flushing system in use for the past 50 years to help solve the city's lack of water resources. Hong Kong is the only city globally using seawater for flushing on a city scale, saving 740,000 cubic meters of freshwater per day.

Using sulphate-reducing bacteria and the sulphate in seawater as the medium to oxidize and get rid of pollutants, Prof Chen discovered he could minimize



UP



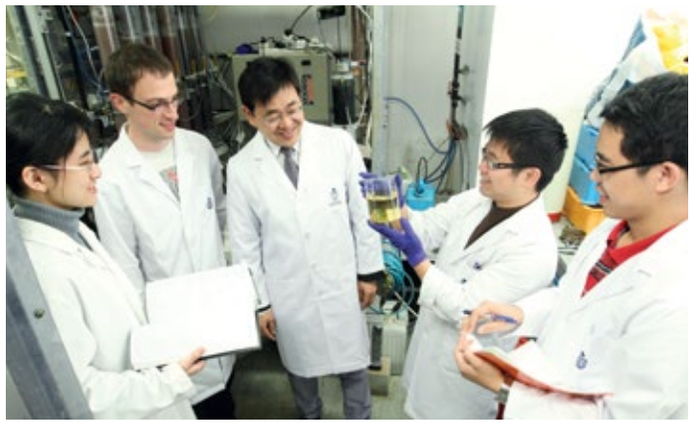
the sludge production rate. This brought a host of additional benefits, reducing energy consumption, odor and greenhouse gas emissions and cutting the cost and space required for treatment by half.

The exciting breakthrough came after several years of studies that had achieved some results but not enough for Prof Chen's high expectations. "After seven years' work, I was still not satisfied. I had only reduced sludge by 40%. This was not even close to my dream." Then, in 2002, Prof Mark van Loosdrecht, a good friend from Delft University of Technology in the Netherlands came to visit Prof Chen at HKUST. For the first time, Prof van Loosdrecht realized that Hong Kong was using seawater for flushing.

Prof Chen recalled: "He said: 'GH, why not think around sulphate?' I thought: 'Yes, there could be solution there.' But we didn't discuss it. I reflected on it for two years and then decided to try it at a lab scale from 2004-06. And it worked very well in the lab. No sludge. Then I took the product to departments of the Hong Kong government and they liked it. So we tried it on a pilot scale at the Tung Chung Sewage Pumping Station. This was also very successful. Now, we are going for a full-scale demonstration."

The large-scale trial has received HK$24.525 million in sponsorship from the Hong Kong government's Innovation & Technology Fund, Drainage Services Department, and industry, the largest amount for a single local environmental project. It will begin in March and run over two years at Shatin Sewage Treatment Works at an average capacity of 1,000 cubic meters of sewage per day.

Following the full-scale demonstration, Prof Chen's target is to see the system adopted in Hong Kong and then take it to coastal cities in Mainland China and to other countries. The technology has already attracted the interest of the UNESCO-IHE Institute of Water Education, which invited Prof Chen to take part in a four-year study. Students from around the world are applying to work with Prof Chen and major companies are showing great interest.



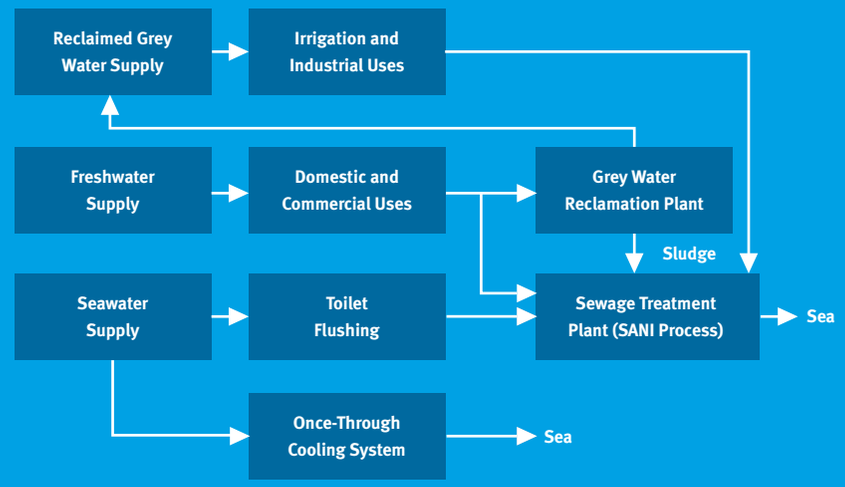
SANI has also drawn in other top researchers in the water field. One eureka moment came during a 2008 visit to HKUST by Prof George Ekama, a globally renowned water quality expert at the University of Cape Town in South Africa. Prof Chen said: "We were in the coffee shop and I was talking about my SANI research when suddenly he leapt up and said: 'Of course! What a fantastic idea!'" He, too, became a collaborator on the project.

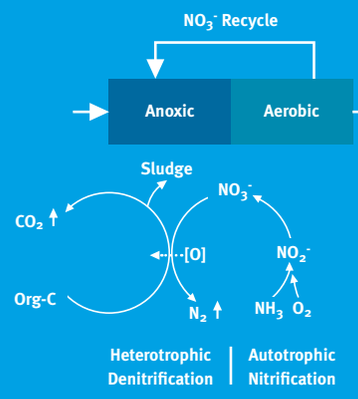
An extension of SANI known as the triple water supply system uses freshwater for drinking, seawater for flushing and cooling, and greywater recycling systems for air-conditioning, kitchen and laundry. This not only minimizes sludge production but reduces demand for freshwater. The Hong Kong Airport has been the first organization to put the system into use, with over 50% saving in freshwater demand, reductions in carbon dioxide emissions, and up to HK$20 million saved on electricity bills.

"We are altering the language but it will take some time to alter thinking about the one-pipe system that has been in place for so many years everywhere except Hong Kong, and the cost of doing so," Prof Chen said. "However, the issue has become so large that people are now starting to see this as a good way to maximize water use." Bringing Prof Chen several steps closer to his dream.

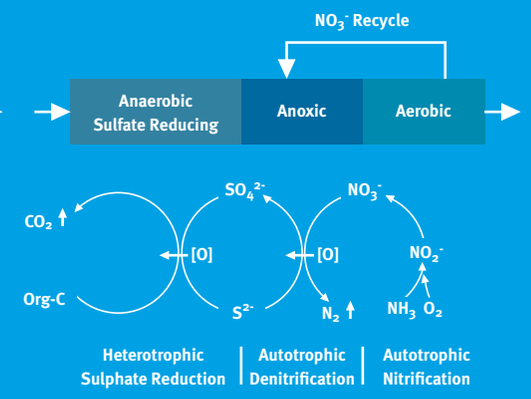
Changing the System

• Conceptual diagram of triple water supply system





Conventional Biological Nitrogen Removal Process



SANI® Process

Nitrification

Going with the FLOW

Prof Guanghao Chen has been deeply connected with water throughout his life:

- Born in the Chinese water town of Jiaxing in Zhejiang Province
- Fortune teller uncle predicts his life will be related to water
- Aged around 11, officially changes the “hao” character in his name to include a water element, without initially telling his parents
- Studies environmental engineering at Zhejiang University
- One of the second batch of national candidates to undertake postgraduate studies overseas, gaining a place on a renowned environmental program at Kyoto University in Japan
- Immediately has to learn Japanese to a level where he can undertake postgraduate studies, including writing a PhD thesis on biological wastewater treatment in Japanese
- After 6.5 years studying and working in Japan, headhunted by National University of Singapore. Immediately has to learn English, gaining access to additional water research knowledge
- Joins HKUST in 1995, attracted by the presence of top names in the wastewater field, such as Prof Howard Ju Chang Huang, the research facilities and the spectacular coastal campus

We Support You, Young Engineers!

A remarkable welcome to life at the School of Engineering awaited the first batch of Year 1 four-year undergraduates

The city-wide 334 reform, which has seen Hong Kong move to a six-year secondary school, four-year university degree education system, brought the first intake of four-year undergraduates to the School of Engineering in September 2012.

These 750 young engineers are younger than their three-year counterparts, with a broader secondary school diploma experience and more varied academic backgrounds than the focused approach of Hong Kong A-level graduates. At the same time, the four-year degree system they have entered is more open and flexible than the three-year system, giving them a year to explore their interests before choosing a major, and a wider range of courses to select throughout their time at the School.

To assist the Year 1s in their academic choices, transition from school to university, and to foster a sense of belonging and identity, the School implemented a fresh introduction to the university experience, tailored to these students’ needs and groundbreaking in its approach to engineering education support.

Clan-tastic

On arrival at HKUST, four-year entrants were placed into one of nine “clans”, which immediately enfolded them within a group environment. Members include a mix of local, mainland and international Year 1s, student mentors from other years, faculty members, and a “clan fellow”, often a Head of Department. Even the Dean participates.

“The clan concept covers four main areas, academic, social, emotional and institutional attachment, to help Year 1s over the transition from school to university and to expand their university experience,” said Prof Roger Cheng, Associate Dean (Undergraduate Studies). “For example, in their first year in the clan, they will also get to know people who may eventually choose different majors from themselves. This can help interdisciplinary communication.”

One activity to help clan members get to know each other saw professional trainers with experience of working with major corporations and engineers hired for a one-day team-building camp. Each clan offered its own camp, securing 60% to 70% total participation – a major success for a non-compulsory activity held at a weekend.

