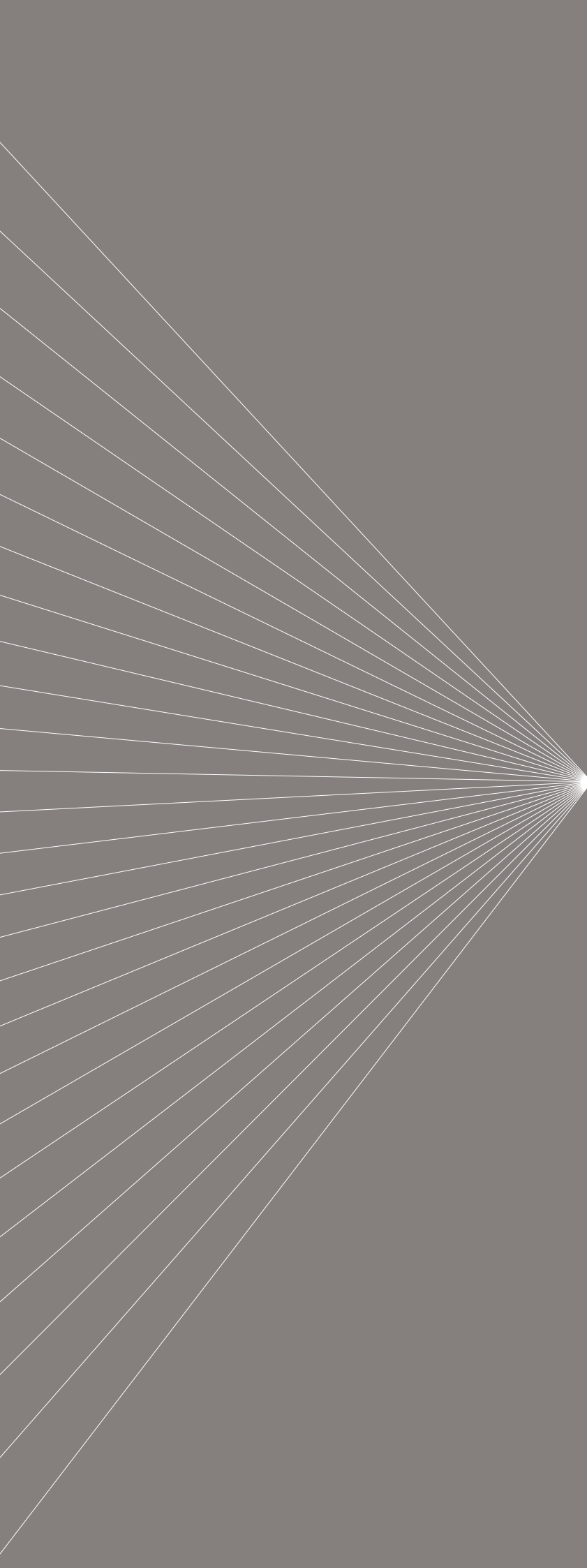


H K K U S T

SENG - Status Report 2003-05



Contents

Dean's Message

In the years 2003-05, the School has made significant progress in both its research and teaching and in international standing.

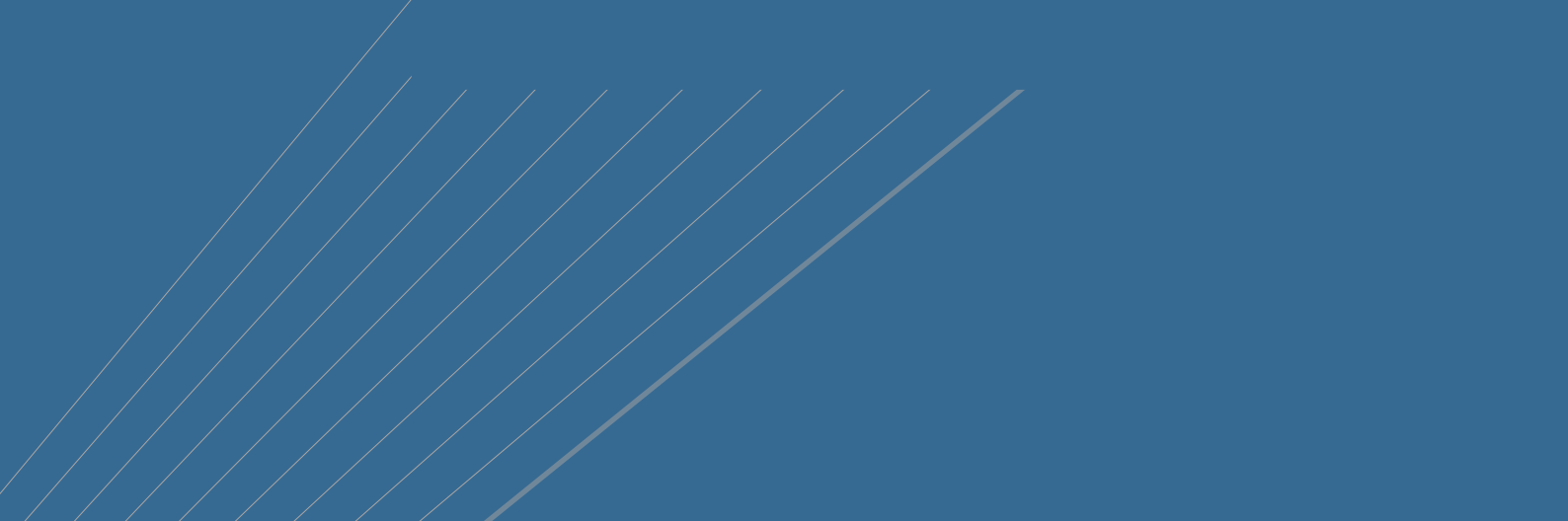
As a research-based engineering school, our international faculty members are dedicated to research and teaching at the highest level and their work has been widely acknowledged internationally. As teachers, their enthusiasm and dedication, along with an informal approach, help them to inspire students as role models, while their top-quality research ensures they bring the latest knowledge into the lecture hall.

We have responded to the changing needs of the engineering profession by building students' all-round skills, introducing new and innovative degree programs, opening up more opportunities for students to widen their global horizons through our exchange program, and helping to introduce them to the real world through internships.

The results have been highly rewarding. By providing a solid educational foundation, a critical mindset, and a wide range of connections to top graduate schools and employers world-wide, the School's graduates have done very well in industry, government, and academia.

The School is also working hard to assist social and economic development in Hong Kong and the region. From the outset, the School has focused on carefully selected high-impact areas such as information technology, logistics and supply chain





management, integrated circuits, advanced materials and nanotechnology, to name just a few. Our standing among global leaders proves the success of this focused approach.

We chose these areas because they are important in assisting Hong Kong to transform itself to a knowledge-based economy. This report illustrates our faculty members' increasingly wide collaborations with partners in academia and industry that bring about technological change, sustainable development, and infrastructural innovations.

In addition, the School has significantly expanded its postgraduate education programs to keep practicing professionals up-to-date with new knowledge and maintain the competitiveness of Hong Kong's highly skilled workforce. These programs will soon be extended to Mainland China where the School is boosting HKUST's presence through a number of enterprising ventures.

Our faculty members, students and alumni are now playing a central role in "Engineering the Future" of Hong Kong and the region. It is an exciting position to be in and we intend to strengthen and build on this solid foundation of excellence to fulfill our mission.

In doing so, we look forward to your support in the years to come.

Philip Chan

Dean of Engineering

Global Recognition of Excellence



Making a significant contribution on a worldwide scale has always been a priority for the School of Engineering (SENG). From 2003-05, we saw our efforts rewarded with a series of high global rankings which confirmed our international standing as a leading academic force.

SENG Ranked among International Leaders

The School of Engineering's pursuit of excellence achieved global acclaim with the release of the first *Times Higher Education Supplement* (THES) international league table covering the fields of engineering and information technology in 2004. HKUST was ranked no.20 in the World's Top 100 Universities in Engineering and IT, the only Hong Kong institution placed in the top 50. Rankings for the THES league table were based on a peer review with some 1,300 international academics asked to provide opinions.

The School saw its achievements further recognized in 2005, when HKUST was ranked no.23 in the World's Top 100 Technology Universities league table, also produced by the *Times Higher Education Supplement*.

ME Department World's No.1 for Research

The Mechanical Engineering (ME) Department gained the top spot globally for its research output in rankings released in 2005. Rankings were based on a survey of 265 universities worldwide carried out by Yuan Ze University in Taiwan.

The survey looked at the average number of Science Citation Index (SCI) papers published from 2000 to 2002, with results placing HKUST's Mechanical Engineering Department in the no.1 position. Department faculty produced an average of 3.29 papers per faculty member per year during this time, putting HKUST ahead of other well-known institutions such as Stanford and Princeton.

Faculty members in the Mechanical Engineering Department pursue pioneering research in many areas, including energy, electronic packaging, nanotechnology, micro-systems and advanced materials.



ECE Publications Set the Pace

The innovative nature of Department of Electronic and Computer Engineering (ECE) research has been continuously recognized by top academic publications, with the Department among the world leaders for number of papers published in leading international journals in the electrical and electronic engineering, and telecommunications fields.

Among its achievements the Department has been ranked no.1 globally for the total number of papers published in *IEEE Transactions on Electron Devices* from 1998-2005; no.2 in *IEEE Transactions on Wireless Communications* from 2002-2005; and no.3 in *IEEE Transactions on Circuits and Systems for Video Technology* from 1997-2005.

The Department was also ranked no.4 in the world for research output published in the *IEEE Journal on Selected Areas in Communications* from 1996-2005

and for the number of papers published in *IEEE Electron Device Letters* from 1998-2005.

Geotechnical Group Gains Top Ranking

Members of the Geotechnical Group in the Department of Civil Engineering saw their innovative research recognized with a no.1 ranking for the number of papers published in four leading journals from January 2001-April 2005.

According to Web of Science® statistics, the Geotechnical Group led the world in terms of total papers published in the *Journal of Geotechnical and Geoenvironmental Engineering, ASCE; Geotechnique; Canadian Geotechnical Journal; and Soil and Foundations*. One member of the group had the highest number of papers published in these journals over the same period.



