

ENGINEERING EDUCATION AS LIBERAL EDUCATION?

*In the first of a special **In Focus** series in which School of Engineering faculty provide fresh insight into engineering education, **Prof Edmond Ko**, Department of Chemical Engineering, highlights the whole-person development program that awaits 21st century engineering students (page 3)*



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Welcome to the latest edition of *In Focus!*

As our Cover Story for this issue reflects, the School of Engineering (SENG) is keen to dispel old notions and convey the exciting nature of an enterprising engineering education in the 21st century. Such an education can open up a wide range of cutting-edge and socially significant technological fields. In addition, engineers must be able to see the bigger business picture and be socially responsible. They must be prepared to offer creative solutions to solve problems, to work together with colleagues from other fields and to communicate their views.

In subsequent newsletters, we will be pursuing this theme in relation to the changes being planned as the School moves toward the introduction of the four-year undergraduate degree in 2012 under Hong Kong's education reform plans.

Among the initiatives that the School has already undertaken to broaden awareness of life as a HKUST engineering undergraduate is the SENG Student Ambassador Program. As our article reports, under this scheme, undergraduate representatives from SENG departments go on school visits and assist at open days. They explain to secondary school students and their families the challenges, rewards and fun of their particular field and the subsequent career prospects. In doing so, they have successfully provided a fresh view of engineering to the community while at the same time improving their own interpersonal and communication skills.

Other reports include a collaborative agreement involving HKUST and leading US aviation company Boeing Phantom Works, a breakthrough application for mobile phones, and an interview with an alumnus who has set up his own chemical company and also works on environmental care products. As these articles show, engineering can open up many great opportunities.

All the best for the rest of the year and 2008.

Prof Philip Chan
Dean of Engineering

Faculty Members

- **Prof Zhigang Li**
Assistant Professor, Mechanical Engineering
PhD - University of Delaware
- **Prof Wenjing Ye**
Assistant Professor, Mechanical Engineering
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- **Prof Jiang Xu**
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Announcements

Regional Collaboration Boost

HKUST has joined 11 other leading universities in engineering to form the Asia-Oceania Top University League on Engineering (AOTULE). The regional league, launched in March this year at a meeting in Tokyo, seeks to improve the quality of engineering education and research and to facilitate international collaborations among its top-ranking members through exchanges of information, students and staff.

At the first gathering, representatives agreed to implement joint annual research symposiums, exchanges, and an annual meeting of Deans of Engineering Schools/Faculties, among other programs. League members include Monash University (Australia), Tsinghua University (China), National Taiwan University (Taiwan), India Institute of Technology Bombay (India) and Tokyo Institute of Technology (Japan).

The second meeting takes place at the Korean Advanced Institute for Science and Technology in Daejeon, Korea from 28-30 November. Workshops for students and young scientists will be held at the same time. Further details of AOTULE are available at <http://www.aotule.eng.titech.ac.jp/index.htm>.

Engineering Education as Liberal Education ?

by Prof Edmond Ko

If the title of this article caught you by surprise, then your reaction was similar to mine when I, as an engineering student, came across a book entitled *Engineering and the Liberal Arts* by Samuel C Florman. What, I wondered then, could engineering and the liberal arts have in common?

To this day, many people still regard engineering as a dry, technical discipline that only involves the application of mathematics and science to solve real-world problems. In this light, engineering students are often perceived to be “nerdy” in the sense that they are too analytical, too narrowly focused, or lacking in people skills.

In fact, since the beginning of the 20th century, there has been an emphasis on the non-technical component (often referred to as general or liberal education) of an engineering curriculum. This emphasis is even stronger in the 21st century, when engineering graduates now face more complex, multidisciplinary problems and, at the same time, a much wider choice of career paths. An engineering education thus provides a solid foundation for whole-person development.

As evidence, we can turn to the Accreditation Board for Engineering and Technology (ABET) in the United States, which recently adopted a new set of accreditation criteria called Engineering Criteria (EC) 2000. To receive accreditation, an engineering degree program must demonstrate that its graduates possess 11 capabilities, six of which are attributes generally associated with a liberal education:

- An ability to function on multidisciplinary teams
- An understanding of professional and ethical responsibility
- An ability to communicate effectively
- The broad education necessary to understand the impact of engineering solutions in a global/societal context

- Recognition of the need for, and an ability to, engage in lifelong learning
- Knowledge of contemporary issues.

Engineering degree programs in Hong Kong are accredited by the Hong Kong Institution of Engineers (HKIE) which, as a member of the Washington Accord, holds engineering schools responsible for helping their students develop a series of attributes. Again, four of these attributes are usually related to liberal education. Students should be able to:

- Communicate effectively
- Engage in lifelong learning and professional development
- Act in accordance with the ethical principles of the engineering profession
- Function in contemporary society.

It is thus clear from the above that an engineering education is aimed at developing people who not only are comfortable with quantitative methods and technology, but also possess the necessary knowledge and skills to solve complex, large-scale problems (technical or otherwise) that a modern society faces. As such, engineering education could indeed be viewed as the liberal education of the 21st century.