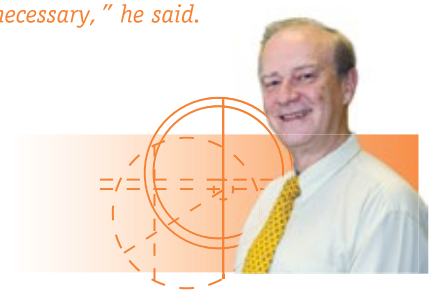
“After the camp, we had lots of positive feedback,” Prof Cheng said. “The young engineers were surprised and pleased that we would organize something like this for them.”

Engineering ID

Building awareness of what engineering is all about is another crucial aspect of the Year 1 experience at the School. One way in which this is realized is through addressing new entrants as "young engineers" rather than students to emphasize the School's professional aspect. The ENGG1010 Academic Orientation, which has been made a required course for graduation, is another essential element.

"This is part of students' education as engineers," said Prof Neil Mickleborough, Director of the School's Center for Engineering Education Innovation.

"So we have workshops covering topics such as engineering identity, the purposes of university education, and key attributes of engineers. Through these workshops, individual advising sessions, and other clan-based social activities, such as barbeques, our school-level faculty advisors, peer mentors and colleagues can proactively keep in touch with Year 1s and support them when necessary," he said.



The close contact has already proved useful. For example, some young engineers revealed that they had difficulty in studying a particular course. Those who had done well in their mid-term examination in this area were then asked to form study groups with their peers who were finding the work challenging. "Both parties found this helpful," Prof Mickleborough said. School faculty advisors also provided assistance.

Another novel aspect of the Academic Orientation course is its incorporation of student advising. "We approach academic advising as a learning experience for our young engineers instead of developmental or administrative exercise," Prof Mickleborough said. "It should be something inside the curriculum. Therefore, we have integrated academic advising into a graduation requirement course. This form of advising appears unique in Hong Kong."

Selecting a pathway

One of the major differences for the young engineers is the amount of choice they have in selecting the courses they will study. "The approach is very different from the three-year program," said Prof Cheng. "We have moved from basically one size fits all to an individual preferences-based model. I think this has been welcomed by the young engineers. It also fits our educational goals, which are to recognize that different students have different aspirations and to give them the freedom to choose and move at their own pace."

Hands-on training for Fall registration

To assist young engineers with the online course registration process to select courses at the beginning of Fall Semester, the School organized hands-on group sessions and briefings in the summer. These included short introductions to the courses available and a chance to try out making a selection on the system (a final decision could be made later). Trained peer mentors were also available to discuss selections.

Individual advice for Spring Semester

In October 2012, the young engineers received one-on-one advising sessions with a School of Engineering professor to help in their selection of courses for the Spring Semester. In these sessions, they were encouraged to talk about what they would like to do, their interests and how these may link up with a major, and any issues. These sessions were highly valued by the young engineers, according to Prof Cheng.

Choosing a major

At the end of Spring Semester 2013, the young engineers will need to decide on their major. Information sessions were organized in November and December 2012 by Departments and more are being arranged. Further advising sessions are also envisaged to help the young engineers decide what they would like to do.

Year 2

As the young engineers enter a particular major, activities will move to the department rather than school level. However, the first year will act as a model, with the Center for Engineering Education Innovation

continuing to offer assistance to the young engineers and assisting faculty on how to provide support.

Foundation for the future

While an evolving learning process for faculty, staff and young engineers, the first semester and feedback on the various activities have provided a valuable foundation on which to build.

One significant outcome already noticed is a stronger link between faculty and the young engineers. "For instance, it seems with the one-on-one session in the Fall, the young engineers felt faculty became more approachable," Prof Cheng said. "This is important. People influence people. If you go to class or lab and never talk to the faculty member, then the learning experience is quite different from if you feel able to approach an academic. This will have a long-lasting impact on their four years at HKUST."

"From the faculty perspective, we feel that more of them see the importance of providing advice to students and more are participating," he said.

Working together with the young engineers have also provided the best moments of the semester for Prof Mickleborough. "You can see the maturing and the building of confidence in the Year 1s as they adjust to the environment and adopt the School of Engineering as their home."

Miss

Young Engineers

Miss and Mr . . . Young

As the first intake of the four-year undergraduate degree program settles in, four outstanding Year 1 students discuss why they have chosen to make the School of Engineering their new home and the different opportunities it is already providing to explore their potential

Ka Ki Fong

NTHYK Yuen Long District Secondary School

Who comes to mind at the launch of a space shuttle? Probably the astronauts. But to me, it is the engineers – designing and making the spacecraft – who are the most important in a journey into space. I hope to become one of them. But who dares to tell her parents that she would like to be an engineer? After all, isn't engineering a male-dominated field that involves dirty jobs such as climbing underneath cars to carry out repairs? However, as I read more, I found that I was wrong. Engineers are problem solvers and leaders. They are passionate and creative. And women engineers are powerful.

Engineers are problem solvers and leaders. They are passionate and creative. And women engineers are powerful.

I was not the only one with misconceptions about engineering. Surprised at my choice, one teacher exclaimed: "What a waste!" Other pathways, such as medicine and journalism, were suggested by my family, teachers and friends. But after much contemplation, I decided that I didn't want to abandon my dream because of what others said. Engineering is where my strengths and motivation converge. It is a worthy calling. Most importantly, it is a decision I won't regret.

After being admitted to HKUST School of Engineering, people asked me another question: why HKUST? I can easily list the reasons: high world rankings and an international outlook; young and forward-looking; and approachable professors, to name just a few. Two further and particularly appealing factors are the University's Undergraduate Research Opportunities Program that allows inquisitive students like me to experience the research world early; and the Women in Science and Engineering community that encourages prospective female students to study science and engineering through summer camps.

In the first semester, the School has offered opportunities far beyond my expectations, including participating in a robot design contest, and all bringing me closer to my ambition to specialize in aeronautics.

Carolina Garcia

Colegio Salvadoreño Inglés
El Salvador

I am a 19-year-old girl who comes from a beautiful country called El Salvador in Central America. I love reading and singing, and since I can remember, I have had a passion for any science-related topic, or anything that includes numbers and solving problems. So I knew engineering would be perfect for me.

I always had this dream of studying abroad. But as I grew up, I started giving up on the idea. I thought: "How can someone like me be accepted into a good university when there are thousands of smarter and more qualified students who are striving to do just the same?"

However, a miracle happened. In my country, in order to graduate, all students need to take an exam that encompasses all the material covered during high school. I remember taking it and thinking, "I am going to fail for sure", but when the results were released, I couldn't believe it! I had the only perfect score in the entire country.

I was immediately attracted by HKUST's academic excellence, international outlook and mesmerizing campus.

As a result, the government decided to give me a full scholarship to whichever university I wanted. I was shocked! You might be thinking I am either very lucky or very smart, but the truth is that the credit is not mine, since I know it was God answering my prayers through those results, and without Him I wouldn't be where I am now.

I started looking at different options, and when I came across HKUST, I was immediately attracted by its academic excellence, international outlook and mesmerizing campus. In fact, I was so sure that this was the perfect university for me that I didn't apply to any others.

I can definitely say I don't regret my decision to come to HKUST since it is everything I expected and more. I hope that my story can inspire others who might be thinking they are not good enough. Trust me, with hard work and God's help anything is possible!

Engineers!

Jeffrey Chun On Lee

STFA Leung Kau Kui College

I have a passion for both science and computing, and friends sometimes ask me why I have chosen engineering rather than science. The reason is simple. Science is the study of Nature – how species evolve, why an object falls whenever we throw it. But I want not only to understand problems but to tackle them. As engineering is the application of scientific knowledge, it can help to solve real-life issues. That is why I am single-minded about studying engineering.

In particular, I love anything to do with computers, especially networking and programming. Recently, I developed an iOS app called "iNavigations". The idea arose from my habit of taking a nap on the bus after school and constantly finding I had missed my stop, which was very inconvenient. During the last summer break, I decided to develop an app to solve this problem. It took me a long time to learn what to do, design and test it. Then, at the final stage, after I had started at the School of Engineering, I asked the advice of Prof Wai Ho Mow, Electronic and Computer Engineering. I modified the app and, finally, it was accepted by the App Store.

If you have a great idea and make enough effort, you can be the one who alters our lives.

You see, while Gauss, Newton, and Einstein developed some incredible mathematical and scientific theories, technologies are not fixed and immutable. The light bulb, for example, has experienced many transformations since Thomas Edison's version and is still being improved on today. So if you have a great idea and make enough effort, you can be the one who alters our lives. I hope that every student in our large School of Engineering family will strive to pursue their dream. And one day we can proudly say we have invented something that has changed our world.

Jeffrey

Marcus Tsz Hing Lo

Lok Sin Tong Yu Kan Hing Secondary School

While my fellow schoolmates shared their aspirations, let me unveil my first-semester experience with you. To me, life at HKUST is like a box of sweets with colorful wrappers illustrating different scenes and many flavors I can try.

After arrival, I met up with members of my "clan" (each four-year first-year student in the School of Engineering is assigned to a group, or "clan", to build friendships and ease the transition from school to university). We took group photos and enjoyed a fun-filled School of Engineering orientation.