Advisory Committee - School of Engineering

Academic Advisors

Name	Term of Appointment	Affiliation
Prof Alfredo H-S ANG	1 Jul 1999 - 30 Jun 2006	Research Professor, Civil and Environmental Engineering, University of California, Irvine, US
Prof John R BIRGE	1 Jul 2003 - 30 Jun 2006	Professor of Operations Management and Neubauer Family Faculty Fellow, Graduate School of Business, The University of Chicago, US
Prof John M DEALY	1 Jul 2001 - 30 Jun 2005	Professor of Chemical Engineering, McGill University, Canada
Prof Stephen W DIRECTOR	1 Jul 1998 - 30 Jun 2006	Robert J. Vlasic Dean of Engineering, University of Michigan, Ann Arbor, US
Prof Mildred DRESSELHAUS	1 Jul 2001 - 30 Jun 2005	Institute Professor, Massachusetts Institute of Technology, US
Prof Timothy W TONG	1 Jul 2003 - 30 Jun 2006	Dean, School of Engineering & Applied Science, The George Washington University, US
Prof Benjamin WAH	1 Jul 2001 - 30 Jun 2005	Robert T. Chien Professor of Engineering, University of Illinois, Urbana-Champaign, US

Industrial Advisors

Dr Kei Biu CHAN	1 Jul 2003 - 30 Jun 2006	Chairman and Managing Director, Surface Mount Technology (Holdings) Ltd, Hong Kong
Ir James Y C KWAN	1 Jul 2003 - 30 Jun 2006	Executive Director & Chief Operating Officer, The Hong Kong & China Gas Company Ltd, Hong Kong
Mr Stephen LAU, JP	1 Jul 2003 - 30 Jun 2006	Chairman, EDS Electronic Data Systems (HK) Ltd, Hong Kong
Dr John LUK	1 Jul 2003 - 30 Jun 2006	Project Advisor of the Project Monitoring Dept, Sun Hung Kai Properties Ltd, Hong Kong
Mr John SHAM	1 Jul 2003 - 30 Jun 2006	CEO, Pentalpha Hong Kong Ltd, Hong Kong
Mr Raymond TONG	1 Jul 2003 - 30 Jun 2006	Managing Director, DCH Healthcare Products Ltd, Hong Kong



World-Class Innovators



The 140-plus faculty members in the School of Engineering are among the world's best in their respective fields. Tenacious researchers and inspiring teachers, their pioneering achievements in driving forward knowledge and technological development help set the pace for our future lives.

Working across the spectrum of engineering fields, our academics research at the cutting edge of their individual specializations while utilizing the opportunity to investigate alternative perspectives through multidisciplinary projects, collaborations with outside academic institutions, and partnerships with industry.

During 2003-05, their forward-looking approach and world-class achievements have been acknowledged with a series of leading honors, awards, and research successes.

From left to right:
Prof Chi Ming Chan, Prof Chak Keung Chan,
Prof Furong Gao and Prof Ka Ming Ng



Chemical Engineering

Head: Professor Ka Ming Ng (Jul 02 - Jun 05)

Professor Chi Ming Chan (Acting Head: Jul 05 - now)

As the only chemical engineering department in Hong Kong, the Department's faculty members set a leading example of the valuable contribution and exciting work the field encompasses.

Using Captive Transducer in Injection Molding". ANTEC is the leading technical forum for pioneering information and advances pertinent to the plastics industry.

Faculty Honors

Prof Chak Keung Chan

Winner of the first Asian Young Aerosol Scientist Award in 2004 for his outstanding contributions to the study of thermodynamics and the hygroscopic properties of atmospheric aerosols. The award was presented by the Asian Aerosol Research Assembly.

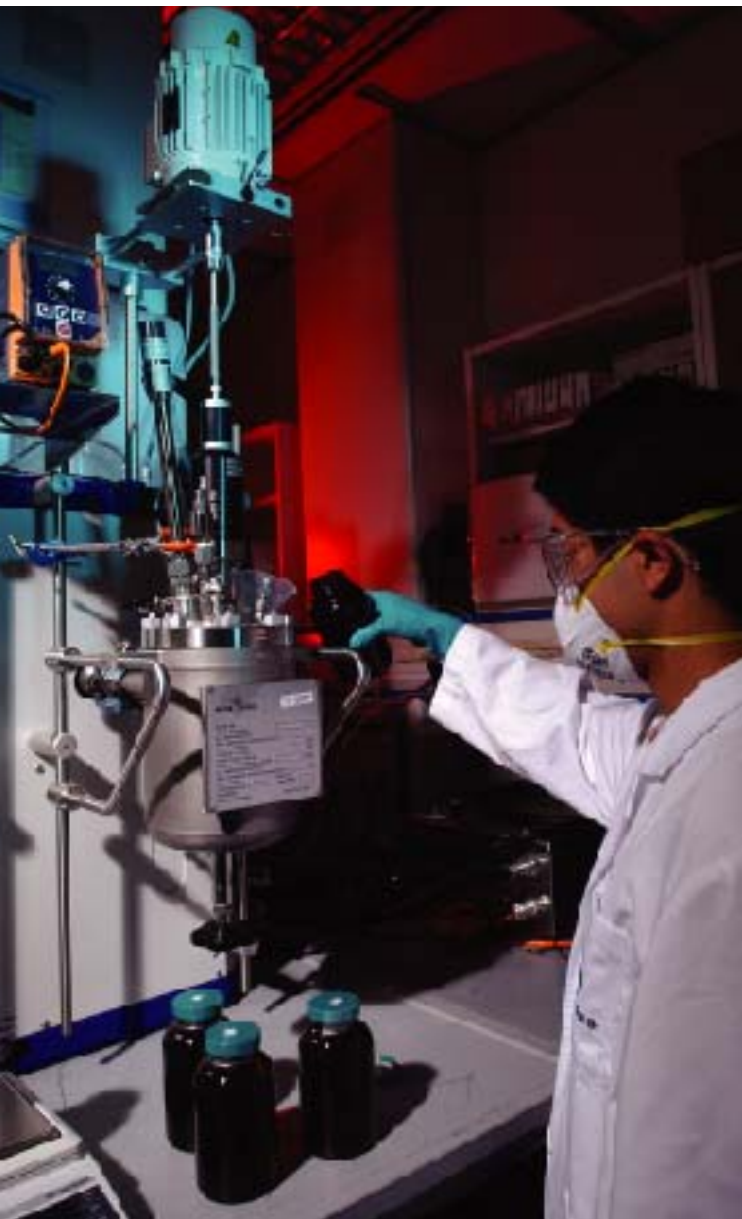
Prof Ka Ming Ng

Elected a Fellow of the prestigious American Institute of Chemical Engineers in 2003 in recognition of his significant contributions to chemical engineering. The Institute is the leading professional body in its field and fellowship is the highest award the organization confers. Of the 12 new Fellows honored that year, Prof Ng was the only one from Hong Kong.

Prof Furong Gao

Received the Best Paper Award at the Society of Plastics Engineers Annual Technical Conference (ANTEC) in 2005, together with his research team. Their study focused on "Weight Prediction





Research Highlights

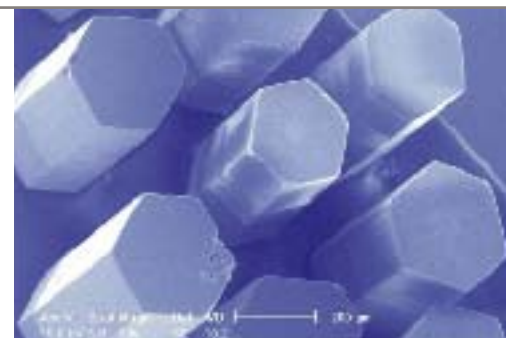
In line with the latest developments in the field, the Department of Chemical Engineering's research focus has evolved toward the areas of advanced materials, biotechnology, high value-added products, process engineering and environmental technologies. Research activities span the spectrum from basic research to technology transfer.

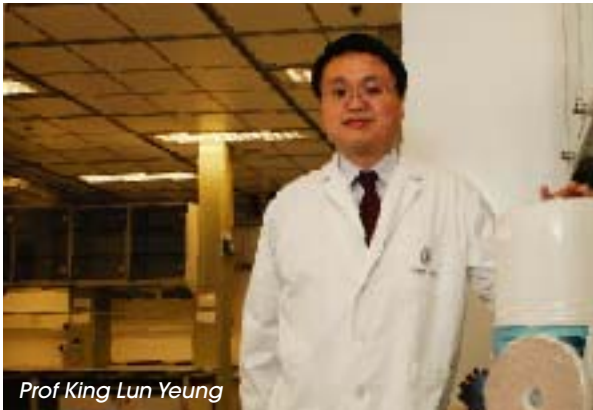
Nano Revolution Improves Indoor Air Quality

Nanotechnology researchers, led by Prof King Lun Yeung, have brought a breath of fresh air inside with the development of a nanocatalyst-based environmental control system to produce cutting-edge products that can improve indoor air quality.

Nanotechnology is the revolutionary new field involving manipulation of materials at the atomic level - measuring from 1 to 100 nanometers - with one nanometer equal to one-billionth of a meter.

The cost-effective air remediation system uses a combination of nanoporous adsorbent and nanocatalyst. The adsorbent captures contaminants,





such as carbon monoxide, formaldehyde, bioaerosols and odorous compounds, and the nanocatalyst inactivates and converts them into harmless compounds (eg CO₂, water and minerals). Applications include air purification systems for homes, offices and cars, with possible integration into existing home appliances such as dehumidifiers.

Small World

HKUST's leadership position in advancing knowledge in nanotechnology was enhanced in 2003 with the launch of the HK\$100 million Institute of NanoMaterials and NanoTechnology (INMT). The

interdisciplinary institute was established with government and industrial support to propel research forward and to develop new products in the field that is expected to change the world in the 21st century.

Researchers at HKUST earlier fabricated the world's smallest single-walled carbon nanotubes, which measure 0.4 nanometers and exhibit superconducting properties.

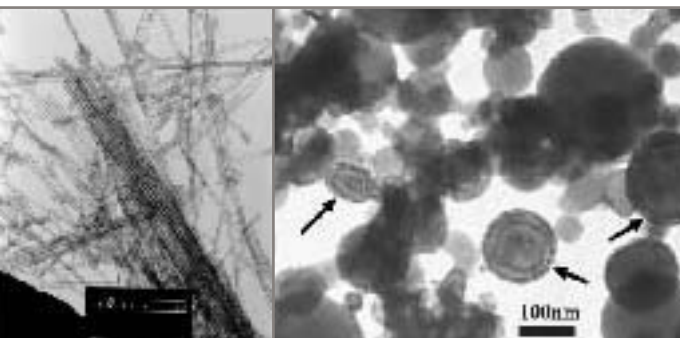
By the end of 2005, preparations were in hand to move INMT under Nano and Advanced Materials Institute Limited (NAMI), an independent corporation led by HKUST. NAMI will engage in industry-led, market-driven research and help Hong Kong establish itself as a design and technology hub for nanoproducts for the region.

Industrial partners can work with NAMI through contract research, project sponsorship, and membership of an industrial consortium.