Of course, we should be cautious in using labels such as “professional” or “liberal” in describing a discipline. The focus should not be on the label, but on clearly defining the intended learning outcomes of an engineering education in terms of the desirable graduate attributes, then delivering these outcomes in an effective and convincing manner. This is the approach taken by the School of Engineering in its planning for the new four-year undergraduate curriculum, details of which will be discussed in subsequent issues of *In Focus*.



- ▶ **Prof Khaled Ben Letaief**, Chair Professor and Head of Electronic and Computer Engineering, was recognized for his dynamic and imaginative service as founding editor-in-chief of *IEEE Transactions on Wireless Communications* 2002-2006 at the IEEE Communications Society Conference ICC 2007.
- ▶ **Prof Chak Keung Chan**, Chemical Engineering, has joined the editorial board of *Atmospheric Chemistry and Physics*, an interactive, open-access journal produced by the European Geosciences Union. In addition, Prof Chan's paper "Understanding Hygroscopic Growth and Phase Transformation of Aerosols Using Single Particle Raman Spectroscopy in an Electrodynamic Balance", co-authored by Alex KY Lee and TY Ling, has been chosen as a "hot article" in scientific journal *Faraday Discussions*. An interview with Prof Chan on the paper is available at: <http://www.rsc.org/Publishing/Journals/fd/News/Chan.asp>
- ▶ **Prof Guohua Chen**, Chemical Engineering, has received "Most Cited Paper 2003-2006" awards for two co-authored papers published in *Chemical Engineering Science*. He has also been awarded a Certificate of Excellence by the World Forum for Crystallization, Filtration and Drying and a Certificate of Merit by the international journal *Drying Technology* for his outstanding research and development in the field. His paper "Electrochemical Technologies in Wastewater Treatment", published in *Separation and Purification Technology*, July 2004, has remained one of the journal's top five "hottest articles" since its publication.
- ▶ The paper, "Factors in Liquid Crystal Photoalignment on Polymer Films: Photoorientation Versus Self-assembly", written by **Prof Vladimir Chigrinov** and **Prof Hoi Sing Kwok**, Electronic and Computer Engineering, and published in *Liquid Crystals*, Volume 33, Issue 2, was ranked among the journal's top 10 most accessed articles in 2006. The paper was co-authored with O Yaroshchuk.
- ▶ **Prof Kenny CS Kwok**, Civil Engineering, has won the Best Paper Award at the Sixth China Urban Housing Conference Beijing. The paper "Air Ventilation Assessment for high density residential development" was co-authored by Raymond Leung and Owen LF Yue. A total of 260 papers were submitted.
- ▶ **Prof Chung-Yee Lee**, Chair Professor and Head of Industrial Engineering and Logistics Management, has been appointed Regional Vice-President Australasia for the Production and Operations Management Society (POMS). The society is the most authoritative source of developments in the production and operations management field.
- ▶ **Prof Neville Lee**, Industrial Engineering and Logistics Management, has been awarded a first-class China National Natural Science Award. Prof Lee was honored with the prestigious prize for his contribution to modeling, fabrication and characterizing of a poly crystal silicon thermal flexure actuator.
- ▶ **Prof Yang Leng**, Mechanical Engineering, has been made a Fellow of Biomaterials Science and Engineering. This honorary status recognizes Prof Leng's excellent professional standing and high achievements.
- ▶ **Prof Mitchell M Tseng**, Industrial Engineering and Logistics Management, has been elected a Fellow of the American Society of Mechanical Engineers. The accolade recognizes Prof Tseng's achievements and exceptional contributions to the engineering profession.
- ▶ **Prof Chi Ying Tsui** and **Prof Wing Hung Ki**, Electronic and Computer Engineering, received the best paper award at the International Symposium on Low Power Electronics and Design (ISLPED). The paper, "Vibration Energy Scavenging and Management for Ultra Low Power Applications", was co-authored by Chao Lu.
- ▶ **Prof Tongyi Zhang**, Mechanical Engineering, has won second prize in the State Natural Science Award 2007. Prof Zhang's project was the only award-winning project nominated by the HKSAR government this year.
- ▶ **Prof Tianshou Zhao**, Mechanical Engineering, has been elected a Fellow of the American Society of Mechanical Engineers. He has gained the honor for his outstanding research involving the development of clean and high-efficient energy technologies.

Winning Ways with Water

Prof Mohamed S Ghidaoui, Civil Engineering, has been drawing the attention of the media far and wide after gaining global recognition for his work in water engineering and environmental fluid mechanics by winning the 2007 Arthur Thomas Ippen Award from the International Association of Hydraulic Engineering and Research (IAHR). The award is the most important that the IAHR can bestow on a member of the water engineering and science community.

Prof Ghidaoui received the award at the IAHR congress in Venice Italy in the first week of July 2007. He also delivered the Ippen lecture at the closing ceremony of the IAHR congress. The title of his talk was "Ippen's Analogy and the Development of Hydraulic Models using Boltzmann's Kinetic Theory of Gases".