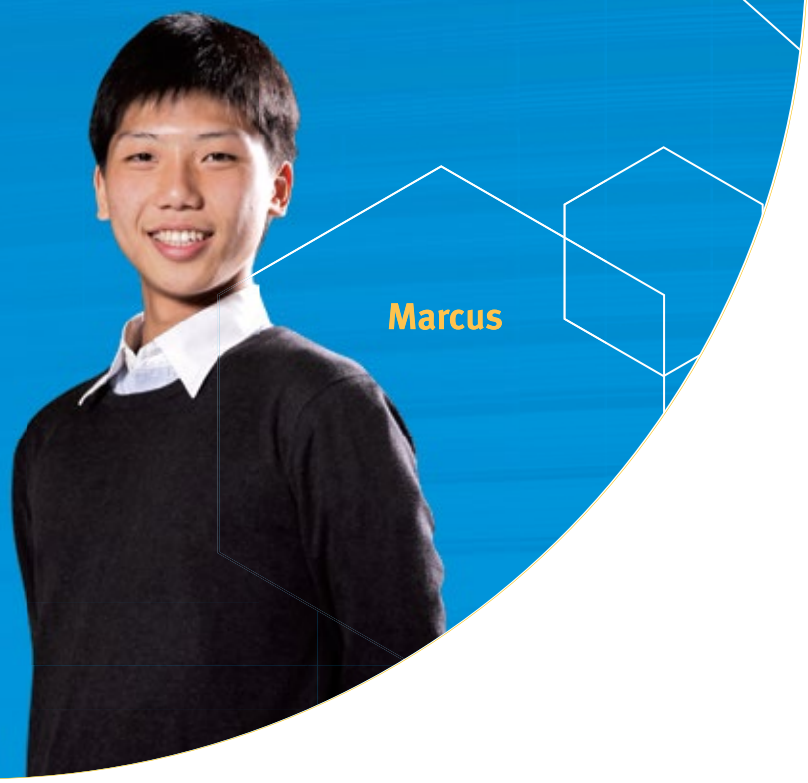
I would like to learn more about society and the world, gain different types of knowledge, and explore my interests before pursuing a career as a pilot. It's looking good at HKUST to be able to do so.

A team-building day camp was also arranged. As you can imagine, starting out at university can be rather lonely without any familiar faces around so the team-building activity was a wonderful chance to meet new people. We were put into teams and set many tasks to accomplish together. Although the members of my group did not know each other initially, by the end of the day we cheered as one. They became my friends, we kept in touch, and I was no longer alone.

On the studying front, in the first two weeks, I found it hard to keep up with the schedule. Here, my peer mentors greatly helped me to adapt to the new learning environment. I overcame my difficulties and finished the semester with a satisfactory result.

There were many other opportunities to make my box of sweets rich, such as dancing in the Gangnam Engin Style@ HKUST music video, sharing my experiences at Info Day, and having a dinner with professors at the Dean of Engineering Scholarship presentation ceremony.

Looking back, I thank my clan and peer mentors for putting me on the right track. Looking ahead, in the next four years, I would like to learn more about society and the world, gain different types of knowledge, and explore my interests before pursuing a career as a pilot. It's looking good at HKUST to be able to do so.



Marcus

Mr Young Engineers

The award-winning HKUST Robotics Team draws students from all levels and engineering departments across the School to design different types of robots and take part in international competitions. Five members describe how team membership has proved a life-changing experience

Chun Yin Leung

- Tsuen Wan Public Ho Chuen Yiu Memorial College
- BEng in Computer Science 2011
- MPhil student, Electronic and Computer Engineering

Fun and enterprise

Since joining the HKUST Robotics Team in 2009, Eric has been impressed by the tremendous support of HKUST students and cohesion within the team. He has found the team is not only a group project, it is similar to a family and this type of atmosphere creates higher morale and efficiency.

In this family, where everyone has different personalities and ways of thinking, Eric has learned to be more understanding and look at issues from other perspectives. He also thinks that "keeping it fun" is as important as working seriously.

After doing well in robotics competitions, Eric and teammates Henry and Tak (both also featured here) decided to try using their robotic knowledge to devise a business plan. "It was time to go to the next stage," he said. They went on to compete in two contests, receiving the First Runner-up place and the Hong Kong Technopreneur Award at the HSBC YDC Young Entrepreneur Challenge 2012, and gaining the Lenovo Innovation Award and a place in the finals of the 1st Asia Innovation Forum. Over 315 teams took part in the first contest and more than 235 teams in the second.

The students' business idea focused on a robot for underwater research, monitoring and investigations. To prepare for the business plan contests, they attended enrichment talks and entrepreneurship workshops organized by HKUST. Now their dream is to realize the plan, Eric said.

Leadership and vision

As leader of the Robocon team taking part in the 2012 local and regional contests, Jackie was able to employ her passion and vision as well as strengthen her analytical skills. Indeed, one of the outstanding memories of taking part in such contests is the strong emotion – sometimes even tears – that team members experience following a victory, she said. "If you watch it on the television, you won't share the same feeling. Only when you are one of the participants can you understand the excitement, after one year's hard work."

In guiding the team ahead, Jackie expected members to learn how to present ideas and make convincing arguments, just as engineers would. Discussions not only embraced robotics but virtually anything. She also improved her decision-making capabilities as she had to compare the pros and cons of different ideas, not simply follow others as in the past.

Now, even though she has graduated, Jackie continues to advise and support the HKUST Robotics Team.

Lai Ying Kwok

- CCC Kei Yuen College
- BEng in Mechanical Engineering 2012
- Trainee, Jetta Company Limited

Jackie

We
Robo

Team

The School first competed in the R and team members have since gon on the international robotics comp Team now encompasses four m Operated Vehicle, Smart Car an students under the guidance of te Director of Global & Community to the HKUST Robotics Team

The following are the awards the second

2012	Competition
June	Robocon Hong Kong Contest
July	7th Freescale Smart Car Competition, South China Region
July	HSBC YDC Young Entrepreneur Challenge, Hong Kong Region
July	JEC Outstanding Engineering Project Award
August	ABU Asia-Pacific Robot Contest
October	1st Asia Innovation Forum Young Entrepreneur Award
November	8th Challenge Cup for Entrepreneur Competition

Tak

Lung Tak Ho

- *AD & FD POHL Leung Sing Tak College*
- *BEng student, Computer Engineering*

Independence and social skills

Before joining the HKUST Robotics Team, Tak was a quiet, retiring person. As team members are required to take an active role, at first he had to force himself to speak and ask more. Later, he found this to be a good change and became more willing to express his opinions. With the encouragement of senior members, he is now more outgoing.

He also found he gained much more than friends. Through training and competitions, Tak acquired presentation skills and greater independence. He had never previously thought of making a robot himself but through his work with the team, he discovered the power of passion to motivate him to achieve great things.

The first competition Tak took part in was held in Thailand, where he learned to treat the contest as an exchange of technical skills and culture. Another important turning point was the HKUST Robotics Team tradition of senior members teaching junior ones. Seeing the transformation of new members from knowing nothing to learning a great deal made a deep impression, he said.

otics

Spirit

obocon Hong Kong Contest in 2004 e on to become leading contenders etitive circuit. The HKUST Robotics ajor areas — Robocon, Remotely d RoboCup — and more than 70 am supervisor Prof Kam Tim Woo, Engagement Program. Additions family are always welcome.

acquired by the various teams in half of 2012:

Award	Team
- Championship, Best Engineering Award, Best Artistic Design Award - First Runner-up	Robocon teams
Third Class Award	Smart Car
First Runner-up and HK Technopreneur Award	Remotely Operated Vehicle
Second Runner-up	Remotely Operated Vehicle
Best Idea Award	Robocon
Lenovo Innovation Award and Finalist	Remotely Operated Vehicle
Gold Award	Remotely Operated Vehicle

Widy

Andreas Widy

- *Santa Laurensia Senior High School, Serpong, Indonesia*
- *BEng student, Electronic and Computer Engineering*

Personal challenge and persistence

Widy's enthusiasm for robotics started in junior high school, with a course on electronics which featured robotics as one of the topics. He became curious how simple electronic equipment could perform powerful functions. He was also fascinated by the usefulness of robots, for example, in moving objects around and collecting data.

Someone who always enjoys a challenge, Widy (as he is usually called) decided to apply to HKUST because he wanted to experience a new environment outside his home country of Indonesia. On starting at the University, the HKUST Robotics Team caught his attention. Although he initially had doubts about his knowledge of robotics, he learned from talking to team members that the basics would be taught.

It wasn't all straightforward at the beginning, but rather than give up, Widy tried to take part in meetings and basic work. Eventually, his efforts paid off. When he saw his robot functioning well, it brought a tremendous sense of achievement, he said.

Motivation and courage

In addition to obtaining great satisfaction from the HKUST Robotics Team's remarkable achievements, Henry has found his attitude toward life has also changed.

With numerous school projects to fit in and the Robocon Team internal competition all at the same time, it meant managing on three to four hours' sleep at night. Yet Henry persisted. "Giving up means an immediate end and instantaneous failure," he said. "If I never give up, I will succeed one day."

In addition, Henry has become more courageous in trying new approaches. "Creativity is unlimited. Through trial and error, we can find good alternatives, which can then be applied in competitions," he said.