<http://www.ust.hk/nami>

Department of Chemical Engineering Website:

<http://www.ceng.ust.hk>

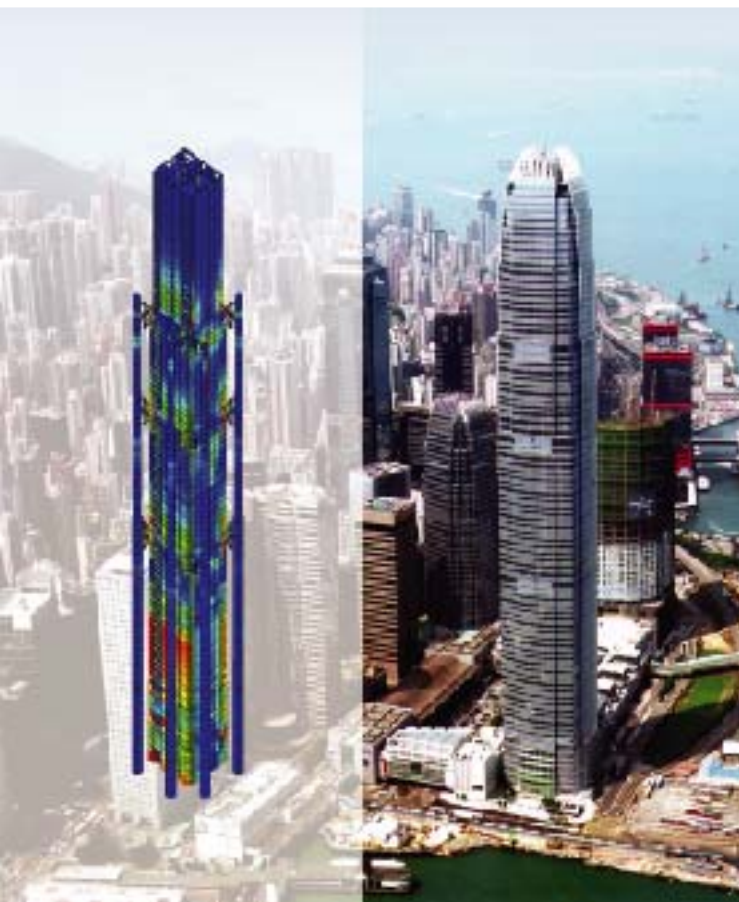


From left to right:
Prof Moe M S Cheung, Prof Junshang Kuang,
Prof Hong Kam Lo, Prof Irene Man-Chi Lo,
Prof Charles W W Ng and Prof Wilson H Tang

Civil Engineering

Head: Professor Moe M S Cheung

Faculty members relish the challenge and the opportunity to play a leadership role in forging our future society, improving quality of life, and helping to protect the environment through their innovative work. Their success has been recognized world-wide.



Cost Efficiency of Structural Elements - Hotter colors denote elements of higher efficiency

Faculty Honors

Prof Moe M S Cheung

Elected a Fellow of the Canadian Academy of Engineering in 2005 in recognition of his leading research work on the development of the finite strip method for bridge analysis and design, and his contributions to bridge engineering. Prof Cheung is also an elected Fellow of the American Society of Civil Engineers and the Canadian Society for Civil Engineering.

Prof Junshang Kuang

Named a Fellow of the Institution of Civil Engineers, UK, in 2004. His research interests include design and analysis of structural systems, reinforced concrete structures, and earthquake-resistant design, among others.

Prof Hong Kam Lo

Winner of an Outstanding Paper Award at the Eastern Asia Society for Transportation Studies biannual conference in 2003. The paper by Prof Lo and 2003 PhD graduate Dr W Y Szeto looked at "Time-Dependent Transport Network Design: A Study on Budget Sensitivity".

Prof Irene Man-Chi Lo

Awarded the highly regarded J James Croes Medal from the American Society of Civil Engineers in 2004 for her innovative barrier technology for waste containment. Prof Lo was the first Asian researcher to receive the award in 15 years. In 2005, Prof Lo also received the Hsai-Yang Research Award from the International Society of Environmental Geotechnolgy.



Prof Charles W W Ng

Made an Overseas Fellow of Churchill College, University of Cambridge, in 2004, an honor awarded to distinguished academics who are world class in their discipline. Prof Ng, Director of the Geotechnical Centrifuge Facility, has also previously received the Young Mao Yisheng Award, presented biannually by the Chinese Institute of Soil Mechanics and Geotechnical Engineering to one outstanding young scientist or engineer below 45 in China, who has made significant contributions in these fields.

Prof Wilson H Tang

Elected an Honorary Member of the American Society of Civil Engineers in 2003 in respect of significant contributions to safety and reliability analysis in civil engineering with emphasis on application to geotechnical systems. The honor is the highest distinction bestowed on an ASCE member. Prof Tang had previously been elected to the US Offshore Energy Center's Hall of Fame as a Technology Pioneer in Reliability-Based Design of Marine Structures.



Research Highlights

From basic research to successful industrial transfer, the Department of Civil Engineering strives to provide solutions to engineering problems of local and international significance. Areas of focus include green buildings and sustainable development, tall buildings, advanced materials, geotechnical engineering, environmental engineering, water resources engineering, traffic engineering and smart infrastructure.

High Achievers

Researchers and engineers have taken optimal design of tall buildings to fresh heights with their exciting achievements. One major advance has been the creation of the world's first motion simulator to reproduce wind-induced motion of skyscrapers. The simulator, located in the CLP Wind/Wave Tunnel Facility (WWTF), is capable of accommodating six people, test apparatus,





monitoring and recording equipment, with a maximum payload of five tons. This has enabled researchers, led by Professor Kenny Kwok, Director of the WWTF, to collect data on test subjects' comfort levels and cognitive performance under various conditions of motion.

Findings can assist in enhancing safety and the comfort of occupants in skyscrapers and are being used to update the international acceptance criteria for occupant comfort for wind-excited tall buildings, such as ISO 6897:1984 (E).

Prof Chun Man Chan has also developed a computer package for the optimal design of tall building structures which has been employed in the design of many buildings in Hong Kong, among them the 118-story International Commerce Centre and the 88-story Two International Finance Centre.

Design optimization holds great potential for more environmentally responsible construction, better utilization of space and a reduction in building costs. It is particularly important for Asia where large numbers of high-rise tower blocks are now being created.

Minimizing Waste

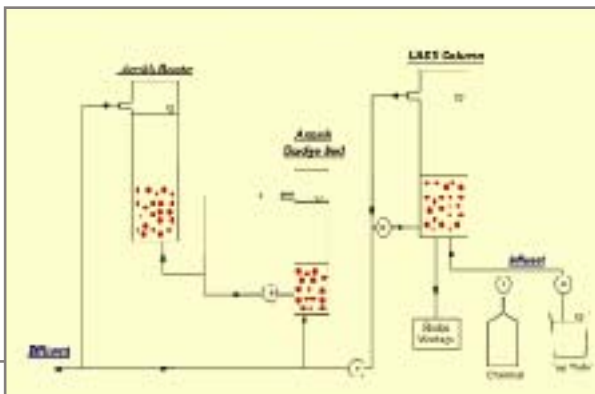
The on-going development of innovative sewage treatment technologies to minimize excess sludge production by Prof Guanghao Chen and his team has led to a number of successful breakthroughs, including the revolutionary SANI process.

Disposal of excess sludge is a particularly difficult environmental problem in heavily populated urban areas. Therefore, the less sludge produced by treatment works the better. The SANI process involves integration of sulfate reduction, autotrophic denitrification and nitrification to minimize excess sludge in saline sewage treatment. The invention works by utilizing sulphur-related bacteria that reduce energy consumption in organic and nitrogenous removal by 50% and excess sludge by 75%, as compared to traditional biotreatment technologies based on carbon-related heterotrophic bacteria.

The process has been well received locally and internationally. Researchers were invited to present their findings at the high-level Third International Water Association Leading-Edge Conference on Water and Wastewater Treatment Technologies in 2005, while the HKSAR Government is looking at piloting trials with a view to full-scale application.

Department of Civil Engineering Website:

<http://www.ce.ust.hk>





*From left to right:
Prof Lionel M Ni, Prof Yunhao Liu,
Prof Brian Kan-Wing Mak, Prof Long Quan and
Prof Qiang Yang*

Computer Science and Engineering

(Computer Science prior to 2 May 2006)

Head: Professor Lionel M Ni

Within this Department, more than 40 faculty members are advancing the revolution that is taking place in how we work, learn, and live through their leading IT research and applications.

Faculty Honors

Prof Lionel M Ni and Prof Yunhao Liu

Winners of the Best Paper Award at the IEEE International Conference in e-Business Engineering in 2005. Prof Ni, Prof Liu and their research team received the accolade for the paper "S-Club: An Overlay Based Efficient Service Discovery Mechanism in CROWN Grid". The same year, Prof Ni was also elected an Overseas Expert by the Chinese Academy of Sciences.

Prof Brian Kan-Wing Mak

Received the Best Paper Award in Speech Processing from the IEEE Signal Processing Society in 2004 for his paper "Subspace Distribution Clustering Hidden Markov Model", co-authored with Dr Enrico Bocchieri of AT&T Labs.

Prof Long Quan

Awarded the Outstanding Overseas Chinese Scholars Fund 2001-2004 from the Chinese Academy of Sciences for his pace-setting research on 3D modeling and motion understanding. The fund brought a total of RMB500,000 in research grants from the Academy.

Prof Qiang Yang

Successfully led researchers from the HKUST-Chinese Academy of Sciences joint laboratory to victory over teams from around the world in the Association for Computing Machinery's Knowledge Discovery and Data Mining Cup in 2004. Prof Yang followed this with another win in the same contest in 2005 with a team of HKUST researchers. The KDD Cup is the most rigorous annual competition in the predictive technology and data mining field.





Research Highlights

Those in the Department of Computer Science and Engineering strive for excellence, quality of research and international visibility. Multidisciplinary research is encouraged and the impact of results enhanced through experimental research and technology transfer. Areas of focus include database and web technologies, artificial intelligence, vision and graphics, theoretical computer science, and networking and multimedia computing.

Sensing Progress

Cutting-edge research on Wireless Sensor Networks (WSN) has opened the way to greater under-

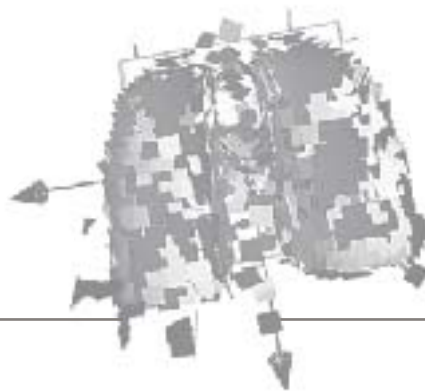
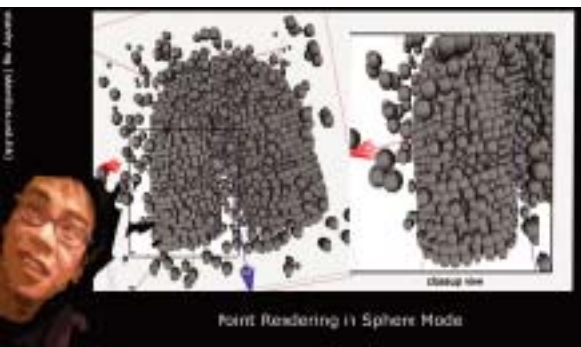
standing of people's interaction with different types of environments, including improved monitoring in mines.

A WSN is a self-organized wireless network where a large number of small, low-cost sensor nodes with limited sensing, data processing and communication abilities interact with the physical world. The sensor nodes work with each other in the network to produce continuous and robust data delivery. Applications include pollution monitoring, traffic control, manufacturing, and military surveillance, among others.

The Department's research involves middleware design, in-network query processing, emulation systems, plan recognition and prediction, routing protocols and a number of applications.

WSN system for underground monitoring in coal mines





One on-going project is the construction of a WSN system for underground monitoring in coal mines. This includes monitoring of oxygen, gas, and water, as well as tunnel structures. The research seeks efficient data transfer algorithms and robust system maintenance measures together with low power consumption to maximize lifetime performance of the system. A prototype is due to be tested in a coal mine in Mainland China.