The Ippen prize recognizes outstanding ability, originality and accomplishment in basic hydraulic research and applied hydraulic engineering. In its citation, the IAHR noted Prof Ghidaoui's outstanding contribution to hydraulics, water resources and environmental fluid mechanics, in particular, the modeling of surface, sub-surface and closed conduit flows. Applications include many of the world's greatest water issues, including water supply, quality, tsunamis, irrigation, land reclamation, navigation and drainage.



The success of Prof Ghidaoui, born in Tunisia and only the second Asia-based researcher to be awarded the prize in its 30-year history, has put a spotlight on his academic research, HKUST and Hong Kong. Prof Ghidaoui has been interviewed on Tunisian radio, by Tunisian newspapers, and news of the award picked up by Hong Kong newspapers and other international media.

During radio interviews, Prof Ghidaoui explained the field of hydraulics and shared his views on tsunami disasters, floods, desalination and its environmental consequences, and global warming, among other high-impact topics. In one interview, he was also joined by phone by two other Tunisian professors at HKUST School of Engineering — Prof Mounir Hamdi, Computer Science and Engineering, and Prof Ben Letaief, Chair Professor and Head of Electronic and Computer Engineering.

"We were able to inform listeners about our research and all three spoke about the success of HKUST, the School of Engineering and its excellent ranking worldwide," Prof Ghidaoui said. The radio interviews sparked strong interest among both listeners and Tunisian and overseas newspapers.

Prof Ghidaoui received his BSc, MSc and PhD, all in Civil Engineering, from the University of Toronto, Canada and joined HKUST in 1993. His other awards include the Albert Berry Memorial Award from the American Water Works Association and Erskine Fellow Award, University of Canterbury, New Zealand.

Journal Ranking System Success Story

Industrial Engineering and Logistics Management Professor Andrew Lim and PhD students **Hong Ma, Qi Wen, Zhou Xu** and Zhu Wenbin won an Innovative Applications of Artificial Intelligence (IAAI) Deployed Application Award for their paper, "Journal-Ranking.com: An Online Interactive Journal Ranking System", at this year's IAAI annual conference. The international event, sponsored by the Association for the Advancement of Artificial Intelligence was held in Vancouver, Canada.

The paper documented joint work between HKUST and business and technology consultants Red Jasper Limited on the successful deployment of an online interactive journal ranking system. The new system allows users to interactively configure their ranking interests, as well as provide a more reasonable method to evaluate a journal's impact.

Flying High with Boeing Research

In a significant move, HKUST has entered into collaborative agreements with leading US aviation innovator Boeing Phantom Works, together with Tsinghua University in Beijing and Southeast University in Nanjing, to research and develop new technology associated with wireless communications.

Phantom Works is the advanced research and development unit for US aviation giant Boeing and the driver of innovation at the enterprise. The research, intended to enable breakthroughs that will benefit onboard entertainment systems for Boeing's commercial airplanes and communication among maintenance technicians at airports, will be carried out by professors, doctoral and master's degree candidates at the three universities.

At HKUST, faculty and students in the Computer Science and Engineering Department will work on the problem of seamless connectivity among different networks used by aircraft line maintenance technicians at airports. Hong Kong International Airport will also participate in the project.

Tsinghua University research will focus on ways to improve the quality of wireless video streaming for onboard entertainment systems and how to make better use of the already installed physical wiring for onboard entertainment systems. At Southeast University, studies will be conducted on compact, ultra-wideband antennas for onboard entertainment systems that do not cause interference with other systems on the airplane.

Mr Robb Graham of Phantom Works' Engineering and Information Technology organization, said: "We believe the talented staff and students at these universities can help us address key technology development challenges and complement our own research."

Mr David Wang, President of Boeing China, said: "China and Boeing have a long, successful history of working together. The collaborative agreements with Tsinghua University, Southeast University and HKUST further expand our relationships and recognize the world-class capabilities of Chinese academic institutions."



Equipment Fund Established

Chiaphua Industries Limited has pledged HK\$2 million to establish a research equipment fund for the Department of Chemical Engineering. The donation will be earmarked to purchase new equipment or upgrade equipment, and to help the Department to devise long-term plans for the acquisition of equipment, among other uses.

The Department's research focus centers on areas at the cutting edge of new knowledge in chemical engineering,

including advanced materials, biotechnology, high value-added products, process engineering and environmental technologies. Prof Chi Ming Chan, Chair Professor of Chemical Engineering and Director of the Optical Fiber Lighting Cables Cooperative Research Center, said: "The Chiaphua donation will provide wonderful support for our leading research by enabling the Department to look ahead and purchase the best possible equipment for overall development."

Coming Soon... More to See on Your Mobile Phone

A breakthrough technology has been developed by a Department of Electronic and Computer Engineering academic that will allow mobile phone users to turn their handsets into a wide-ranging media center.

The exciting innovation, known as "Pan-V", enables mobile phone users to substantially expand the video/audio contents available on their handsets, according to Professor Oscar Au, Electronic and Computer Engineering, who has helped to create the technology together with Hong Kong company AnTech MPS (Global) Ltd.