Henry

Hoi Lam Chan

- *Buddhist Tai Hung College*
- *BEng in Computer Engineering 2012*
- *MPhil student, Electronic and Computer Engineering*

Xilinx - HKUST Lab to Drive Global Electronic Engineering Advances

The School of Engineering's electronic and computer engineering research received a major boost in June 2012, with the opening of the Xilinx - HKUST Joint Lab. The lab marks the start of significant long - term collaboration between HKUST and global giant Xilinx Inc, the world leader in All Programmable technologies and devices.

The innovative Joint Lab will provide resources to HKUST faculty and students for cross-platform, cross - disciplinary research projects and teaching activities in areas such as embedded systems, signal processing, IC design, network and control. The University will also share core undergraduate courseware through the Xilinx University Program with universities and institutes around the world.

Xilinx Inc donated over HK$ 2 million to equip the Joint Lab at its launch and in September provided a next - generation field programmable gate array (FPGA) platform with embedded ARM processors.

Prof Joseph Lee, Vice - President for Research and Graduate Studies, HKUST, said that the Joint Lab would powerfully add to the advancement of global research and interdisciplinary studies through the combined endeavor of HKUST's international research vision and innovative Xilinx products and technologies.

Dr Ivo Bolsens, Senior Vice President and Chief Technology Officer of Xilinx, added that the company was honored to work with HKUST and to bring the benefits of Xilinx's All Programmable technologies, devices and design tools to a broad base of electronic engineering professors and undergraduate students.

Others attending the opening ceremony included Prof Khaled Ben Letaief, Dean of Engineering, HKUST; Prof Ross Murch, Head of the Department of Electronic and Computer Engineering, HKUST; Mr Fai Yeung, Vice President of Sales and Marketing in Asia Pacific, Xilinx; Dr Kevin Xie, Greater China Manager of the Xilinx University Program; and Prof Jiang Xu, Founding Director of Xilinx - HKUST Joint Lab.

The ceremony was followed by a talk by Dr Bolsens on "Entering the Era of Crossover System - on - Chips". Nearly 100 professors, staff and students from HKUST and various organizations attended. A two - day training workshop for faculty members, staff, and graduate students from Hong Kong and Mainland China was also held at HKUST.

Lighting Up the Future

A cutting - edge research proposal to shine fresh light on sustainable development, led by **Chair Professor Kei May Lau**, Electronic and Computer Engineering, has won funding in the Research Grants Council's highly competitive Theme - Based Research Scheme. Out of 46 preliminary proposals only five were eventually supported.

The Scheme focuses on themes of strategic importance to the long - term development of Hong Kong, with Prof Lau's project seeking to develop a "Cost - Effective and Eco - Friendly LED System - on - a - Chip (SoC)". Funding allocated was HK$ 30.565 million.

The project aims to advance the adoption of solid - state lighting in Hong Kong and globally through innovative device fabrication and packaging technologies that can optimize LED efficacy. The target is to provide the technology that can speed up the move to energy - efficient lighting. A project goal is to utilize silicon integrated circuit technologies in LED lighting to develop integrated optimization from device design to lighting systems. In addition, the platform will aim for solutions that reduce manufacturing costs and lead to LED chips in products that can replace traditional lighting sources.

Streaming Cloud Technology Leads Way to High-Quality Multimedia Broadcasting

A HKUST research team led by Prof Gary Chan, Computer Science and Engineering, has developed Streamphony, a next-generation streaming cloud for large-scale high bitrate stream broadcasting over the global Internet. The innovative technologies that Streamphony employs have defined a new era for content distribution networks.

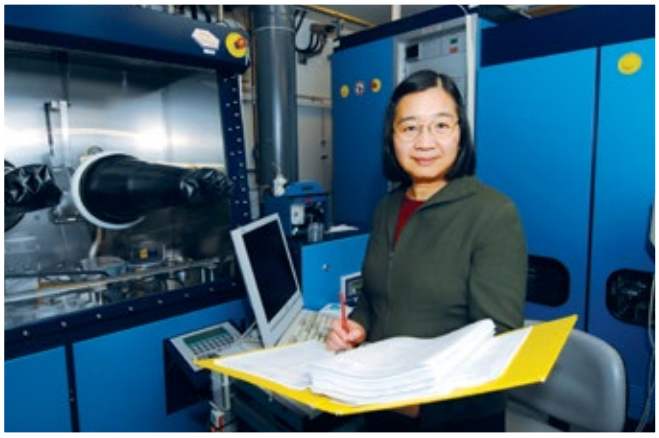
The high efficiency and low deployment cost of Streamphony have been well received by both content and service providers, with the technology achieving high-quality multimedia broadcasting with 70% cost savings on bandwidth and 30% on hardware.

Streamphony is the culmination of years of industry-driven research and advanced development. Using a distributed and self-optimizing protocol, the technology achieves system scalability to a virtually unlimited number of users. Its patented technologies are also highly adaptive to the network environment to attain the best performance. "Streamphony divides the multimedia stream into multiple 'sub-streams' and intelligently 'pushes' them over multiple paths in the cloud," Prof Chan explained. "This new design paradigm is a quantum leap from the traditional design, leading to its remarkably low delay. It also enables the integration of IP multicast to substantially cut down network traffic and cost."

The industry leader Mei Ah Digital Technology Limited has been adopting the technology. Mr Steve Law, Executive Director of the company, said that Streamphony's approach was a good match for Mei Ah's business on content distribution and multimedia streaming. Streamphony is expandable and flexible enough to support network growth, heterogeneous device types, and new features such as 7.1 audio effect, adaptive bitrates and 3D animation, as well as offering high-quality and low-cost content delivery. "Streamphony fits our goals with its innovative approaches," he said.

The success of the project demonstrates the impacts of research through close collaboration among HKUST, government, and industry, with the Hong Kong government's Innovation and Technology Commission (ITC) and various companies providing funding and trial sites.

The holistic approach of materials + device + circuit + systems has brought top system and integrated circuit design experts together on the same team. With leading material scientists at work on the project, there will also be opportunities for training a new generation of researchers and the potential for spin-off ventures.



Innovative Thinkers Make GLOBAL

Five more faculty members have been elected Fellows of prestigious professional organizations

Institute of Electrical and Electronics Engineers (IEEE)

With the election of the following three academics, the total number of IEEE Fellows at HKUST has now reached 30, including 21 from the Department of Electronic and Computer Engineering, seven from the Department of Computer Science and Engineering, and two from the Department of Mechanical Engineering. HKUST had the largest number of newly elevated IEEE Fellows among universities and institutions in Hong Kong. IEEE Fellowship is the highest grade of membership. The total number of IEEE Fellows selected in any one year cannot exceed 0.1% of the total voting membership.

Prof Amine Bermak

Electronic and Computer Engineering

Prof Bermak was elected for contributions to sensing and processing of vision and olfactory circuits and systems. He is an international leader in sensor research and was among the first to pioneer the concept of time-domain sensing for vision, olfaction and temperature sensors. His research stands at the crossroads between algorithmic solutions and hardware-friendly VLSI architecture for sensors and microsystems applications. The main focus is to integrate microsystems that include sensing and processing, making the implemented microsystems smarter, autonomous and less power hungry in large-scale deployment. Applications range from smart cameras to passive RFID and electronic nose microsystems. "I would like to dedicate this IEEE Fellow honor to my students who have made real contributions in all the work I have done," he said. Future plans include greater focus on technology transfer and training of postgraduate students to become leaders in their respective fields.

Prof Mansun Chan

Electronic and Computer Engineering

Prof Chan was cited for his research on CMOS device modeling. The result of Prof Chan's work is a tool that allows designers to rapidly simulate the characteristics of new devices. One of the models was developed over 16 years, initially at HKUST and then transferred to UC Berkeley. By 2002, it had become an industrial standard model for a state-of-the-art transistor technology. Most major companies are now using this model, including Intel and IBM. "This is a major achievement to me as it involves a practical model," Prof Chan said. "For many others, people just write a paper, and that's the end of it. But this one is actually being used. The model has been implemented in almost all simulators used in circuit design. It helps designers create new devices and shortens the time to get to the final product."

IMPACT

Prof Daniel Palomar

Electronic and Computer Engineering

Prof Palomar has made remarkable contributions to convex optimization-based signal processing for communications in recent years. He received the 2004 Young Author Best Paper Award from the IEEE Signal Processing Society for his publication on "Joint Tx-Rx Beamforming Design for Multicarrier MIMO Channels: A Unified Framework for Convex Optimization", co-authored with John M Cioffi and Miguel Angel Lagunas. Applications for his research include multi-antenna wireless communication systems, network optimization, robust designs via convex optimization, adhoc competitive multiuser systems via game theory, among others. His latest research includes variational inequality (VI) methods for multiuser communication systems, rank-constrained semidefinite programming, and optimization methods for financial engineering. "I love what I do. It's basically my dream come true. I look for a problem that nobody has solved and I try to see if I can use what I know to solve it," he said.