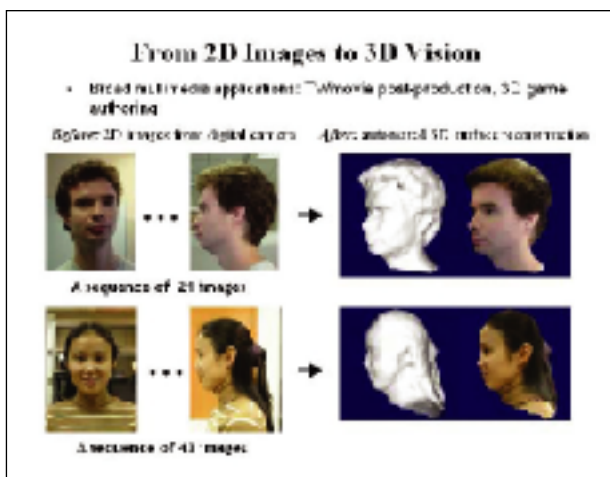
Long-Term Vision

The Vision and Graphics Group has been actively involved in a number of significant areas, including image and video segmentation, 3D reconstruction, modeling and rendering, and high-level understanding of images.

Projects during 2003-05 have advanced knowledge in the field through successfully enabling 3D modeling from 2D images that can capture a complete 3D model of an object or a human head, including eyes and hair; the simulation of the deformation of brushes and the ink depositing process to bring realistic 3D Chinese brush painting and calligraphy to the world of digital art; and image-based modeling and rendering to create fly-through or walk-through animations from a single, large Chinese landscape painting or panorama.

Department of Computer Science and Engineering
Website:

<http://www.cse.ust.hk>



From left to right:
Prof Khaled Ben Letaief, Prof Amine Bermak,
Prof Xiren Cao, Prof Wing Hung Ki,
Prof Chi Ying Tsui and Prof Hol Sing Kwok

Electronic and Computer Engineering

(Electrical and Electronic Engineering prior to 2 May 2006)

Head: Professor Khaled Ben Letaief

The Department's faculty members are renowned as inventors, academic leaders, entrepreneurs, editors of leading journals and Fellows of prestigious institutes in the field, and for their dedication to the pursuit of new knowledge. In 2005, the Department had eight Institute of Electrical and Electronics Engineers (IEEE) Fellows among its faculty.

Faculty Honors

Prof Khaled Ben Letaief

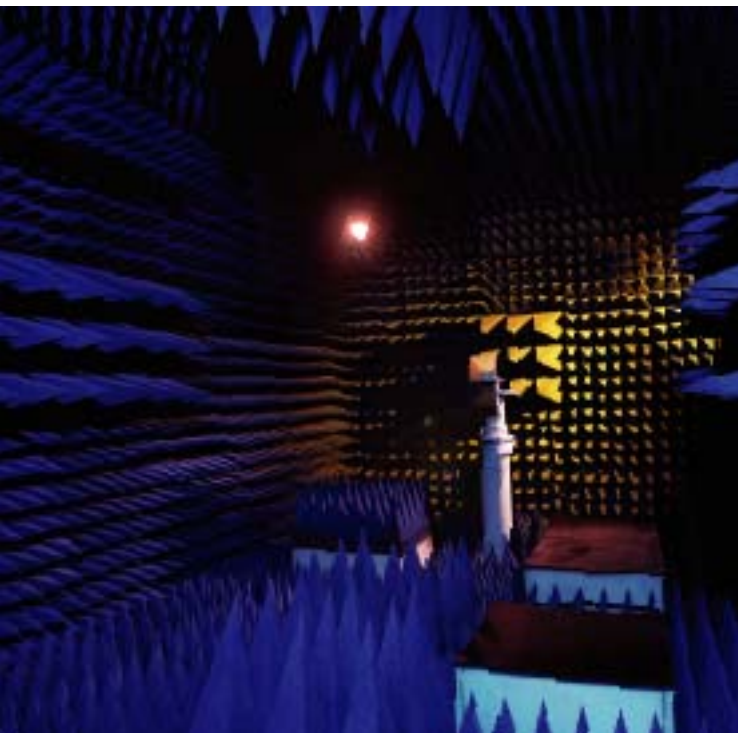
Elected a Fellow of the prestigious IEEE in 2003. Prof Ben Letaief was cited for his contributions to the analysis, design and performance evaluation of high-speed wireless communication systems. He is also the founding Editor-in-Chief of *IEEE Transactions on Wireless Communications* and in 2005 was elected a member of the Board of Governors of the IEEE Communications Society.

Prof Amine Bermak

Gained the 2004 IEEE Chester Sall Award for Best Paper published in *IEEE Transactions on Consumer Electronics*. Prof Bermak, together with his Australian collaborators Prof F Boussaid and Prof A Bouzerdoum proposed a novel, ultra-low power operating technique for mega-pixels current-mediated CMOS imagers.

Prof Xiren Cao

Selected as Editor-in-Chief for the journal *Discrete Event Dynamic Systems: Theory and Applications*, published by Springer, in 2005. In the same year, Prof Cao was also appointed Chair of the IEEE Fellow Evaluation Committee of the IEEE Control Systems Society.





Prof Wing Hung Ki and Prof Chi Ying Tsui

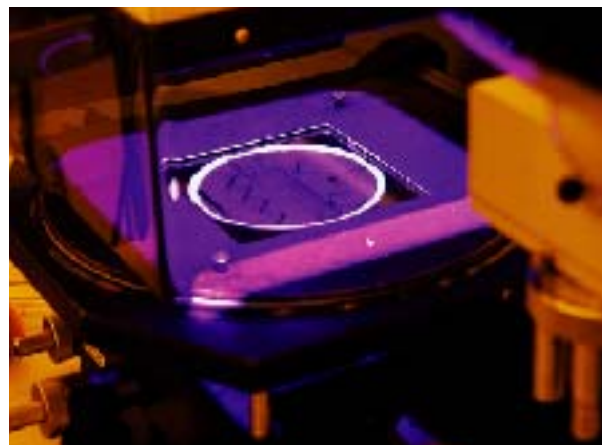
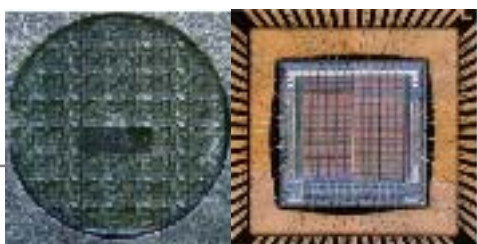
Winners of the Outstanding Design Award in the University LSI Design Contest, together with PhD graduate Dongsheng Ma. The contest was organized by the 2004 IEEE Asia and South Pacific Design Automation Conference.

Prof Hoi Sing Kwok

Made a Fellow of the IEEE in 2003 for his pioneering studies in display technologies. The outstanding nature of Prof Kwok's work has been widely recognized and in 2005 he was also elected a Fellow of the Society for Information Display (SID). He holds 10 patents.

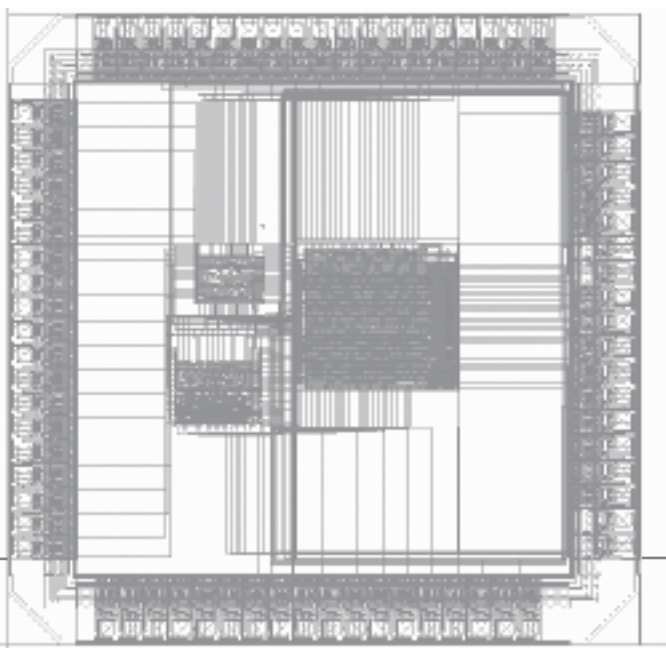
Research Highlights

The Department is committed to excellence in research and education in both the local and international arenas, to strengthening relationships with key universities in China and to broadening collaboration with local and Mainland industries, in order to advance the knowledge society. Areas of focus include wireless communication and networks, IC design engineering, control and robotics, signal, speech, image and video processing, display and photonics, and micro/nano-electronics and devices.



Developing Wireless Technologies to Transform the World

Technologies for the next generation of wireless systems, such as Beyond 3G, Cognitive Radio, Ultrawideband (UWB), WiFi, and WiMax, need to support very high bandwidth efficiency, use low power consumption, and offer robust performance.



Core technologies developed by the Department's Wireless Research Group include advanced signal processing algorithms, reconfigurable antenna and cross-layer designs for MIMO, OFDM and multi-carrier CDMA, all of which are highly important in overcoming the challenges posed by next generation wireless networks. The world-class quality of the team's research has led to many publications in top academic journals, contributions to numerous patents and standards, and the development of various advanced prototypes, including a Wireless LAN testbed and 4x4 MIMO testbed.

The group's research has also enjoyed the support of telecommunications companies and vendors in projects such as system design for B3G and cognitive radio systems.

http://www.ece.ust.hk/wireless_proj/



Colorful Display Sparks Change

Photonics technology has a wide-ranging role to play in applications from displays and lighting to biomedical diagnostics and telecommunications.

Breakthroughs in this area during 2003-05 include Prof Hoi Sing Kwok's development of a novel color Liquid Crystal Display using the conventional TN fabrication process. This new type of display does not use color filters. Other advantages are vivid colors, simple processing and low cost. The technology can be used in watches, calculators and game machines, among other devices. It has been transferred to a local LCD manufacturing company for mass production.

Prof Kwok and Prof Man Wong also conducted research as part of the Chinese Ministry of Science and Technology 863 Program and successfully developed the first five-inch diagonal full-color organic light emitting diode display on an active-matrix back plane in China.

Department of Electronic and Computer Engineering Website:

<http://www.ece.ust.hk>



From left to right:
 Prof Raymond K M Cheung, Prof Chung-Yee Lee,
 Prof Mitchell M Tseng and Prof Fugee Tsung

Industrial Engineering and Logistics Management

Head: Professor Chung-Yee Lee

The enthusiasm of our internationally renowned faculty members creates a stimulating environment to make fresh discoveries, provide solutions, and advance the analytical tools, management skills, and technology that can boost the competitiveness of Hong Kong industry.



Faculty Honors

Prof Raymond K M Cheung

Gained the Best Paper Award for the *IIE Transactions* focus issues on Logistics and Scheduling for 2002-03. Prof Cheung received the award for the paper "A Time-Window Sliding Procedure for Driver-Task Assignment with Random Service Times", written together with PhD graduate Darren D Hang. Prof Cheung also won the *IIE Transactions* Publication of the Year Award.