Pan-V will enable users of 3G and 3.5G mobile phones to watch television programs at almost the time that shows are aired, see DVDs, and watch surveillance videos, among other video/audio contents.

Housed in a modem-sized box, the technology is designed to connect to a television, audio-visual equipment or surveillance camera. It can then capture, store and stream video and audio content, compressing them into a format that can be accessed on mobile phones, other mobile devices such as PDAs and notebooks, and also computers.

Prof Au said that a delay of less than 20 seconds would allow the system to capture the video feed. He pointed out that Pan-V would allow any mobile phone with access to the internet to enjoy real-time television, including handsets costing less than HK\$2,000.

Pan-V complies with international standards of data computing and communications and can be used anywhere in the world. It can also be operated remotely, allowing users to change channels, start and stop a recording, and switch video input, among other functions.

The research project was funded by the Hong Kong Innovation and Technology Commission, with the technology licensed to AnTech. "In a great display of university, industry and government co-operation, we have developed a novel technology that can revolutionize the behavior of mobile users throughout the world, bringing about better life and greater convenience," Prof Au said.



Wireless Communication R&D Center Set Up

HKUST and Huawei Technologies Co Ltd, a leader in next-generation telecommunications networks, have established the Huawei-HKUST Joint Research and Development Center. The research center aims to support the University's pursuit of academic excellence in wireless communication technology, to further industrial collaboration, and to provide training to

leaders of the next generation. The center will also support Huawei's product development and enhance its research and development capability. Professor Khaled Ben Letaief, Chair Professor and Head of the Electronic and Computer Engineering Department, said he was delighted about the development.

SENG Ambassadors Spread the Word About Engineering



Third-year undergraduate Liew Seng Fatt, Electronic and Computer Engineering, is still working toward his degree. Yet, as a School of Engineering (SENG) Student Ambassador, there are already many mysteries about the engineering world that he can unlock for secondary students who may want to follow him.

“Often, school students are unaware of what engineering is all about,” said Seng Fatt, one of a group of Year 3 ambassadors from different SENG departments who spoke to *In Focus*. “They think engineers do experiments, play with gadgets, but don’t really know about the different areas within the field or the prospects.”

Engineering and the extensive range of disciplines and careers it covers, its essential role in the modern world and the benefits that society derives from those who join the multi-faceted profession are just some of the eye-opening areas that the SENG Student Ambassador Program is keen to bring to the attention of secondary students as they consider what direction to take at university and beyond, and to students’ families.

The program was set up in 2006 to widen interest among and inform young people about different HKUST engineering degrees and the careers that follow at a peer-to-peer level. “They treat us as brothers and sisters,” said Claudia Sin Hiu-ching,

Computer Science and Engineering. This year, a total of 29 students have been nominated to participate from the School’s six departments and the Computer Engineering program.

Ambassadors attend training workshops to strengthen their knowledge of HKUST and business etiquette then participate in SENG outreach events, such as school visits and open days. School visits may involve setting up a booth at a school and giving a demonstration that illustrates what the ambassador’s particular department does, explaining basic engineering concepts, and answering questions about student life at HKUST. Open days may find ambassadors showing visitors their department’s laboratories, equipment, and HKUST’s scenic campus.

Through such events, the ambassadors also have the opportunity to meet a range of people inside and outside HKUST and develop their time management, presentation and interpersonal skills. Secondary school students, teachers and parents can gain both an informed and an informal view of life as a HKUST engineering undergraduate.

“I think what we are doing is very useful,” said Reeves Chung Ming-yan, Civil Engineering. “When I was a secondary school student, I didn’t know the difference between architecture and civil engineering. This type of thing can be very confusing when you are still at school. As a student ambassador, I have the opportunity to explain, talk about the School of Engineering and, hopefully, help others to find a good path.”

Aviva Chow Shing-fung, Chemical Engineering, further explained: “Most secondary students think engineering students are quite



boring and not willing to talk to each other. I wanted to break this traditional view. So I became a student ambassador.”

With HKUST hosting the only chemical engineering department in Hong Kong, Aviva is also keen to explain more about his subject. “Chemical engineering is a discipline in which the principles of mathematical, physical and natural sciences are used to solve problems in applied chemistry. Through the work of chemical engineers, new petroleum products, plastics, agricultural chemicals, pharmaceuticals, electronic and advanced materials, among many other products, evolve.”

Helping secondary school students to understand the essential role of engineering in the community and the positive job prospects in the field is vital for Hong Kong given the strong emphasis on business in the city, the student ambassadors said.

“Take the stock market for example,” said Anthony Lee Lap-tak, Technology & Management Dual Degree Program - Computer Engineering and General Business Management. “Behind the screens showing the price of the stocks, many programs are required to get the prices and operate the trading system. This all has to be done by programmers with professional training.

“Infrastructure projects need civil engineers. Logistics and industry need professional engineers. Hong Kong needs engineers,” he said.

As does the world at large.



Top Career Start for High Achiever

Fresh graduate Ray Fang, Computer Engineering (CEPG), set a new high for CEPG graduate employment earlier in the year when the then final-year student secured a top job opportunity from a New York-based hedge fund management company. Ray defeated many of his English-native counterparts in two rounds of interviews to win a

junior application developer position with a salary of nearly HK\$50,000 per month.