Optical Society of America (OSA)

Prof Jianan Qu

Electronic and Computer Engineering

Prof Qu was cited for his pioneering work on the development of label-free non-invasive spectroscopy and imaging technology for life science research and medical diagnosis. Working together with doctors and life scientists, Prof Qu's research focuses on non-invasive technology that can provide a high-resolution insight into what is going wrong inside cells. "Our bodies have intrinsic signals. But most of them are not strong enough so you need to develop a highly sensitive light sensor to be able to see them. That's the job of an engineer." The whole development of medical technology is led by the non-invasive concept, he said, adding that there were a lot more huge challenges to tackle. Two current theme-based research projects involve work with stem cells to help people with severe heart disease and brain disorders respectively.

International Association for Pattern Recognition (IAPR) and American Association for the Advancement of Science (AAAS)

Prof Qiang Yang

Computer Science and Engineering

Prof Yang was elected an IAPR Fellow and AAAS Fellow for his research on data mining and artificial intelligence. He was made an IEEE Fellow in 2009. Data mining involves the processing of information to make sense of all the data that we now receive on the web, phone, multimedia channels, and others. This includes data generated by GPS devices, such as mobile phones, and healthcare applications where sensors can monitor activity. Collaborators include Huawei and Microsoft Research Asia in Beijing as well as students and professors at Shanghai Jiao Tong University. "I enjoyed science fiction movies such as *2001: A Space Odyssey*, and found IBM's Deep Blue computer fascinating. Interest is the most significant driver," he said. One of his current goals is to build a real lifelong learning system that can organize the details of a person's life and keep them up to date with their interests. "So, hopefully, in the near future, you can build your own mirror image."

Tsinghua University
Joint MPhil/PhD Established

In another pioneering move for postgraduate engineering education and academic exchange at HKUST, the School of Engineering has signed an agreement with the Graduate School at Shenzhen, Tsinghua University (THU), on their first joint MPhil/PhD program.

Dean of Engineering Prof Khaled Ben Letaief said that the partnership was part of the School's vision to build its Mainland and international presence through strategic alliances with top institutions. "This collaboration will go a long way in enhancing our future participation in research projects and activities in the Pearl River Delta region," he noted.

Students on the four-year PhD program will spend two years each at HKUST and THU. Those on the two-year MPhil will study for one year at each institution. Every student will have two faculty advisors, one from each university, and following graduation will become alumni of both institutions. The agreement was signed in November 2012 and the first cohort of students could be admitted as early as Fall 2013.

Other benefits of the joint program for students are wider learning opportunities and the chance to gain different cultural perspectives. It will also enhance the School of Engineering's drive for excellence and its endeavor to lead the way globally in the postgraduate educational experience it provides.

In the past few years, the School has actively sought partnerships with top institutions outside Hong Kong to build the multicultural nature of its postgraduate community. Agreements on joint PhD programs have included Korea Advanced Institute of Science and Technology (KAIST) in 2008, Pohang University of Science and Technology (POSTECH), Korea, in 2011, and Sharif University of Technology, Iran, earlier in 2012.

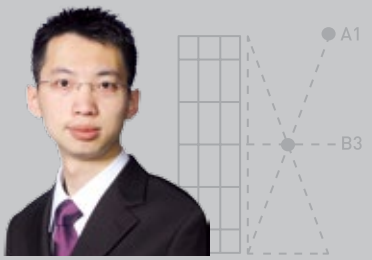
The Graduate School at Shenzhen, Tsinghua University, was jointly established by Shenzhen Municipal Government and Tsinghua University in 2000 and is one of the fastest-growing institutions in Asia-Pacific. The current Dean Prof Feiyu Kang is a HKUST Engineering School PhD graduate, receiving his doctorate in mechanical engineering in 1997.

Indoor Air Quality Expert Recognized

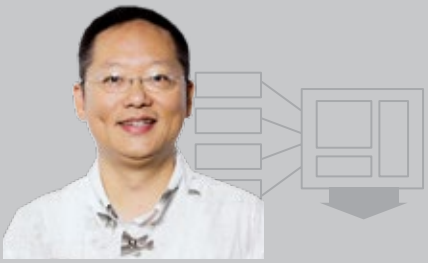
Associate Dean of Engineering **Prof Christopher Chao**, Mechanical Engineering, has been elected to the Board of Directors of the International Society of Indoor Air Quality and Climate. Prof Chao, a specialist in contaminant transport in indoor environments, will serve until 2016. He has taken on the roles of Vice President and Chair of the Technical Program Committee for the 13th International Conference of Indoor Air Quality and Climate (Indoor Air 2014) to be held at the Hong Kong Convention and Exhibition Centre in July 2014. The society's flagship conference attracts over 1,000 global participants from disciplines ranging from engineering and science to public health.

In addition, a research paper by Prof Chao received a 2012 Best Paper Award from *Building and Environment* journal. The paper, co-authored with Prof Chao's PhD students S Yin and G N Sze-To, focuses on "Retrospective Analysis of Multi-Drug Resistant Tuberculosis Outbreak During a Flight Using Computational Fluid Dynamics and Infection Risk Assessment" (Vol 47, January 2012). In 2011, the journal received 1,195 submissions. Some 200-plus papers were accepted for publication and three were selected to receive a Best Paper Award.

Faculty Honors, Awards and Achievements



Prof Jack Cheng, Civil and Environmental Engineering, and his PhD student Moumita Das received the Best Applied Paper Award at the 14th International Conference on Computing in Civil and Building Engineering. The paper was entitled "A gbXML-Based Web Service Framework for Green Building Design and Rule-Based Code Checking". The conference was held in Moscow, Russian Federation, in June 2012.



Prof Richard So, Industrial Engineering and Logistics Management, gave a keynote speech entitled "System Ergonomics" at the 5th AUN/SEED-Net Regional Conference on Manufacturing Engineering in Manila in November 2012. The meeting was held in conjunction with the 1st Human Factors and Ergonomics Society of the Philippines Conference.

Prof Huihe Qiu, Mechanical Engineering, received the Philips Outstanding Paper Award at the International Conference on Electronic Packaging Technology and High Density Packaging in Guilin in August 2012. The paper entitled "A Nanostructure Patterned Heat Spreader for On-Chip Thermal Management of High-Power LEDs" was co-authored with his PhD students Zhen Sun and Xiaodan Chen. The conference covers the latest developments in the field.

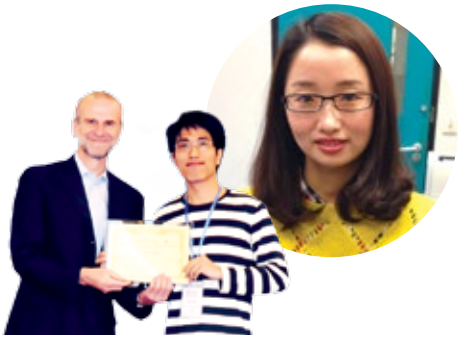
Prof C Y Tsui, Electronic and Computer Engineering, and his PhD student Toby Zhiliang Qian received a Best Paper Award for their study "Traffic-Aware Adaptive Routing Algorithm on a Highly Reconfigurable Network-on-Chip Architecture" at the 2012 IEEE/ACM International Conference on Hardware/Software Codesign and System Synthesis. The conference was held in Finland in October 2012. It is the premier forum in design, modeling, analysis, and implementation of modern embedded systems.

The work of **Prof Qian Zhang**, Computer Science and Engineering, was recognized with the 2012 Ho Leung Ho Lee Foundation Science and Technology Innovation Award. The Foundation was established in Hong Kong in 1994 to promote the development of science and technology in China and to reward scientific and technical personnel with outstanding achievements and great innovations. It awards three annual prizes: for scientific and technological achievements; scientific and technological progress; and scientific and technological innovation.

Student Honors, Awards and Achievements

Cho Yan Chan, **Lai Kin Leung**, and **Man Lam Wong**, Year 3, Electronic and Computer Engineering, won the Varitronix 30th Anniversary Scholarship for Best Final Year Project on Display Technology 2011-12. Their study looked at "Photo-Aligning Materials and Technology: Physics and Application in Liquid Crystal Devices". Varitronix Limited, one of Hong Kong's leading liquid crystal display manufacturers, donated a total of HK$150,000 over five years from 2008/09 to the Department of Electronic and Computer Engineering to run the award.

Undergraduate **Qifeng Chen**, Computer Science and Engineering, was ranked 12th in the Google Code Jam World Final 2012 in New York, the best achievement by a Hong Kong student since the competition started in 2003. Some 35,000 professionals and students participated in the contest in 2012, with only the top 25 invited to the world final. Qifeng attributed his outstanding performance to his leadership experience in HKUST's ACM-ICPC Programming Team, his studies, and his participation in the University's Undergraduate Research Opportunities Program.



PhD students **Wei Chen** and **Jianying Zheng**, Electronic and Computer Engineering, gained the Best Student Paper Award at the 2012 IEEE International Conference on Information and Automation for their paper on "Linear Quadratic Optimal Control of Continuous-Time LTI Systems with Random Input Gains", co-authored with Prof Li Qiu.

Marco Hoi Fai Cheung, Year 2, Chemical & Bioproduct Engineering and General Business Management, received the first prize at the fifth Henkel Innovation Challenge. The event is an international ideas competition for students in Europe, Asia-Pacific, the United States and Mexico. Marco and his School of Business and Management partner Yi Sun, created a product they called Loctite Watts, which makes it possible to convert heat waste energy into useful power. The HKUST student duo beat 19 other teams at the international finals of the contest, held in Warsaw, Poland. They received a Round the World ticket and travel vouchers worth €1,000.