Prof Chung-Yee Lee

Elected a Fellow of the Institute of Industrial Engineers (IIE) for his professional leadership and outstanding contributions to the field in 2005. Prof Lee also received the Best Paper Award, together with co-authors Sitong Tan and Houmin Yan, for the *IIE Transactions* focus issues on Operations Engineering in 2003-04. The paper was entitled "Designing an Assembly Process with Stochastic Material Arrivals".



Prof Mitchell M Tseng

Made Honorary Adjunct Professor of Management at the Technical University of Munich in 2003 and awarded the Distinguished International Research Fellowship at the University of Calgary in the same year. Prof Tseng was further recognized in 2005 when he received the Outstanding Industrial Engineer Award from the School of Industrial Engineering at Purdue University. He is an active member of the International Academy of Production Engineering Research.

Prof Fugee Tsung

Received the Best Paper Award for the *IIE Transactions* focus issues on Quality and Reliability for 2002-03. The paper by Prof Tsung and Prof Daniel W Apley was entitled "The Dynamic T-squared Chart for Monitoring Feedback-Controlled Processes".

Research Highlights

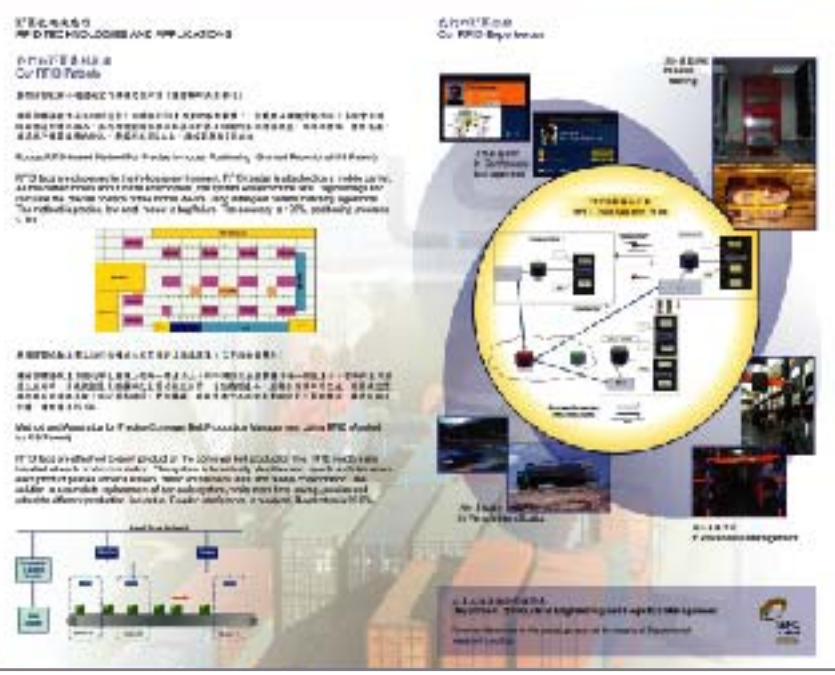
The Department seeks the development of fundamental scientific knowledge, partnerships

with local and regional industries to motivate and validate research, and collaboration with renowned institutions in the areas of logistics and supply chain and product design and manufacturing. Areas of focus include: transportation management; information technology and e-business; mass customization; computer-aided design and manufacturing; precision manufacturing; ergonomics/human factors engineering; and statistical quality control and Six Sigma.

'Green Lane' Plan to Avoid Border Congestion

When traffic congestion occurs, businesses lose time and money. With the Border Crossing Analysis and Enhancement feasibility study carried out from April 2005 to January 2006, the Department's researchers put forward a state-of-the-art solution to streamline the flow of increasingly heavy traffic at the land border between Hong Kong and Mainland China. The number of goods vehicles and container trucks crossing the border climbed to over 10 million in 2004, according to HKSAR government figures.





The project, managed by Prof Chung-Yee Lee and Prof Andrew Lim, investigated the time spent on queuing and documentation and utilized real-time data to provide a border-crossing time analysis and cost-benefit figures for a Green Lane Concept.

This concept involves a non-stop boundary crossing, implemented with the aid of data mining, GPS, e-seal, EPC network and RFID technologies. Researchers built a simulation model and also developed information requirement specifications for future system development.

Benefits of such a reduction in uncertainty and time at the border include cost-saving for companies, and secure and highly efficient border controls for government that in turn attract more business.

Keeping Air Cargo On the Move

Researchers, led by Prof Raymond Cheung, have been working with Hong Kong Air Cargo Terminals

Limited (Hactl), an international leader among air cargo terminal operators, to study dynamic routing policies for air cargo terminals' container storage systems.

The project has also estimated the efficiency and increase in throughput as well as suggesting integration and deployment strategies.

Through simulation models that recreate the real working environment at Hactl, researchers have been able to identify bottlenecks in throughput and put forward solutions that can improve service efficiency without affecting on-going work.

Department of Industrial Engineering and Logistics Management Website:

<http://www.ielm.ust.hk>

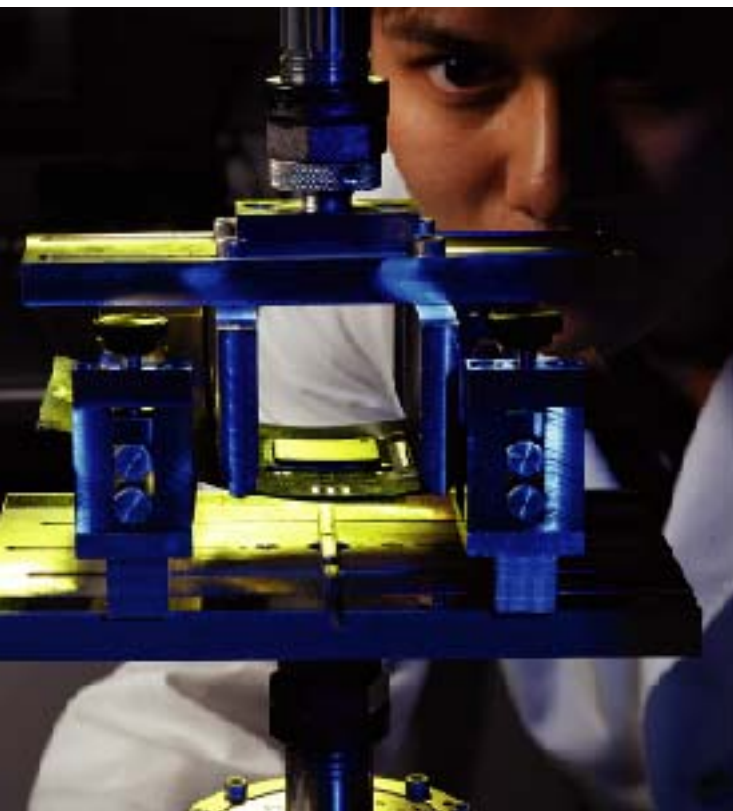




Mechanical Engineering

Head: Professor Tong-Xi Yu

Our leading scholars and experienced engineers research at the forefront of their respective specializations and in emerging areas to bring exciting international advances and to contribute to industrial and economic development in Hong Kong and the region.



Faculty Honors

Prof Ricky Shi-Wei Lee

Elected a Fellow of the renowned American Society of Mechanical Engineers in 2003. In the same year, Prof Lee was also made a Member-at-Large of the IEEE Components, Packaging & Manufacturing Technology Society Board of Governors. In 2005, he became an Editor-in-Chief for *IEEE Transactions on Components and Packaging Technologies*.

Prof Tong-Xi Yu

Elected a Fellow of the UK-based Institute of Mechanical Engineers and a Fellow of the American Society of Mechanical Engineers in 2003. In 2005, Prof Yu was also appointed an Associate Editor of the influential mechanics journal *Acta Mechanica Sinica* by the Chinese Society of Theoretical and Applied Mechanics.

Prof Tongyi Zhang

Awarded a Croucher Senior Research Fellowship in 2003-04 for his contribution to material science. Prof Zhang has published more than 100 papers in leading journals and co-holds two US patents.

From left to right:
Prof Ricky Shi-Wei Lee, Prof Tong-Xi Yu and Prof Tongyi Zhang

Research Highlights

Working at the forefront of developments, the Department helps to enhance people's lives through its high-impact research into many of the essential areas that underpin both society today and tomorrow's world. Our research focus includes electronic packaging, energy and thermal systems, Micro-Electro-Mechanical Systems (MEMS), advanced engineering materials and precision technology.

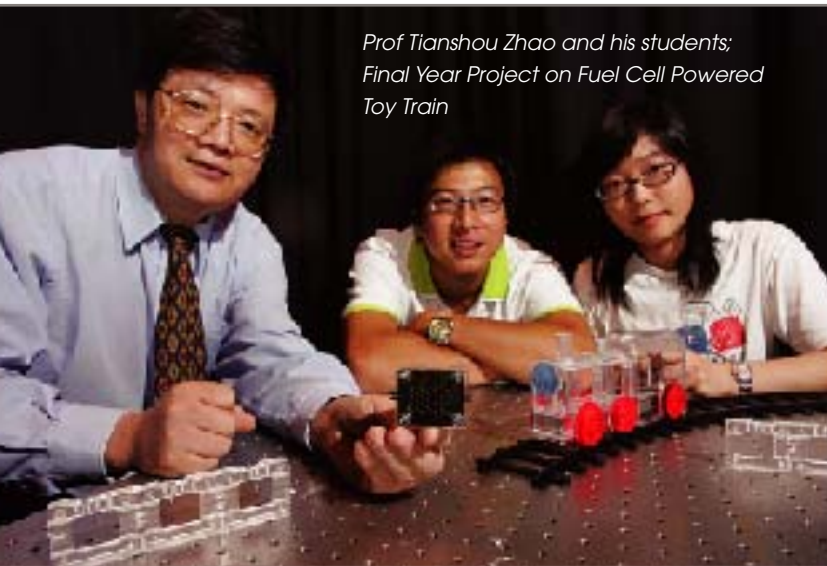
Advanced Microsystems Packaging

Electronic packaging and assembly has been identified as a high impact area at HKUST for many years. The Electronic Packaging Laboratory (EPACK Lab) and Microsystems Packaging Institute (MPI) were established in 1997 and 2004, respectively. Both units are led by Mechanical Engineering

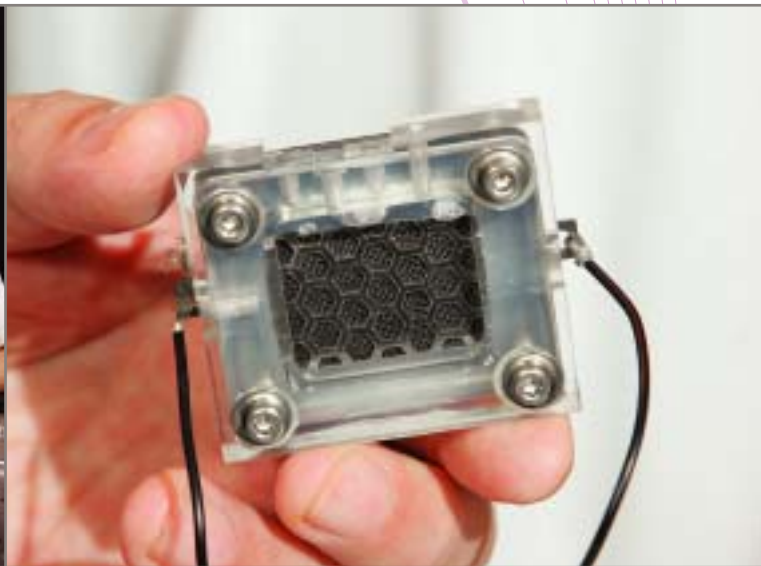
faculty members. In 2005, a new Center for Advanced Microsystems Packaging (CAMP) was launched to integrate the EPACK Lab and MPI. The missions of CAMP include academic research, industrial services, professional training, and technology transfer.