In fact the appointment is a return for the outstanding achiever, who worked at the company as an intern during the summer of 2005 after finishing his exchange studies at the School of Engineering & Applied Science, University of Pennsylvania, US.

Ray, originally from Mainland China, was admitted to HKUST's Computer Engineering Program in 2003. A passionate learner, he gained a number of scholarships and Dean's List Awards. He said he felt CEPG had been the perfect choice for him as it provided exposure to a wide range of hardware and software issues. He also finds it great fun and highly satisfying to apply what he has learnt during the CEPG program to the realities of the commercial world.



US Internship Puts Knowledge into Action

Technology & Management (T&M) Dual Degree Program student Mary Lau was able to put both her mechanical engineering skills and general business management knowledge to work over the summer with a high-flying internship at Beckman Coulter, Inc in Minnesota, US.

Beckman Coulter is a leading manufacturer of biomedical testing instrument systems, tests and supplies. During her time at the company, Mary was able to work on product design and help to develop automated machines to carry out medical tests for clinical and diagnostic applications.

"I found my T&M studies assisted me a

great deal," said Mary, now in her final year at HKUST. "I had to design hardware and perform experiments to concept-

prove potential improvement for next-generation biomedical instruments. I also applied the business knowledge I had learnt to my product design, which had to take into consideration the needs of the market and clients' business strategies. I really enjoyed the relaxed working environment, which cultivates employees' innovation, and was happy to receive very good feedback from the company."

Mary took up her US summer internship immediately after her exchange to the University of Minnesota.



Inside the World of an Aircraft Engineer

Chan Chi Ho, Year 3 Mechanical Engineering, shares his exhilarating experience as a member of the student Aircraft Engineer Development Scheme, organized by the Hong Kong Institution of Engineers (HKIE) and Hong Kong Aircraft Engineering Company Ltd (HAECO)

“ I joined the Aircraft Engineer Development Scheme shortly before the start of the Spring semester in my second year. This was the first time the program had been offered and I was proud to be among those selected.

The scheme is recognized by the Civil Aviation Department (CAD) so that the material we learn, the exams we take and the training hours accumulated during the two-year program will be recognized if we apply for the HKAR-66 Category B Aircraft Maintenance License from CAD in the future.

The scheme has various components. Firstly, participants are divided into groups and mentors assigned to each group. We have meetings regularly to discuss our progress and recent aviation issues. Guidance courses and site visits are also organized to equip us with aviation knowledge. To date, I have visited the HAECO and Government Flying Service hangars at Chek Lap Kok, and the headquarters of Hong Kong Aero Engine Services, a company that specializes in overhauling Rolls-Royce engines in Tseung Kwan O. I was even offered the chance to visit the Asian Aerospace show held in Hong Kong in early September.

However, my most unforgettable experience so far has been the two-week, on-the-job training at HAECO headquarters at Chek Lap Kok in mid-August. In the first week, classroom lectures helped us to learn the basics of the industry, such as the maintenance procedures for different types of aircrafts and safety precautions in the hangar. After acquiring sufficient knowledge to work in the hangar, we were led by a licensed aircraft engineer to observe different maintenance tasks on a genuine aircraft.

Since inspections are carried out on every part of the aircraft, we were able to access different parts of the aircraft, including those out of bounds to passengers and even crew members. For example, we observed the installation of special batteries in the avionics compartment right below the cockpit and an inspection of the flight recorder installed in a small compartment behind the main cabin. Furthermore, we learnt the importance of teamwork and got an idea of how the work was organized among team members.

We could talk to the engineers and technicians working there in order to understand more about the working environment and the opportunities in the industry. But most exciting of all was the fact that aircraft were taking off and landing just beside me every day for two weeks. That was awesome! ”