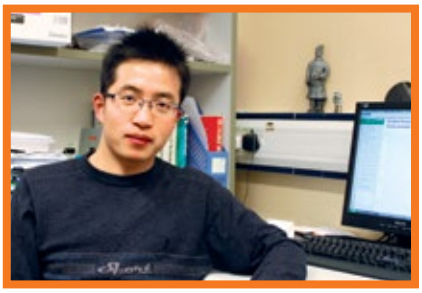
Undergraduate **Roy Ming Hin Chung**, Computer Science and Engineering, won the highly competitive "Talent Meets Bertelsmann 2012" business program, organized by world-leading media company Bertelsmann in Beijing. He received the opportunity to attend a training workshop in Germany and a graduate job offer from the company.

PhD student **Allen Yichuan Deng**, Civil and Environmental Engineering, received the Student Travel Grant Award at the 12th International Conference on Construction Applications of Virtual Reality, held in Taiwan. His paper was entitled "Mapping BIM Models and 3D GIS Models Using Instance-Based and Linguistic Methods", co-authored with Prof Jack Cheng. He also received the Best Project Award at the pre-conference workshop.

PhD candidate **Shaoming Huang**, Computer Science and Engineering, gained first place in the Student Research Competition at the ACM SIGPLAN Programming Language Design and Implementation (PLDI) Conference. PLDI is one of the most prestigious computer science conferences in the area of programming languages and software engineering. The competition consisted of three sections, involving extended abstracts, posters, and oral presentation.

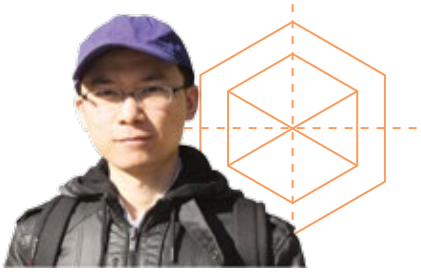
2012 Electronic and Computer Engineering final year students shone at the HKEIA Innovation & Technology Project Competition 2012, with several final year projects receiving awards. The Gold Award went to **Anthony Hon Pan Lo** and **Shavian Wai Shan Ng** for their "Object Searching Robot with Kinect". The Bronze Award was won by **Hon Lun Lai**, **Wing Lung Leung**, and **Po Lam Liu** for the project entitled "Muscle-Computer Interface". **Ryan Sheshan Aaron** and **Da Qiang Yeoh** received a Merit Award for their work on "Smart Glasses: Twiptor". The contest seeks to recognize and reward students with outstanding final year projects that demonstrate excellence in technology and innovation.

PhD student **Tongde Huang**, Electronic and Computer Engineering, won the Best Student Paper Award at the IEEE International Conference on Solid-State and Integrated Circuit Technology. The paper was entitled "High-Performance Depletion-Mode AlN/GaN MOSHFETs with Regrown Source/Drain", and co-authored by Xueliang Zhu and Prof Kei May Lau.

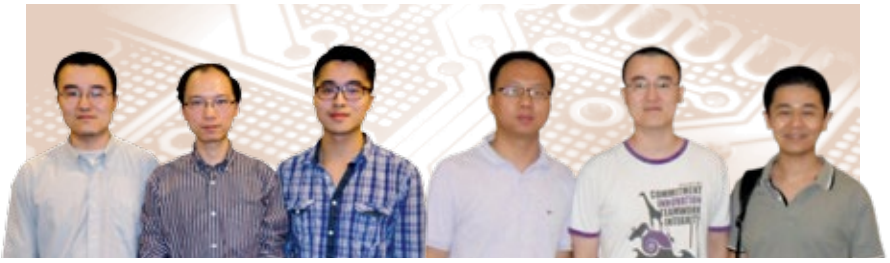


PhD student **Sandy Xiuyi Lin**, Mechanical Engineering, received the Best Poster Paper Award (First Prize) at the 15th European Conference on Composite Materials for the paper entitled "Effects of Reduction and Size of Graphene on Mechanical and Electrical Properties of Graphene Oxide Papers". It was co-authored by Q B Zheng, N Yousefi, X Shen and Prof Jang Kyo Kim.

PhD student **Yin Zhu**, Computer Science and Engineering, was awarded a prestigious Google Fellowship in Mobile Computing. He was one of only four people to receive a fellowship in the Greater China area. The Google PhD Fellowship Program recognizes outstanding PhD students doing exceptional work in computer science, related disciplines, or promising research areas. It was launched in China in 2010.

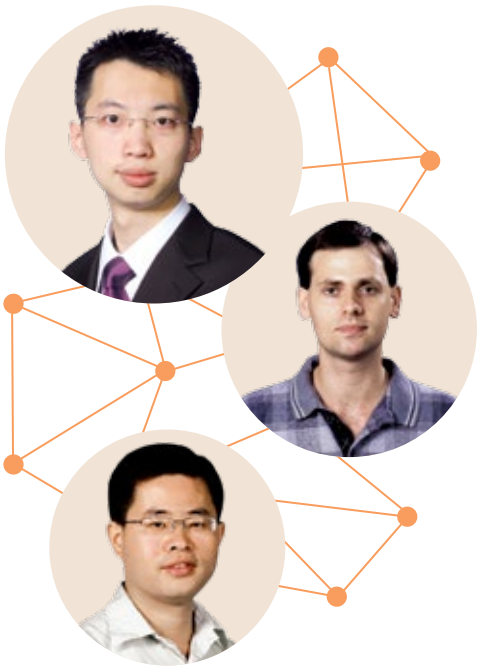


An undergraduate Chemical and Biomolecular Engineering student team comprising **Fung Chu Li**, **Bowen Sun** (Dual Degree Program), **Hon Ting Wong**, and **Lang Xu** won the First Class Prize at the Energy Saving and Emission Reduction Competition held at X'ian Jiaotong University.



Two teams of Computer Science and Engineering PhD students won championships in the Nokia Mobile Data Challenge 2012. **Yin Zhu**, **Erheng Zhong**, and **Bin Wu** were awarded the championship for the "Semantic Place Prediction" task for their project "Feature Engineering for Place Category Classification". **Ben Tan**, **Erheng Zhong**, and **Kai Xiang Mo** were awarded another championship for the "Demographic Prediction" task for their project "Your Phone Understands You". The competition attracted more than 200 teams worldwide.

PhD student **Hyunmin Seo**, Computer Science and Engineering, and Prof Sunghun Kim received the ACM SIGSOFT Distinguished Paper Award at the 27th IEEE/ACM International Conference on Automated Software Engineering. Their paper focused on "Predicting Recurring Crash Stacks". The award is the most prestigious software engineering conference paper award. The award is given to selected papers from top SIGSOFT-sponsored software engineering conferences. Only around 10% of accepted papers (1%-2% of submitted papers) are selected for the award.



Teaching Excellence Honored

Three professors from different departments have been recognized for their innovative and continuous excellence in undergraduate teaching and promotion of students' learning in the School of Engineering Teaching Excellence Appreciation Award 2011-12.

Prof Jack Cheng, Civil and Environmental Engineering, received the Distinguished Teaching Award for his work on outcome-based education and enhancement of students' exposure to real-world engineering practice. A graduate of HKUST, he has also provided great mentorship to undergraduate students as an advisor to the Civil and Environmental Engineering Students' Society and a clan chief to the School's four-year degree students. A clan chief is one of the important figures in the School's innovative student support system.

Prof David Rossiter, Computer Science and Engineering, and **Prof Ling Shi**, Electronic and Computer Engineering, received Teaching Awards. Both have made substantial contributions to the four-year curriculum. In addition, Prof Rossiter has secured remarkably high student evaluations over different courses and a number of years. Prof Shi has developed a key, hands-on introductory course, actively seeking and using feedback to improve it. He also serves as the Department's Mainland Student Coordinator.

Spurring Innovation and International Team Spirit

It was a fruitful multicultural summer for 33 HKUST students and their overseas peers who competed in the Technology and Management International Business Plan Competition 2012, held in Hong Kong and Mainland China in August.

The contest, co-organized by the HKUST Dual Degree Program, University of Illinois at Urbana-Champaign and University of Sao Paulo, requires mixed international teams of top students to develop an application and business plan for an emerging technology. Plans are then presented to an eminent panel of judges.

The 2012 competition was the seventh time the contest had been held. Student teams spent one week on research, market analysis, and the development of viable business plans for one of the six industries named as Hong Kong's new economic pillars.

Team spirit was encouraged prior to the start of the competition with a day's rafting in Sai Kung. Other activities included a visit to Hong Kong Applied Science and Technology Research Institute (ASTRI) and a three-day trip to Guangdong. Company visits to Guangdong Bear Electric Ltd and Tencent provided opportunities for students to learn about two fast-growing companies in Mainland China.

After keen debate among the judges, Team "WeCycle" was selected as the winner for their business idea centered on waste reduction and collection of recyclable materials.

Spotlight on Shenzhen Industry Links

The Second Annual HKUST ECE Shenzhen Industry Day was held on November 2, 2012, to promote and explore collaboration between Shenzhen industry and the Department of Electronic and Computer Engineering (ECE) on research topics of mutual interest. The event, co-organized by ECE, the School of Engineering Center for Industry Engagement & Internship, and the HKUST Shenzhen Research Institute was held in Nanshan, Shenzhen, bringing together more than 60 representatives from local companies and HKUST.