CAMP's major research areas include flip chip bumping and wafer level redistribution; through-silicon-vias and high density interconnects; 3D packaging and system-in package (SIP); MEMS and optoelectronics packaging; wire bonding and leadframe technologies; mechanical shock protection for portable electronics; and lead-free soldering and solder joint reliability. Over the years the research team working on electronic packaging and assembly at HKUST has won substantial international recognition and CAMP, together with the EPACK Lab and MPI, has become a technology landmark for advanced microsystems packaging.





*Prof Tianshou Zhao and his students;
Final Year Project on Fuel Cell Powered
Toy Train*



Fuelling the Future

Prof Tianshou Zhao, Associate Director of the Center for Sustainable Energy Technology, has boosted efficient, clean energy-conversion technologies with advanced research into Direct Methanol Fuel Cell (DMFC) development.

This type of fuel cell converts the chemical energy of liquid methanol directly to electricity. With potentially high efficiency, low emissions and a simple compact system among its advantages, the technology is among the most competitive to replace conventional batteries in portable electronic devices and also internal combustion engines.

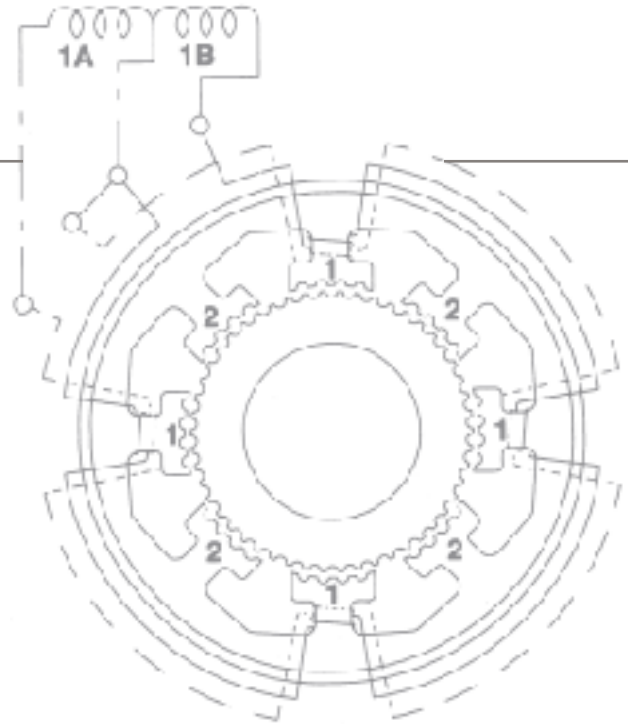


Prof Zhao and his group have made many significant breakthroughs in this area. These include the discovery that the power of miniature DMFCs can be boosted by up to 60% by shrinking and optimizing the channels that deliver fuel to the cell's heart and that the use of multi-walled carbon nanotubes as alternative supporting material for the catalyst leads to an increase in power of about 40% compared with carbon black supporting material.

The group has also developed a passively operated prototype DMFC, with neither liquid pump nor gas compressor, and a demonstrated maximum power density of about 50 mW/cm^2 , the highest performance for this type of fuel cell in open literature.

Department of Mechanical Engineering Website:

<http://www.me.ust.hk>



Passport to Success



In developing the young minds that will become the leading thinkers and creative talents of the future, the School of Engineering sets out to give students the ability to analyze and creatively solve problems, understand the latest developments, and put such knowledge to work. The success of this approach can be seen in our students' many achievements in external competitions and awards.

Open for Business

HSBC Young IT Entrepreneur Awards 2004-05

A team of Hong Kong students led by HKUST Computer Engineering Program student Michael Wong gained the "Best of the Best" award in HSBC's highly competitive regional competition, after earlier winning the Hong Kong contest. The team's innovative business plan involved a Mobile Identity scheme which would provide software to retail companies to replace membership or discount cards and enable customers to use their mobile phone numbers to obtain discounts. More than 1,700 students in over 660 teams took part in the contest in Hong Kong, Malaysia, Thailand and the Philippines.

Data Mining Champions

ACM Hong Kong Collegiate Programming Contest; ACM Knowledge Discovery and Data Mining (KDD) Competition, 2004 and 2005

Student computer engineers and scientists from HKUST showed their first-rate problem-solving skills by gaining top place in the Association for Computing Machinery (ACM) Hong Kong Collegiate Programming Contest in both 2004 and 2005. Meanwhile, postgraduates and postdoctoral fellows under the supervision of Prof Qiang Yang, Department of Computer Science and Engineering, won the KDD Cup in 2004 and 2005, defeating international teams from academia and industry. The competition requires participants to solve a

complex, practical problem and is the most rigorous annual competition in machine learning and data mining.

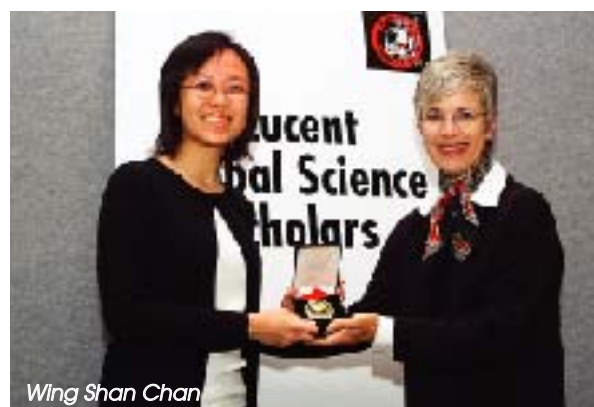
Bright Start

Lucent Global Science Scholars Awards 2004 and 2005



Students on the Dual Degree Program in Technology and Management were named Lucent Scholars in two successive years. The prestigious award scheme selects top students from different countries to attend the week-

long Global Science Scholars Summit at Lucent Technologies' headquarters in New Jersey, US. The two awardees were Wing Shan Chan in 2004 and Jovian Ling in 2005. Both were the only students chosen from applicants in Hong Kong.





Racing to the Top

Robocon 2005

School of Engineering students took four out of six prizes, including the top award, at the Robocon Hong Kong Contest and gained a second runner-up award at the grand final in Beijing. The contest, launched in 2002 by the Asia-Pacific Broadcasting Union, seeks to bring together young people from different countries and to generate interest in information technology and engineering. The 2005 competition was based on a "Great Wall of China" theme with teams designing and constructing manual and automatic machines that could collaborate in a three-minute contest to climb the "Great Wall" and complete various tasks. In Beijing, 20 teams from 19 different countries and regions took part. The Hong Kong competition is organized by Radio Television Hong Kong (RTHK) and co-organized by the Hong Kong Computer Society and the Hong Kong Institution of Engineers.

Standing Firm

Introducing and Demonstrating Earthquake Engineering Research in Schools (IDEERS) Competition 2005

Five postgraduate students from the Department of Civil Engineering took first prize at the IDEERS

competition in Taipei by designing and creating a model of a three-story earthquake-resistant building in 6.5 hours. The HKUST design was based on stiff box columns and triangular prism corner columns padded with light-weight polystyrene to absorb the vibration. Models were then subjected to simulated earthquake tests at Taiwan's National Center for Research on Earthquake Engineering. Only the models built by HKUST and National Cheng Kung University, from Taiwan, withstood the maximum vibration of 1.5g (comparable to an earthquake measuring eight on the Richter Scale) with the HKUST team securing victory with their lighter model. Seventeen international teams took part in the contest, including participants from US, Japan, Taiwan and Hong Kong universities.

IC Designs Draw World Attention

IEEE International Solid-State Circuits Conference ("Chip Olympics") 2005

The Department of Electronic and Computer Engineering has continued to make its presence regularly felt at the "Chip Olympics" in San Francisco, the leading international forum in the integrated circuit design technology field. Building on the success of HKUST researchers at previous "Chip Olympics", in 2005, MPhil student Wing Lun Ng introduced a Phase Locked Loop (PLL) chip that could output signals as high as 24GHz to help improve high-frequency wireless applications. At the same conference, 2004 PhD graduate Dr Hoi Lee discussed his novel design for power management integrated circuits for the new generation of portable electronics.

Student Achievements — 2003-05

Student	Department	Award	Organization / Conference	Year
Yu Hin CHAN	Mechanical Engineering	Best Student Paper Award	International Symposium on Electronic Materials and Packaging	2003
Shoushun CHEN	Electronic and Computer Engineering	Best Paper Award	5th IEEE International Workshop on System-on-Chip for Real-Time Applications	2005
Hoi LEE	Electronic and Computer Engineering	Best Student Paper Award	IEEE Custom Integrated Circuits Conference	2004
Alex K N LEUNG	Electronic and Computer Engineering	Young Scientist Award	Hong Kong Institution of Science	2003
Si Wan LI	Chemical Engineering	Carl Klason Prize for the Best Student Presentation	11th Polychar World Forum on Advanced Materials	2003
Jiangchuan LIU	Computer Science and Engineering	Young Scientist Award	Hong Kong Institution of Science	2003
Jing LIU	Computer Science and Engineering	Best PhD Paper Award	4th ACM Postgraduate Research Day	2003
Jeffery LO, co-author	Mechanical Engineering	Best Poster Paper Award	Electronic Components & Technology Conference	2004
Haiqing SONG	Industrial Engineering and Logistics Management	Doctoral Dissertation Award	Council of Supply Chain Management Professionals	2005
W Y SZETO	Civil Engineering	Gordon Newell Memorial Prize and HKSTS Outstanding Doctoral Dissertation Paper Award	Hong Kong Society for Transportation Studies	2005
W Y SZETO	Civil Engineering	Outstanding Student Paper Award	8th Conference of Hong Kong Society for Transportation Studies	2003
Wang Fai THONG	Civil Engineering	Best Paper Award	Hong Kong Institution of Engineers Materials Division	2004
Kevin K M TSIA	Electronic and Computer Engineering	Best Paper Award	IEEE Hong Kong Section LEOS Chapter 5th Postgraduate Conference	2004
Q K WAN	Civil Engineering	Outstanding Student Paper Award	9th Conference of Hong Kong Society for Transportation Studies	2004
Timothy WAN	Civil Engineering	Young Engineer's Award	3rd China-Japan-Korea Joint Symposium	2005
Eric Y W WONG	Civil Engineering	Fugro Prize	Hong Kong Institution of Engineers	2005
Xusheng WU	Electronic and Computer Engineering	Best Student Paper Award	IEEE International Meeting for Future of Electron Devices	2005
Lei ZHANG	Computer Science and Engineering	Best PhD Paper Award	5th ACM Postgraduate Research Day	2004

Forging the Movers and Shapers of Tomorrow



With a student body of more than 3,500, the School of Engineering enrolls 40% of HKUST's undergraduates and postgraduates, making it the University's largest school. All departments offer undergraduate programs leading to Bachelor of Engineering (BEng) degrees and Master of Philosophy (MPhil) and Doctor of Philosophy (PhD) research programs. There are also a series of course-based Master of Science (MSc) programs.