Honors and Achievements

- An Industrial Engineering and Logistics Management team beat nine other teams from local universities to win the 2007 Hong Kong Society for Quality Company Based Student Project Competition.
- **Cheung Cheuk-him** and **Chung Chun-tak**, Computer Science and Engineering, won the first runner-up and bronze award in the Hong Kong region and final round of the 2007 Amway Pan-Pearl River Delta Region Universities IT Project Competition with their final year project “Feng Shui Design and Analysis System”.
- First-year student **Brian Cheung Ngai-hoi**, Technology & Management Dual Degree Program, gained sponsorship to participate in the Summer Institute in Business and Technology offered by the renowned University of Pennsylvania.
- PhD candidate **Liwei Guo**, Electronic and Computer Engineering, received the 2007 IEEE International Workshop on Signal Processing Systems (SiPS) Best Paper Award. His paper, “Fast Multi-hypothesis Motion Compensated Filter for Video Denoising”, was co-authored by Professor Oscar Au and postgraduate students **Mengyao Ma** and **Zhiqin Liang**.
- Doctoral candidate **Yiu-ting Lau**, Chemical Engineering, won the 16th International Conference on Secondary Ion Mass Spectrometry Student Award, held in Kanazawa for his paper “Lamellar Orientation on the Surface of a Polymer Determined by ToF-SIMS and AFM”.
- Fresh graduate **Kino Lin Jialiu**, Computer Engineering, received a full scholarship to study Computer Science at Carnegie Mellon University in the US. The scholarship will cover six years' study for a PhD degree.
- PhD student **Ernest Lo Sze-yuen**, Electronic and Computer Engineering, won the Best Paper Award at the prestigious 2007 IEEE International Conference on Communications, held in Glasgow, Scotland. The award-winning paper, “Cooperative Concatenated Coding for Wireless Systems”, was co-authored by Professor Khaled Ben Letaief, Chair Professor and Head of Electronic and Computer Engineering.
- Doctoral candidate **Shen Dou**, Computer Science and Engineering, won first prize at the Postgraduate Student Research Paper Competition, organized by the IEEE (HK) Computational Intelligence Chapter. His research paper focused on “Building Bridges for Web Query Classification”.
- Several Civil Engineering students received awards at this year's Institution of Civil Engineers (ICE) Hong Kong Association paper competition. **Suen Po-chi**, and **Tsoi Hiu-fung** received the Best Paper Award and Merit Award respectively in the Structural and Materials Discipline. **Tsang Chun Wang** received the Best Paper Award in the Highways, Railways and Transportation Discipline.
- Third-year student **Sunny Wong Kai-kwong**, Technology & Management Dual Degree Program, was awarded the Epson Foundation Scholarship 2006-07. The scholarship aims to reward university students with outstanding academic performance and sound social responsibility.
- PhD graduate **Zhou Xu**, Industrial Engineering and Logistics Management, gained an honorable mention for his thesis in the prestigious Transportation Science and Logistics (TSL) Society Best Dissertation Prize Competition 2007.
- Final-year undergraduate **Kevin Zhao Keliang**, Computer Science and Engineering, received full scholarships to Carnegie Mellon University and University of California, San Diego in the US for PhD studies.
- PhD student **Zhu Xiuling**, Electronic and Computer Engineering, won the Best Poster Award at Asia Display 2007 in Shanghai for his paper “High-performance Top-emitting White Organic Light-emitting Devices”.

Undergraduates Win Engineering Award for ROBOTS

A School of Engineering student team has reinforced the enterprising outlook of a SENG education by taking home the “Best Engineering Award” at the 2007 Robocon Hong Kong contest.

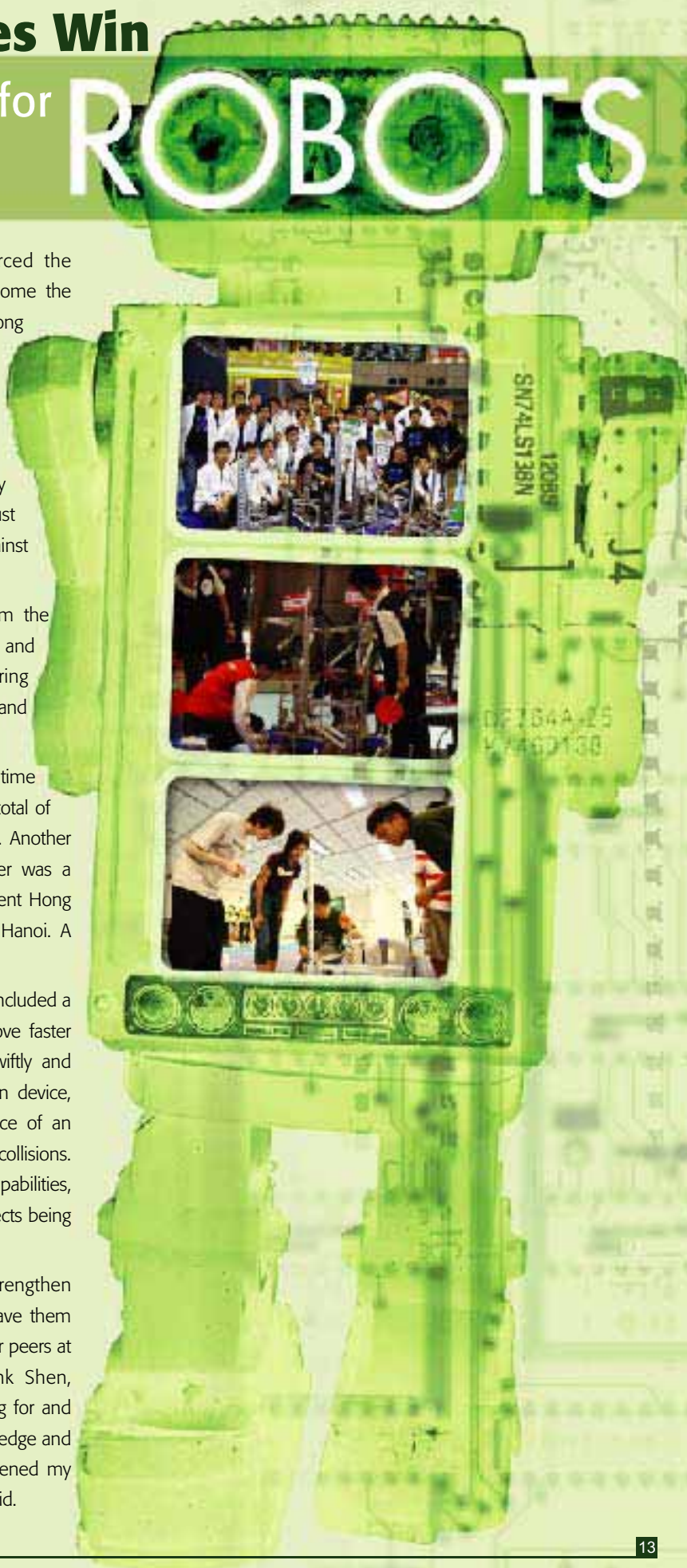
The annual competition, organized by RTHK, the Hong Kong Institution of Engineers and Hong Kong Computer Society, encourages university students to gain first-hand experience of engineering and information technology applications by creating their own robots. The robots must then undertake a series of tasks in a competition against machines created by other student teams.