Welcome speeches by Prof Ross Murch, Head of ECE, and Prof Mitchell Tseng, Associate Vice-President for Research & Innovation, were followed by an introduction of the enterprising Texas Instruments (TI) Scholar@HKUST program. This sponsors selected ECE master's degree graduates on a six-month co-op program at TI and HKUST (see below). Technical sessions featured presentations, posters and demos on the latest LED technology and market trends, integrated circuits, systems and applications, and biomedical electronics. All are areas of particular strength within ECE.

Speakers at the event included Prof Kei May Lau, Prof Patrick Yue, Prof Bert Shi, Prof Weichuan Yu, Prof George Yuan and Prof Levent Yobas of ECE; Dr Phil Chen, R&D Manager, Osram; Dr David Xiao, Managing Director, Advanced Photoelectronic Technology; Dr Justin Chuang, Vice President and Group Director – Communications Technologies Group, ASTRI and ECE Adjunct Professor; Dr Joy Laskar, Vice President of Advanced Technology, InSite Partners; and Ms Rebecca Liu, Senior Manager – Strategic Business Development, Greater China & South Asia Region, STMicroelectronics.

IC Research Boost

Texas Instruments (TI) is committed to higher education, in particular the field of engineering. In line with this, the company creates partnerships and programs to promote excellence in research, contributes financial resources, offers expertise, and donates equipment. In 2012, the company gave a donation to the ECE Department to establish the TI Scholarship Program, enabling master's degree graduates to be sponsored on long-term cooperative research projects in areas related to semiconductor design.

At the ECE Shenzhen Industry Day, Cedric Li (pictured), MSc in Integrated Circuit Design Engineering 2012 and the first TI scholar, received a commemorative plaque from Ms Irene Deng, Design Manager & Senior Member of Technical Staff, Semiconductor Group, who has been instrumental within Texas Instruments in setting up the scholarship program. They are accompanied by Prof Ross Murch, Head of ECE (first left), and Prof Patrick Yue, Director of the Center for Industry Engagement & Internship (first right).

Qualcomm Set to Strengthen Ties

The fifth annual Qualcomm-sponsored Greater China University Research Workshop@HKUST was held on November 7, 2012, drawing over 50 people from industry, universities in Greater China, HKUST faculty, and postgraduate students.

Keynote speakers included Dr Rajesh Pankaj, Senior Vice President of Engineering, and Dr Chienchung Chang, Vice President of Engineering, both at Qualcomm, who spoke on the latest trends of the wireless and networking industry. This was followed by a poster and demo session where members from other universities in the Qualcomm-sponsored University Research Community in Greater China presented their work.

A laboratory tour provided a view of the state-of-the-art facilities at HKUST's Wireless Communications Lab, Photonics Technology Lab, and Consumer Media Center. Qualcomm and HKUST also plan to establish a Qualcomm Lab@HKUST to work on collaborative projects related to wireless and networking.

Asia Quality Congress
Sets the Pace

Four hundred quality experts from industry, academia and government took part in the wide-ranging and productive Asian Network for Quality (ANQ) Congress 2012 at HKUST in August 2012, strengthening Asia's voice in the quality area globally.

The forum's theme focused on "Striving for Excellence through Product and Service Quality", with the event promoting academic research in the quality field and enhancing communication between quality practitioners and experts from different countries and regions.

Speakers at the event shared the latest developments in quality management and the application of quality assurance concepts in a corporate environment. They included Mr Masahiro Sakane, Chairman of Komatsu Ltd, Mr Gregory H Watson, Immediate Past Chairman of the International Academy for Quality, and Mr Janak Mehta, President of the International Academy for Quality. In addition, delegates discussed ways to extend quality concepts from product manufacturing to healthcare, education and other services to achieve greater quality of life and work.

The University co-hosted the event with the China Association for Quality and Hong Kong Society for Quality, with Prof Fugee Tsung, Head of Industrial Engineering and Logistics Management at HKUST serving as a Congress Co-Chair. Also attending were Mr John Hung, Secretary-General of the Hong Kong Council for Testing and Certification, Mr Qi Weiming, Chairperson of the Asian Network for Quality cum Vice-President and Secretary General of China Association for Quality, and Dr Lotto Lai, Chairman of the Hong Kong Society for Quality.

ANQ comprises non-profit organizations from 39 regions in Asia. It seeks not only to improve the quality of human life by contributing to the progress of science and technology but also to assist industry development through promotional activities for research and development of quality and quality management.

Revving Up for Innovation Management

A dynamic illustration of how to combine engineering knowledge with effective management was provided by Dr Andy Palmer, Executive Vice President at Nissan Motor Company Ltd, on campus in November 2012. Dr Palmer, who holds a master's degree in engineering and a PhD degree in management, gave a fascinating presentation to students and professors on innovation and how this could support the company's Nissan Power 88 mid-term business strategy to raise profit margins and global market share to 8% by fiscal year 2016.

Manufacturing Systems in the International Spotlight

The 62nd College International pour la Recherche en Productique (CIRP) General Assembly successfully took place in Hong Kong in August 2012, attracting some 830 people, 98% of whom were from outside Hong Kong.

HKUST President Prof Tony F Chan delivered a memorable speech at the opening ceremony and keynote speakers shared their innovative ideas on research related to manufacturing processes, production equipment and automation, manufacturing systems, and product design and manufacturing. Speakers included Prof Andrew Nee, CIRP President, Dr Frank Zhao, Group Vice President of Geely Automotive Company, and Dr Lienjing Chen, Managing Director, Pratt & Whitney China Operations.

CIRP is an eminent academic organization founded in the early 1950s to address issues related to modern production science and technology through scientific research and international cooperation. The organization has around 550 members from over 40 countries, with membership intentionally limited to enhance exchange and personal relationship-building. It also encourages participation of industry in its activities.

The 2012 program started with a research associate conference in Dalian, followed by a pre-conference tour of Shanghai-Nanjing. Two post-conference trips were arranged to Tianjin-Dalian-Beijing and Taipei-Hsinchu. All the tours included industry visits, sightseeing and cultural expeditions. The Chair of the Organizing Committee was Prof Mitchell Tseng, Industrial Engineering and Logistics Management, HKUST School of Engineering.

During his talk, entitled "Leadership of Innovation", Dr Palmer noted that to be successful innovation requires not only creativity but leadership backed by science and discipline. Using the Nissan Zero Emission Project and Nissan NY Taxi initiatives, among other examples, Dr Palmer showed how innovations are created, appreciated, managed and commercialized at Nissan.

Dr Palmer gained his MSc in Product Engineering from the University of Warwick in 1990 and a PhD in Management from Cranfield University in 2004. He joined Nissan in 1991, initially working as a business administration manager at the Nissan Technical Centre Europe. He transferred to Japan as Program Director for Light Commercial Vehicles in 2002 and established a business unit for these vehicles in 2004. The light commercial vehicle business was identified as one of the four breakthroughs in the company's business plan from 2005-07.

The presentation was organized by the School of Engineering and HKUST Institute for Advanced Study, and hosted by Prof Richard So, Department of Industrial Engineering and Logistics Management. Mr Paul Miles, General Manager of Nissan Global Company Ltd in Hong Kong, also attended the talk. In October 2012, Prof So led HKUST colleagues to visit Infiniti (HK), Nissan's luxury brand now headquartered in Hong Kong, to explore potential collaborations between the company and HKUST.

Wider View of the World of Mechanical Engineering

The Department of Mechanical Engineering (MECH), in co-operation with the Mechanical Engineering Students' Association, provides many activities for students to learn more about the field of mechanical engineering and foster departmental spirit. These initiatives assist personal development and are increasingly important under the four-year undergraduate degree system that calls on students to play a more active part in choosing the courses they would like to study.

The first semester of 2012-13 saw a number of different events successfully arranged.

Annual Dinner 2012

The MECH Annual Dinner 2012 celebrating the Department's 21st anniversary was held on November 9, 2012. Around 130 alumni, students, family and friends of the Department gathered together for the highly enjoyable occasion.

A speech by Prof Matthew Yuen, Head of the Department, got the celebration off to a memorable start. Four distinguished alumni awards were also presented in recognition of outstanding service to the Department as well as professional academic and/or industrial achievements. The awardees were: Ho Yeung Chan, BEng (2002), MSc Intelligent Building Technology and Management (2006); Dr Ivan Man Lung Sham, BEng (1996), MPhil (1998), PhD (2003); Dr Fubin Song, PhD (2007); and Chi Wai Yu, MPhil (1999).

Workshops Offer Inside View

The Department hosted two workshops to provide insight into different aspects of mechanical engineering for students. The workshops are a new addition to the year's activities to deepen understanding of the field.

Guest speakers for the first workshop were Ir Edmond Kwong Ho Leung and Ms Gigi Lam who discussed how to become a chartered engineer through the Hong Kong Institution of Engineers' Scheme A program. The second workshop featured Prof Wei Shyy, HKUST Provost and Chair Professor of Mechanical Engineering, Prof Jang Kyo Kim, Professor of Mechanical Engineering, and Yaxiong Cai, previously an intern at Boeing. The workshop focused on aspects of aeronautical and mechanical engineering, and experience-sharing about the life of an intern.

Over 100 students attended the events, mostly Year 1 engineering students. Another three workshops are being planned by the Department in the second semester.

Company Visit

Technical visits are an old tradition for the Department's students' association to enhance knowledge of current working opportunities and business environments. A recent tour saw a group visit to Hong Kong Aero Engine Services Limited, allowing students to understand more about engine decomposition, company operations, and its Scheme A program, supervised by the Hong Kong Institution of Engineers. Future plans include visits to Cathay Pacific and the Mass Transit Railway Corporation.

Inside Story on iPhone 5

In October 2012, over 300 School of Engineering students gained greater understanding of how electronic and computer engineering technologies impact on everyday life through an iPhone 5 "autopsy", conducted by a group of Electronic and Computer Engineering faculty.

The demonstration gave those attending a valuable chance to take a close look at the electronic components inside the phone. The event was introduced by Prof Patrick Yue, who also discussed the integrated circuit chips used by iPhone 5. This was followed by talks on antennas (Prof Ross Murch), display technologies (Prof Hoi Sing Kwok), networks (Prof Vincent Lau), software applications (Prof Wai Ho Mow) and social media (Prof James She). A video of the event can be viewed at: www.youtube.com/watch?v=2edg-sQKDDk&feature=share.

From Hardware to Heartware

The second in the School of Engineering's thought-provoking Starting from Technology Seminar Series took place in September 2012. The event encouraged students to connect their future work to the community and to develop their "heartware", or compassion, integrity and values, alongside their technological skills in order to create useful, people-oriented products.

At the talk, Mr Erwin Huang, CEO of WebOrganic and a founder of the SCHSA social enterprise which has pioneered the use of technology for senior citizens' safety, and Mr Andrew Ma, TEDxMongKok 2012 speaker, discussed "The 'Heartware' Required to Excel in the 21C Technology-centric World". The seminar series, which forms part of the School's Global & Community Engagement (GCE) Program, seeks to broaden awareness of the role engineers play in society.

Mr Huang brought two types of heartware products to show students: Safety Bell assists elderly people who live alone while Nike Fuel makes people more self-aware of their health as it tracks physical activity. Mr Ma pointed out that people often do not really communicate even with the latest hi-tech gadgets. However, heartware provides a way to transfer hope, love and wisdom, and through this they may alter their lives.

Mr Huang ended the seminar by giving tips on learning how to learn and how students can identify what they want to learn.

As further encouragement to participate in community work and local and international contests, 80 students received achievement certificates for excellence at a presentation ceremony organized by the GCE Program in October 2012. It was the first time such certificates had been awarded.

At the ceremony, Prof Kam Tim Woo, Director of Global & Community Engagement Program, also announced the launch of the GCE Student Enrichment Grant Scheme and GCE Student Initiated & Organized Projects Fund. Both schemes provide sponsorship for full-time undergraduate and postgraduate engineering students to join local and international activities.

Learning the Latest about
Engineering Leadership

The School of Engineering organized the thought-provoking "What's Missing in Engineering Leadership?" international seminar at the InnoCentre in Kowloon in October in line with the School's drive to keep alumni and members of the professional community up to date with the latest global engineering trends.

The distinguished line-up at the seminar included Prof Po Chi Wu, Mechanical Engineering, HKUST; Prof Ikhlaq Sidhu, Fung Institute Chief Scientist and ELPP Program Curriculum Architect, University of California at Berkeley; and Prof Paris de L'Etraz, IE Business School (Madrid, Spain). Prof Christopher Chao, Associate Dean of the School of Engineering, introduced the event.

The seminar covered timely topics, such as the key principles for successful engineering leadership, how technical leaders can be transformed into enterprise leaders, how leaders choose and identify opportunities, and the latest thinking on innovation management in Silicon Valley.

Winning Ways

Two School of Engineering PhD graduates have been honored with Hong Kong Young Scientist Awards. **Dr Kaishun Wu**, 2011 PhD graduate in Computer Science and Engineering, won in the Physical / Mathematical Science field for his research on "MAC / PHY Advances in Wireless Networks". Electronic and Computer Engineering graduate **Dr Can Yang**, who also graduated in 2011, received the award in the Engineering Science field for his contribution to the paper, "BOOST: A Boolean Representation-Based Method for Detecting SNP-SNP Interactions in Genome-Wide Association Studies". An award is given annually in each of the Physical / Mathematical Science, Life Science, and Engineering Science areas.

The accolades were presented at the Hong Kong Institution of Science Annual Conference 2012 in November. They recognize young scientists and engineers in Hong Kong who excel and exhibit great promise in their field of study and promote science and technology development in the region. Dr Wu is currently a Research Assistant Professor at HKUST Fok Ying Tung Graduate School in Nansha and Dr Yang is an Associate Research Scientist at Yale University.

IELM Networking Lunch in Beijing

Postgraduate alumni, current postgraduate students and faculty members of the Department of Industrial Engineering and Logistics Management (IELM) enjoyed a productive get-together lunch at the 2012 INFORMS international conference in Beijing. Those attending included Head of Department Prof Fugee Tsung, Prof Jeff Hong, Prof Ning Cai and Prof Xiaowei Zhang, along with 21 alumni and 11 students.

The gathering provided a great opportunity for alumni to meet each other and to discuss issues and experiences with students. Alumni at the lunch included those now working at prestigious academic establishments, including Tsinghua University, Shanghai Jiao Tong University, Sun Yat-sen University, City University of Hong Kong, Huazhong University of Science and Technology and the University of Macau.

New Appointments

Faculty Members

Prof Pan Hui
Assistant Professor, Computer Science and Engineering
PhD – University of Cambridge

Teaching Faculty

Prof Yuan Shuai Liu
Lecturer, Chemical and Biomolecular Engineering
PhD – The Hong Kong Polytechnic University

Adjunct Faculty

Prof Edward Chang
Professor, Computer Science and Engineering
PhD – Stanford University

Prof Xiaowei Sun
Professor, Electronic and Computer Engineering
PhD – University of Pennsylvania

Prof Jean Marie Tarascon
Professor, Chemical and Biomolecular Engineering
PhD – University of Bordeaux

Prof Cary Yang
Professor, Electronic and Computer Engineering
PhD – The Hong Kong University of Science and Technology

Visiting Faculty

Prof Spiros Bakiras
Associate Professor, Computer Science and Engineering
PhD – University of Southern California

Prof Moncef Gabbouj
Professor, Electronic and Computer Engineering
PhD – Purdue University

Prof H V Jagadish
Professor, Computer Science and Engineering
PhD – Stanford University

Prof Frank Lam
Assistant Professor, Chemical and Biomolecular Engineering
PhD – The Hong Kong University of Science and Technology

Prof Gibson Lam
Assistant Professor, Computer Science and Engineering
PhD – The Hong Kong University of Science and Technology

Prof Carrie Ling
Assistant Professor, Bioengineering Graduate Program
PhD – The Hong Kong Polytechnic University

Prof Wei Zhang
Associate Professor, Electronic and Computer Engineering
PhD – The Chinese University of Hong Kong

Condolence

Professor Chih Kang Shen

With deep regret, we report that Prof Chih Kang Shen, Founding Head of the Department of Civil and Environmental Engineering (1991-95), passed away in California on July 17, 2012, aged 79. Prof Shen is remembered with great respect at HKUST, where his vision and commitment laid down the solid foundation of high standards that the Department has continued to strive for and achieve since those opening days.

Prof Shen retired from a 24-year career in the Department of Civil Engineering at the University of California, Davis, to join HKUST. At Davis, he served as Department Chair (1988-91), among other faculty positions. As Department Head at HKUST, he assembled a top faculty and shaped the Department into a highly visible academic unit. Prof Shen retired from HKUST and returned to his home in Davis in 1998.

During an outstanding academic and professional service career, Prof Shen focused largely on investigating soil mechanics and foundation engineering. He also trained, mentored, and became a role model for innumerable students.

SENG Award Winner Gives ‘Smart’ Materials Keynote

The winner of the HKUST School of Engineering Distinguished Research Excellence Award 2012 **Prof Tongyi Zhang** gave a fascinating keynote on December 11, 2012, to an audience of over 200, including HKUST President Prof Tony F Chan, other senior members of the University management, students and members of the public.

Prof Zhang, Chair Professor in the Department of Mechanical Engineering, spoke on “Fracture and Failure of Smart and Intelligent Materials of Piezoelectric Ceramics”. His research on such “smart” materials has made a huge impact on the academic world, with numerous national and international honors, 170 published papers, and two co-held US patents. Piezoelectric ceramics also have a wide range of applications in hi-tech industries.

The Distinguished Research Excellence Award is the highest level of recognition bestowed by the School, and has been established to acknowledge the impact and contribution of the School’s leading-edge faculty. The keynote forms part of the award and is an honor in itself.

In his introductory speech, Dean of the School of Engineering Prof Khaled Ben Letaief noted the faculty support and outstanding nominations received for the Research Excellence Award scheme since its launch in 2011. President Chan also spoke about the importance of world-class research for HKUST’s international recognition and long-term success in his opening remarks and applauded the School of Engineering for starting the scheme.

A tea reception following the keynote brought together 160 people, including those who attended the keynote as well as friends of the School of Engineering. The gathering was held at the School’s new front office on the Academic Concourse.

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
Young Reporters: Ka Ki Fong, Sathish Raghuraman
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