As faculty members work at the forefront of research, they are able to bring the latest developments into the lecture theater ensuring teaching and learning in the School of Engineering incorporates the most up-to-date knowledge in its programs. This also enables the School to provide programs in emerging fields and to continuously adapt its programs to keep them relevant to the changing needs of both the local and international communities.

Widening the View of Undergraduates

The scope of undergraduate education in the School of Engineering has broadened recently to incorporate additional perspectives along with its established professionally based degree programs. "It is not enough to simply study the academic side now," said Professor Helen C Shen, Associate Dean (Undergraduate Studies). "Students need to widen their view of life. This is particularly important for those on the technical side. The world needs all-round people."

To encourage undergraduates to pursue self-development as well as engineering skills in different fields, the School has been creating further opportunities to build inner understanding, communication skills, and business know-how to prepare students for job-seeking and employment.

One area that has been enhanced is the Personal Development element within the School's Academic and Professional Development course. "Previously this was more focused on adjustment from school to university and communication in English. We have now introduced career-oriented elements and skills involved in the transition from university to work," Prof Shen said.

Other career-focused opportunities are available through internal and external competitions in which students present ideas and solutions for a technically based issue, or a business plan for a



Prof Helen C Shen

technically related enterprise; and internships which provide both students and employers with a chance to see how the other works and whether they are compatible.

Competitions include the School of Engineering-organized Hang Seng Innovative Design Competition, started in 2004, which motivates students to create useful engineering applications and products, demonstrates their creativity and enhances their presentation skills; Robocon, arranged locally by Radio Television Hong Kong (RTHK) and internationally by the Asia-Pacific Broadcasting Union, where teams design machines to perform certain set tasks; and the HSBC Young IT Entrepreneur Award, which helps students acquire practical business knowledge through developing a business plan involving IT.

Meanwhile, the School's expansion of internship opportunities has allowed more undergraduates to gain practical insight into work practices and to apply what they have learnt at HKUST. An internship usually runs over two to three months in the summer or as a one-year leave-from-study placement after completing the second year. Students go to many leading companies and organizations covering a range of fields, including Morgan Stanley, Motorola, Cathay Pacific, Ove Arup, Credit Suisse First Boston, and HKSAR government departments.

An extensive student exchange program to study at partner universities overseas and in the Mainland opens up further views of the world. Students go for two semesters after completing their second year. The experience boosts independence and knowledge of different cultures, which provides valuable preparation for the increasingly common multicultural work environment and helps develop a global outlook as well as polishing English skills in different social settings.

By the end of 2005, the School had more than 35 top-tier partners in the US, Sweden, France,

Singapore, UK, and Germany, among others. It is continuing to explore arrangements in different locations, including Taiwan and Korea, and to encourage more students to participate to keep the program growing.

One additional opportunity for overseas study, introduced in 2004, is the Summer Exchange Program in Europe where students take part in a specially tailored course, with instruction in English, joining participants from around the world. The School is now working with universities in France and Germany to provide places on such programs.

Greater interaction with students from the Mainland has also seen steady development, with 60 full-time undergraduates enrolled in the School of Engineering in 2005, and 30 to 40 each semester on exchange from top Mainland universities. Those taking up full-time studies undergo a one-year preparatory course before joining the regular degree program.

To ensure the School stays ahead in its academic programs as well as its career and personal development, the School is already well underway



with its plans for the 2012 introduction of the four-year undergraduate program in line with educational changes in Hong Kong and HKUST's own Strategic Plan, unveiled in June 2005. The HKUST plan maps out a framework for the transformation of undergraduate education, among other initiatives, with more flexibility introduced through modular programs and interdisciplinary curricula.

In the School of Engineering, the four-year degree is set to give students a broader base of knowledge in their initial years before going into a speciality, Prof Shen said. "We want to give students time to think what they really want to do." The flexibility envisaged includes dual majors and minors across departments and Schools to provide more combinations of subjects and multiple perspectives. "This is what the future will demand," she said.

Technology & Management Dual Degree Puts Students on the Fast Track

The elite, four-year undergraduate Technology & Management Dual Degree Program, launched in 2003, has brought a dynamic opportunity for the School of Engineering to answer the growing demand among businesses for graduates with both technical and managerial skills.

The pioneering program, which was the first of its kind in Hong Kong, is jointly run by the Schools of Engineering and Business, both globally renowned in their respective fields. It enables students to gain



two degrees, a Bachelor of Engineering in a specific engineering field together with a Bachelor of Business Administration, training them to be able to tackle issues from both technological and business viewpoints.

Many additional activities are also incorporated into the program to equip students with strong communication skills, build personal development and offer early exposure to the working world in order to develop all-round skills and provide practical experience that gives them a highly competitive edge in the job market.

"With statistics showing about 40% of School of Engineering graduates find jobs involving business as well as engineering, introducing a course that specifically equipped students for such positions was a good idea for both students and industry," said Prof Chi Ming Chan, Co-Director of the Dual Degree Program and Chair Professor, Department of Chemical Engineering.

To make the demanding program successful, Prof Chan and fellow Co-Director Prof Kar Yan Tam, Associate Dean of the School of Business and Management, and Chair Professor, Department of Information and Systems Management, have limited intake to around 30 students per year. Undergraduates are drawn from among the top 1% of students locally and overseas, including Early Admissions Scheme entrants, whose first-rate results allow them to enter universities in Hong Kong after Form Six, and international students to encourage cultural exchange within the group.

"It is not easy to be good at both engineering and business. So we have to recruit students who will be able to cope with taking the two degrees plus all the other activities we arrange for them," Prof Chan said.



These activities include internships at local companies, attending business forums, a guaranteed exchange place to study at universities overseas and an executive mentor to provide one-on-one guidance about the working world. Special one-semester projects with companies such as IBM are also arranged where students develop business plans and solutions to problems through working on a real-case scenario.

"We felt, on top of students' regular courses, we needed to set up programs that would integrate what they learn from the School of Engineering and School of Business," Prof Chan said. "We wanted to build a bridge with these programs that would join these two pillars of knowledge together. Such practical experience is highly important as students have to know how to utilize what they learn."

Further program development is envisaged, with the co-directors working on new initiatives, such as collaboration with the University of Pennsylvania, which also offers a dual degree program in technology and management, and the University of Illinois, Urbana-Champaign, which has a minor degree program covering the two areas.

The first cohort of students will graduate from the program in 2007 and Prof Chan is highly optimistic about their prospects. "They are a group of talented people with both engineering and business know-how who can join a company anywhere in the world and start to contribute immediately. In addition, we hope that, in the future, some of these students will set up their own

companies. A graduate pool like this is very important for Hong Kong.”

Dual Degree Program in T&M Website:

<http://www.techmgmt.ust.hk>

Meeting of Top Minds

Events Attended by Dual Degree Students in 2005:

- The First Banking and Finance Technology Forum (Hong Kong)
- BusinessWeek High Achievers Program
 - Fourteenth Annual Asia Leadership Forum (Bangkok)
 - Fourth Annual CEO Insights Forum (Chongqing)
 - Ninth Annual CEO Forum (Beijing)



Prof Zongjin Li

Master of Science Programs Keep Engineers on the Move

The School of Engineering has introduced an increasing number of innovative Master of Science (MSc) programs during 2003-05, to help graduates boost their skills in current and emerging fields and sharpen their competitive edge, and to assist long-time engineers to refresh their knowledge of the latest developments.

While MPhil and PhD degrees train students in discovery and understanding of mechanisms and theory in a specific research area, the MSc programs offered at the School of Engineering provide practical technology and management training to fulfill the changing needs of industry.

“Society requires not only researchers but people with practical skill and sufficient knowledge to design and develop products and increase productivity,” said Prof Zongjin Li, Associate Dean (Postgraduate Studies).

To decide the type of programs to offer, the School conducts industry surveys to analyze the areas of rapid development, skill shortages, and to look ahead at likely developments for society as a whole. “We carefully design each program so it has a solid base in industry and is useful for people who need to manage technology. We compare directions occurring in other developed countries and create courses that can train students to meet the challenges of the future,” Prof Li said.



Examples of leading Master’s programs offered by the School of Engineering include IC Design Engineering, Telecommunications, Intelligent Building Technology and Management, and Civil Infrastructural Engineering and Management.

Students include those from the Mainland, who are attracted to the excellence of HKUST faculty members with their advanced knowledge and international academic connections. Mainland students also appreciate the fact the courses are taught in English, enabling them to catch up quickly with new developments. “The booming economy in the Mainland means there is more and more practical need for such programs,” Prof Li said. “Recently, we have seen a significant increase in the Mainland intake. This is a very good sign.”

Programs are usually held at HKUST, but in the future, the School plans to make them available on the Mainland.

Also ahead are new programs that answer the ever-evolving demands of industry including more multi-disciplinary courses that combine engineering fields with other areas, such as finance and engineering or civil engineering and law.

“We want to give students a broad view, active knowledge, and to

prepare them for possible future developments in order to give them the capability to open new directions for companies and enhance their career prospects,” Prof Li explained.

“Our programs encourage the transfer of theory to practice. Faculty members have many connections with industry and are very aware of demand; support staff ensure courses are well organized; and the university has advanced facilities to help build the most beneficial MSc courses for students and industry,” he said. “If we offer a program, we want it to be the best.”