The “Fiery Dragon” team, comprising 13 students from the Departments of Electronic and Computer Engineering and Mechanical Engineering and the Computer Engineering Program, also picked up the second runner-up prize and gained the highest score of all matches in the final.

The 2007 Robocon Hong Kong contest was the fourth time the competition had been organized locally, attracting a total of nine student teams from five different local universities. Another SENG team, “Delta”, also took part. The overall winner was a University of Hong Kong team which went on to represent Hong Kong at the 6th ABU Asia-Pacific Robocon contest in Hanoi. A HKUST team won Robocon Hong Kong in 2005.

Notable technical features of both HKUST teams' robots included a superior route recognition system enabling them to move faster than other rival robots, mechanical arms that could swiftly and comfortably transport objects, and an obstacle detection device, which emitted sound waves and calculated the distance of an obstacle from the rebound, allowing the robots to avoid collisions. Both teams' automatic machines also had color sensor capabilities, allowing them to recognize opponents' “pearls” (the objects being transported) and prevent them from scoring.

In addition, getting ready for the contest helped strengthen students' information-gathering skills while taking part gave them the opportunity to meet up with and see the work of their peers at other institutions. Fiery Dragon team member Frank Shen, Electronic and Computer Engineering, said that preparing for and participating in the event had helped to expand his knowledge and views. “The Robocon experience not only greatly broadened my perspective but also helped me to do well in class,” he said.



President's Cup Winners Push Research Boundaries

Original, creative and socially aware student teams and individuals from the School of Engineering swept up all the top awards in the President's Cup 2007, an annual University-wide contest organized by HKUST to encourage undergraduates to pursue research, innovate, and enhance their presentation skills.

The two main prizes in this year's President's Cup went to teams from the Department of Chemical Engineering. The overall winners were Cheung Chi-yeung, Cheung Tsz-wing, Chung Yiu-lun and Hau Yu-ki, who greatly impressed the Selection Committee with their enterprising project focused on the "Production of Particles for Pulmonary Drug Delivery Via Aerosol Technology". The project sought to create a platform to investigate the feasibility of manipulating piezoelectric ink jet printing technology to produce mono-disperse droplets for pulmonary drug delivery.

Fellow Chemical Engineering students Chan Wai-kit, Cheung Ki, Koon Wing-tsz and Siu Fong-chung took the Gold Award for their work on "A Novel Catalytic System for the Removal of Pollutants Emitted from Motor Vehicles". With the Hong Kong government seeking to reduce levels of pollutant emissions, the students set out to develop a new type of catalytic converter that uses copper supported on bentonite (the component in a conventional converter is platinum) and to simultaneously reduce nitrogen oxides over 80% and volatile organic compounds through selective catalytic reduction.

There were two Silver Award winners. Kelly Woo Ka-po, Civil Engineering, gained one for her project "Evolutionary Structural Form Optimization for Improving Economical Effectiveness of High-rise Buildings Using Hybrid Genetic Algorithms", which investigated how to develop an efficient and effective way to perform sizing optimization and topological optimization simultaneously. An Electronic and Computer Engineering team comprising Lance Lam Chi-wai, Chau Chun-mei and Tam Ka-yan took the other award with "Application of Real Time Searching Algorithm in Image Encoder".

Entries for the contest are initially assessed by the Selection Committee on their objective, originality, and innovativeness, among other aspects. The Selection Committee, which is constituted by the Office of the Vice-President of Academic Affairs, then draws up a shortlist of those to go forward to the semi-final. For the semi-final, entrants must provide a final report and participate in an exhibition which is open to the public. The exhibition may involve on-site demonstration of a new invention or a display of project deliverables. In a further test of students' communication skills, those chosen to go on to the final must prepare a 15-minute oral presentation, which is followed by questions from the Selection Committee. These presentations are also open to the public.



My Colorful Career

Successful entrepreneur Wicky Wong (BEng Chemical Engineering 1998) started his own hair dye chemical production company in Hong Kong and gradually expanded to a large-scale plant in Mainland China. He now sells his dyes globally and also works on environmental care products that utilize HKUST research. He explains his winning formula

Before establishing your own business, what kind of work did you do?

I worked as a consultant in a financial services company in New York and as a project manager in a direct investment company in Hong Kong. However, by 2000, I could see that the demand for beauty products in Mainland China was taking off. As there was little competition in the hair dye area there at the time and I had my HKUST degree in Chemical Engineering, I decided to enter the business.

Did you face any initial difficulties?

In the beginning, I only had my technical knowledge and experience from my financial work. I didn't have any customers. So things moved slowly. Also, quality assurance is very important in the cosmetics industry so everything had to be tested very carefully. Eventually, I was able to set up a production line in Hong Kong. When I was ready to scale up, I invested in setting up a large chemical plant in the Hangzhou Xihu industrial area with mainland partners because purchasing and manufacturing of chemical products is more convenient in Mainland China. However, finished products are still tested for quality in Hong Kong before being exported overseas.

You are involved in two companies. What do they produce?

Artec Chemical (<http://www.artechem.com>) is involved in manufacturing and supplying personal care related chemicals, with

sales in more than 60 countries. Artenano (www.artenano.com) manufactures and supplies healthcare and environmental care products. At Artenano, we produce a patented nano catalyst for air purification, especially for the removal of volatile organic compounds (VOC) and ammonia-related gas pollutants. The technology for this is from HKUST. Another product is a UV light-cutting solution that can be used on glass to reduce UV light and lower the temperature in summer, saving electricity costs. We would like to expand in these environmental care areas so that more people can benefit from HKUST technologies.

How has your relationship with HKUST assisted you?

The connection has been essential. In terms of nanomaterials, I think HKUST is undoubtedly one of the leaders in the field. In fact, Artenano, is a HKUST spin-off company. In addition, I employ School of Engineering graduates. We need employees trained in environmental engineering and chemical engineering, areas in which HKUST is strong.

Do you have any words of advice for current SENG students and budding entrepreneurs?

Pay full attention in class so that you don't need to spend so much time on revision and can take part in more extra-curricular activities. Learn English and Putonghua well as today's graduates really face a globalized economy both in terms of markets and competitiveness and business and talent. Those who are good at languages and reasoning are better equipped to handle different problems.

Additional material provided from Wicky Wong's interview in the series Engineering Your Future, jointly produced by RTHK and HKUST School of Engineering.



HKUST Hosts Greater China Student Programming Contest

The Computer Science and Engineering Department successfully hosted this year's Tsinghua-HKUST Programming Contest, an annual Greater China collegiate team competition. Undergraduates from Tsinghua University (Beijing) and National Tsing Hua University (Hsinchu, Taiwan) were invited to join HKUST students in the exciting contest at the HKUST campus. It was the first time the event had been held in Hong Kong.

Two individual teams from each university and a joint "United Women's Team", comprising female students from all three institutions, took part, with students from Tsinghua University

becoming the eventual winners. The competition aims to foster creativity, teamwork and innovation in building new software programs among computer science students and to promote cultural exchange.

Prof Lionel M Ni, Head of the Computer Science and Engineering Department at HKUST, said he had been delighted to bring together students from the Mainland, Taiwan and Hong Kong. "It was not only a good opportunity for them to share ideas in the computer science field but also an interesting cultural learning experience," he said.

Computer Subsidy Program Launched

The Computer Science and Engineering Department (CSE) launched its first student computer subsidy program together with Lenovo and Microsoft to assist low-income family CSE students for the 2007/08 academic year. The program targeted new students admitted to CSE programs through JUPAS. Under the scheme, a range of subsidies were made available to new students with a monthly household income of \$20,000 or less to purchase a Lenovo notebook computer, with free software pre-installed by Microsoft.

Mr Ken Wong, General Manager of Lenovo Hong Kong and Taiwan, said the company was committed to advancing information technology education and narrowing the digital divide in Hong Kong and hoped its support for the program would lessen needy students' financial worries and help to provide a worry-free learning environment. Microsoft Hong Kong's Director of the Developer and Platform Group Ms Joelle Woo said she hoped the program would enable students to realize their full potential by improving the quality and effectiveness of their learning.



SMART MOVE

The School of Engineering has organized the enterprising Pioneering a New Digital Lifestyle with Samsung - Smart Gadgets Competition 2007, with the support of Samsung Electronics. The contest calls for teams of two to four SENG undergraduates to design innovative standalone electronic objects to foster students' creativity and inspire technological innovation. Winners will be announced in December.

<http://www.seng.ust.hk/samsung/>

Calendar of Events

November 23-24, 2007

10th Computer Science Deans' Forum

Organized by the Computer Science and Engineering Department

January 3-7, 2008

Eighth International Conference on Fundamentals of Fracture (ICFF VIII)

<http://www.me.ust.hk:80/~icff8/>

January 21-23, 2008

HKUST Nanotechnology Workshop

Contact: Prof Yi-Kuen Lee, Mechanical Engineering: meyklee@ust.hk

The above events are subject to change without prior notice

Don't be the Missing Link ...

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

Stay connected and keep in touch!

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