MSc Program Expansion

Master of Science in	Year Launched
Civil Infrastructural Engineering and Management	2002
Electronic Engineering	2005
Engineering Enterprise Management	2003
Environmental Engineering*	2005
IC Design Engineering	2003
Information Technology	2003
Intelligent Building Technology and Management	2004
Mechanical Engineering*	2005
Telecommunications	2003

**Both programs were previously offered with government funding support and had been re-designed when launched in 2005.*

MSc Programs Website:

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

Degrees Conferred 2003-2005

Undergraduate Programs	2003	2004	2005
BEng in Computer Science (Information Engineering) and Electronic Engineering (Information and Communication Engineering)	4	-	-
BEng in Electronic Engineering (Information and Communication Engineering) and Computer Engineering	1	2	-
BEng in Electronic Engineering (Information and Communication Engineering) and Computer Science (Information Engineering)	-	-	1
BEng in Chemical Engineering	24	26	29
BEng in Chemical and Environmental Engineering	23	31	33
BEng in Chemical and Polymer Engineering	8	4	-
BEng in Civil and Structural Engineering	93	109	90
BEng in Civil and Environmental Engineering	15	13	16
BEng in Computer Engineering	119	115	100
BEng in Computer Science	73	69	86
BEng in Computer Science (Information Engineering)	55	54	32
BEng in Electronic Engineering	65	83	81
BEng in Electronic Engineering (Information and Communication Engineering)	65	49	48
BEng in Industrial Engineering and Engineering Management	39	34	42
BEng in Industrial Engineering and Engineering Management (Transportation Logistics Management)	22	32	33
BEng in Logistics Management	8	4	2
BEng in Mechanical Engineering	51	47	43
BEng in Mechanical Engineering (Building Services)	23	32	26
Total	688	704	662

Postgraduate Programs	2003	2004	2005
MSc in Bioengineering	1	4	5
MSc in Chemical Engineering	3	3	3
MSc in Civil Engineering	18	14	24
MSc in Civil Infrastructural Engineering and Management	—	33	49
MSc in Computer Science	14	16	8
MSc in Electrical and Electronic Engineering	8	14	19
MSc in Engineering Enterprise Management	—	—	44
MSc in Environmental Engineering	18	18	10
MSc in IC Design Engineering	—	—	58
MSc in Industrial Engineering and Engineering Management	13	14	19
MSc in Information Technology	—	—	182
MSc in Intelligent Building Technology and Management	—	—	2
MSc in Mechanical Engineering	2	11	6
MSc in Telecommunications	—	—	75
MTM in Global Logistics Management	25	32	14
MTM in Information Technology	20	47	10
MPhil in Bioengineering	2	3	3
MPhil in Chemical Engineering	3	4	6
MPhil in Civil Engineering	8	24	18
MPhil in Computer Science	26	20	17
MPhil in Electrical and Electronic Engineering	41	33	26
MPhil in Environmental Engineering	—	3	6
MPhil in Industrial Engineering and Engineering Management	7	2	14
MPhil in Mechanical Engineering	14	11	6
PhD in Bioengineering	—	1	—
PhD in Chemical Engineering	1	7	2
PhD in Civil Engineering	9	11	13
PhD in Computer Science	5	16	12
PhD in Electrical and Electronic Engineering	12	10	20
PhD in Industrial Engineering and Engineering Management	3	1	3
PhD in Mechanical Engineering	10	6	11
Total	263	358	685

Dynamic National Presence



The School of Engineering has helped HKUST strengthen its ties and presence nationally during 2003-05 in line with the University's mission to contribute to the economic and social development of the country as a leading university in China.

Forging a PRD Hub for Technological Innovation

Nansha IT Park

Developments at the Nansha IT Park received a huge boost with the donation of HK\$800 million from the Fok Ying Tung Foundation in 2005, the largest private gift yet received by the University. Of the funds donated, HK\$500 million is being put towards the setting up of an education and research institute at Nansha, due to be completed by 2008.

The Nansha IT Park was jointly launched by the University, the Fok Ying Tung Foundation and the Guangzhou government at the end of 2002. The Park's mission is to provide a Pearl River Delta (PRD) platform for creative IT and technology industries, R&D, start-ups and education and training to boost regional competitiveness and build the area's international reputation as a hub for technological innovation.

With HKUST responsible for concept design, project management, and training and development, School of Engineering faculty played an essential part in shaping the Park's concept, with their expertise in technology and infrastructure development.



The Park will support technological development and professional training in leading fields such as digital life, IC design, electronic packaging, and engineering materials, another indication of the cutting-edge academic capabilities in the School of Engineering.

HKUST plans to offer a number of postgraduate programs at the Park, including MSc in Computer Science and Technology, MSc in Electronic Technology, and MPhil in Computer Science.



Enterprising Outlook

Zhejiang Advanced Manufacturing Institute

With China becoming a powerhouse for global manufacturing, there has been significant interest in leveraging the technological capability of the School of Engineering, particularly in the field of advanced manufacturing technology. There have been several fruitful collaborative programs in the Pearl River Delta region. There has also been vibrant industrial growth in the Yangtze River Delta, which could not be ignored. Thus, at the invitation of Zhejiang Provincial People's Government, Professor Mitchell Tseng from the Department of Industrial Engineering and Logistics Management received a major grant to establish the Zhejiang Advanced Manufacturing Institute (ZAMI) in Hangzhou City in 2004.

ZAMI's mission is to develop new technologies, methods and tools to guide manufacturing industry upgrades, to transfer academic findings and results for broader impact, to attract worldwide talents, and to create the best R&D environment for manufacturing research programs at HKUST. It is the



first research institute co-established by a university in Hong Kong and Zhejiang province.

The four major research and development areas are: mass customization; radio frequency identification technology (RFID); network-based manufacturing systems; and design for comfort. These programs cover the major new trends in global manufacturing industries.

In addition, ZAMI is benefiting HKUST through research and internship opportunities for undergraduates and postgraduates, enabling them to apply knowledge in a real-life manufacturing environment. Through ZAMI, we also gain greater insights into the technologies required to help Hong Kong industries and can help integrate the value chain through developing complementary strengths between Hong Kong companies and mainland production capabilities in order to maximize opportunities for both.

Opening the Door to Tomorrow's World IT Key Laboratory

World-class research at HKUST received a significant boost in 2004 with the establishment of a Ministry of Education (MOE)/Microsoft Research Asia (MSRA) Information Technology Key Laboratory at HKUST.

This was the first MOE Key Lab established in Hong Kong. Professor Lionel Ni, Head of the Department of Computer Science and Engineering, took on the additional role of Key Lab Director.

MOE/MSRA Key Labs provide a model for university-industry-government co-operation. They conduct basic research project in computer science, train talented young researchers and promote the Chinese information technology industry.

At HKUST, the focus is on three research areas — vision and graphics, systems and networking, and mass information management — and nurturing the IT professionals of the future. The Key Lab status raises the profile of HKUST on the Mainland enabling it to attract top PhD students and academics.

HKUST-MSRA collaboration, first initiated in 2000 with the founding of the MSRA/HKUST IT Joint Research Laboratory, was further strengthened in 2005, with the launch of a joint doctorate supervision scheme to help IT education and research on the Mainland.

Under the agreement, MSRA will nominate candidates for admission to the Department of Computer Science and Engineering's PhD program. Students undertake their coursework and examinations at HKUST and carry out thesis research at MSRA Beijing, jointly supervised by the University and MSRA. Successful candidates will receive their doctorate from HKUST.



About SENG

The School of Engineering is the largest of the four Schools within the Hong Kong University of Science and Technology (HKUST), enrolling about 40% of the University's undergraduate and postgraduate students and committed to teaching and research

at the cutting edge of engineering. In 2005, HKUST was ranked No.23 in World's Top 100 Technology Universities league table. HKUST admitted its first students in October 1991.

Administration

President

Professor Paul Ching-Wu Chu

Vice-President for Academic Affairs

Professor Yuk-Shee Chan

Dean of School of Engineering

Professor Philip C H Chan

Associate Dean of School of Engineering (Undergraduate Studies)

Professor Helen C Shen

Associate Dean of School of Engineering (Postgraduate Studies)

Professor Zongjin Li

Head of Department of Chemical Engineering

Professor Chi Ming Chan (Acting Head)

Head of Department of Civil Engineering

Professor Moe M S Cheung

Head of Department of Computer Science and Engineering

Professor Lionel M Ni

Head of Department of Electronic and Computer Engineering

Professor Khaled Ben Letaief

Head of Department of Industrial Engineering and Logistics Management

Professor Chung-Yee Lee

Head of Department of Mechanical Engineering

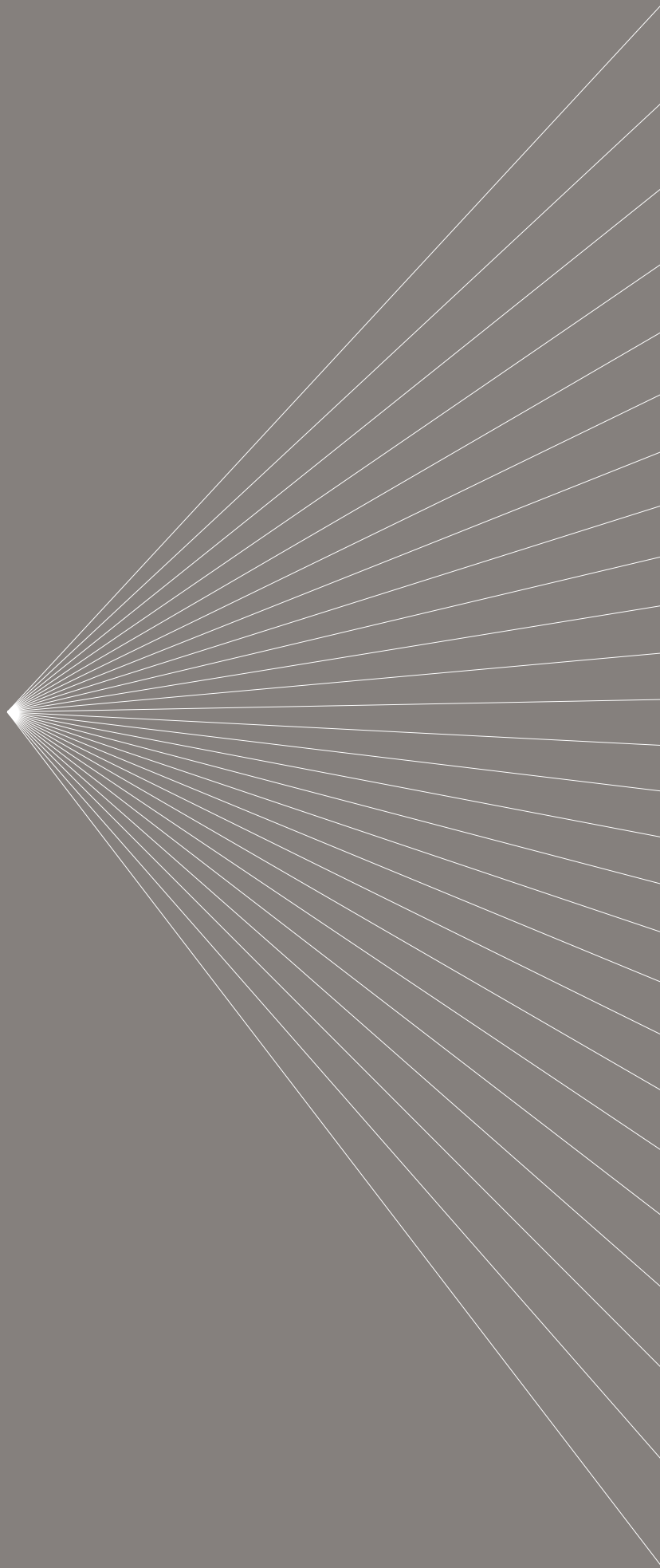
Professor Tong-Xi Yu

Figures at a Glance

Faculty	Regular	141
	Visiting	9
	Total	150
Students	UG	2094
	PG	1424
	Total	3518

Research Funding (2002-05) in Millions				
	2002-03	2003-04	2004-05	Total
UGC	129	125	115	369
RGC	174	81	123	378

www.seng.ust.hk





SCHOOL OF ENGINEERING
THE HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY