Research Grant Results

Demonstrate Engineering Enterprise

The School of Engineering has gained the most funding and largest number of new projects of the University's four Schools in the 2003-2004 Research Grants Council Competitive Earmarked Research Grants (RGC-CERG), helping HKUST secure the highest success rate among the eight University Grants Council-funded institutions for the 10th consecutive year.

The University had a 62% success rate in grants approved, with 159 projects supported and total funding of more than $91 million. Seventy-nine of these projects were proposed by the School of Engineering, with more than $40 million awarded. The proposals were examined by the RGC's subject panels and assessed with the help of overseas experts. "The results show the quality of our faculty, and that the research they conduct is at a leading, international level," said Prof Philip Chan, Dean of Engineering. He said the School should continue to strive to improve on its RGC-CERG success rate. "Two departments had a success rate greater than 70% this year and, given the quality of our academics, I think we could achieve a success rate greater than 70% for every department."

Meanwhile, Innovation and Technology Fund (ITF) figures show HKUST had been awarded nearly $63 million in ITF funding for 22 projects under the University-Industry Collaboration Programme (UICP) by June 2003. Seventeen of these projects were proposed by the School of Engineering, with more than $55 million in ITF funding awarded. The UICP aims to increase interest in R&D in the private sector by encouraging partnerships between universities and industry. It requires companies to provide matching funds, bringing the total funding amount awarded to School of Engineering projects to over $110 million. Research led by Prof Lionel Ni, Head of the Department of Computer Science, is being done in partnership with WebEx Communications, Inc. for the project “Next generation online multimedia collaboration system.”

Prof Chan believes the School must continue to seek additional sources of funding to support its first-rate research and further develop the University's standing as a world-class institution.

### Faculty and staff at HKUST have donated more than $500,000 to the We Care Education Fund, set up by the Permanent Secretary for Education and Manpower, Mrs Fanny Law, and her civil service colleagues to help the children of SARS victims.

The money was raised through the HKUST SARS Relief Campaign initiated by the Department of Mechanical Engineering and supported by the HKUST Staff Association. The campaign received contributions from more than 260 faculty and staff members from different departments within the University.

### Donation for SARS Relief

Mrs Fanny Law (middle) received a cheque of HK$545,744 from Mr Adrian Cheung of Office of University Development & Public Affairs (first from left), Prof Raymond Wong of HKUST Staff Association (second from left), President Prof Paul Chu (second from right) and Prof Yang Leng of Mechanical Engineering (first from right).
Message from the Dean

New Academic Appointments

Prof Philip Chan
Dean of Engineering

Prof Chan joined the University in 1991 and was promoted to Professor in 1997. During the past years, Prof Chan has demonstrated his outstanding leadership and administrative skills through his service as Acting Head of Electrical and Electronic Engineering Department, Head of the Department and Acting Dean of Engineering. Prof Chan received his PhD in Electrical Engineering from the University of Illinois at Urbana-Champaign.

Prof Moe Mo Shing Cheung
Head and Professor of Civil Engineering

Prof Cheung is an expert in bridge structures and buildings, and an experienced administrator. He has been the Director, Technology Directorate in the Public Works and Government Services Canada, and the Adjunct Professor at University of Ottawa and Carleton University. Prof Cheung received his PhD in civil engineering from the University of Calgary.

Prof Khaled Ben Letaief
Head of Electrical and Electronic Engineering

Prof Ben Letaief is an international renowned researcher in the field of wireless communication. He is currently the Director of the Center for Wireless Information Technology and the Hong Kong Telecom Institute of Information Technology. Prof Ben Letaief was appointed Acting Head of Electrical and Electronic Engineering in January 2003, and became substantive Head in July 2003. He received his PhD from Purdue University.

Prof Roland Chin
Vice-President for Research and Development

Prof Chin, Professor in Computer Science, was appointed as Vice-President for Research and Development of HKUST in June 2003. He received his PhD in electrical engineering from the University of Missouri. Being a founding member of HKUST, Prof Chin has made substantial contributions to the University as an academic leader and as a pioneer of technology development.

In this school year, there are many challenges ahead of us. As you may have read in the newspapers, the Government is seriously considering changing university education from the current three years to four years. The move will have profound implications for the tertiary and secondary education systems in Hong Kong. At this stage, most of the parameters are not yet known. However, we need to be prepared and are getting underway with four-year curriculum design and resource planning.

With a four-year curriculum, there are many opportunities. Should we consider a common first year for all engineering students? Should the additional credits made available be used to build up students’ language skills, mathematics or scientific fundamentals? Should we further strengthen general education?

To address these issues, I have appointed a committee with representatives from all the engineering departments in the School. The Committee chairman is Prof Chi Ming Chan, Associate Dean of Engineering responsible for the undergraduate studies program.

Another recent alteration in Government funding policy also affects the University and the School of Engineering significantly. The University Grants Council (UGC), the University’s funding agency, has decided to gradually rescind support for taught postgraduate programs. This includes all Master of Science programs in the School. Thus we are now switching these programs from UGC support to self-financing. Further reports on the status of this change will be made in the future.

Best regards for the academic year.

Prof Philip Chan
Dean of Engineering

New Faculty Members on Board

• Prof Dennis T K Tong
  Assistant Professor, Electrical and Electronic Engineering
  PhD, University of California, Los Angeles

• Prof Xiantong Qi
  Assistant Professor, Industrial Engineering and Engineering Management
  PhD, University of Texas, Austin

New Visiting Faculty Members on Board

• Prof Chiphong Kwan
  Visiting Assistant Professor, Chemical Engineering
  PhD, Massachusetts Institute of Technology

• Prof Xiangwen Lu
  Visiting Assistant Professor, Industrial Engineering and Engineering Management
  PhD, University of California, Irvine

• Prof Ivan Man Lung Sham
  Visiting Assistant Professor, Mechanical Engineering
  PhD, Hong Kong University of Science and Technology

New Adjunct Faculty Appointed

• Prof Edmond Ko
  Adjunct Professor, Chemical Engineering
  PhD, Stanford University

• Prof John Endicott
  Adjunct Professor, Civil Engineering
  PhD, University of Cambridge
Research and Development

Sonic Ranger

Puts Accent On Better English

Primary students now have a sound way to improve their English pronunciation with the July launch of Sonic Ranger, a dynamic, interactive learning software based on advanced speech recognition technology created by two School of Engineering academics.

The Sonic Ranger project, managed by the Hong Kong Applied Science and Technology Research Institute Company Ltd (ASTRI), was inspired by the PLASER software developed earlier by Prof Man-Hung Siu, Assistant Professor in the Electrical and Electronic Engineering Department, and Prof Brian Mak, Assistant Professor in the Computer Science Department, to help secondary students with English pronunciation.

Sonic Ranger differs from other available software in using speech recognition technology that can evaluate pronunciation at the level of each phoneme in a spoken word rather than the whole word. Using such technology combined with games to increase motivation, Sonic Ranger improves young learners' skills in distinguishing different sounds when listening and accurately reproducing these sounds when speaking.

Instant feedback employing a novel, three-color scheme to report results (blue for good, green for fair, red for bad) is particularly useful for correcting mispronunciations, the professors said. "We were brought up in Hong Kong so we understand the challenges students face in learning English pronunciation," Prof Siu said.

The software is based on American English as more resources were available for building the speech recognition engine. However, in order not to penalize local students for their accents, the professors collected different utterance recordings of local students with 'good' English to train the computer to learn and accept 'good' pronunciation spoken with a Hong Kong accent.

ASTRI's role was vital in providing the support to fully develop the product, find the six business partners and promote it, Prof Mak said. A home edition of Sonic Ranger is on sale and an online version available for classroom teaching. Details can be found at http://www.sonicranger.com.

Prof Mak and Prof Siu are currently researching multimedia technologies (including speech technologies) to improve upper-form students' English fluency.

Unified Messaging System

Speeds Convergence

The days of struggling to remember separate telephone, mobile phone and email contact details look numbered with the recent development of a multi-service telecommunications platform by School of Engineering researchers.

The "Unified Messaging System" (UMS), based on cutting-edge Voice over Internet Protocol (VoIP) technology, is being developed by the University's ATM/IP Telephony Solution Cooperative Research Center in collaboration with industrial partner China Motion Telecom Group. The co-principal investigators are Prof Xiren Cao, Department of Electrical and Electronic Engineering, and Prof Bo Li, Department of Computer Science.

UMS subscribers are given a unique address, or unified messaging identification number (UMID). They can then send and receive messages in fax, voice, video or email format in real time via any communication device, including telephone, pager, personal computer, or mobile phone.

"The project is highly relevant to Hong Kong's future aim to become the business center for China and the world," said Tony Hau, Chairman and CEO, China Motion Telecom Group. Prof Cao added: "Our system provides a flexible and efficient way of offering multi-services to customers."

This offers a great deal of convenience and more service options for customers, according to Prof Li. He said service providers can also benefit due to cost reduction and service expansion.

The research team is now looking for companies interested in further developing and deploying the platform in the market.
Ground-breaking nanomaterials research is being developed by School of Engineering researchers to create a nanocatalyst-based environmental control system that can be used to produce pioneering products to improve indoor air quality in Hong Kong and internationally.

The front-running, two-year project, which also involves a water remediation system, is being coordinated by the University's Institute of Nanomaterials and Nanotechnology, with faculty team members from the Chemical Engineering and Industrial Engineering and Engineering Management Departments. The air remediation system is led by Prof King Lun Yeung.

The novel air remediation system uses an adsorbent to first capture contaminants found in various indoor environments. The contaminants are then decomposed by a nanocatalyst and rendered harmless. Pollutants targeted include carbon monoxide, odorous compounds, formaldehyde and bio-aerosols found in places such as health clinics, kitchens and restaurants.

The project, which runs until December 2004, has gained further significance following the SARS outbreak earlier this year. Prof Po Lock Yue, Project Coordinator and Director of the University's Environmental Engineering Graduate Program, said:

"Although we will not be working on the coronavirus, the methodology developed should be applicable to decontamination of airborne bacteria and viruses. Extension to a SARS-type of virus is, in principle, feasible and would be one of the targets for post-project work."

A preliminary air remediation prototype is now available with deliverables currently focusing on a version that can be combined with a commercially available dehumidifier.

"This is science at the frontier with direct applications that can benefit Hong Kong and society at large," Prof Yue said.

The project has received nearly HK$9 million from the Innovation and Technology Fund. There are four industrial partners: Honeywell, Vivendi Environmental, Chiaphua and Grandy Environmental. All are involved in either air cleaning systems or environmental processes for air and water remediation.

### International Honors and Awards

- **Prof Irene Lo** (Civil Engineering) was the recipient of Hong Kong Institution of Engineers (HKIE) Peter Chan Best Paper Award for the technical paper entitled “Environmental and Landfill Operational Aspects of Co-disposal of Dewatered Sewage Sludge and Municipal Solid Waste” in June 2003.

- **Prof Charles Ng** (Civil Engineering) was the recipient of the 2002 Young Mao Yisheng Award by the Chinese Institute of Soil Mechanics and Geotechnical Engineering. This award is nominated every two years for a young researcher who has made significant contributions in soil mechanics and geotechnical engineering.

- **Prof Longquan** (Computer Science) has been awarded “The Outstanding Overseas Chinese Scholars Fund of Chinese Academy of Science 2001-2004,” and received a total of RMB500,000 grants from Chinese Academy Science for the research “3D modeling and motion understanding.”

- **Professor Emeritus Ping Cheng** (Mechanical Engineering) received the 2003 Thermophysics Award from American Institute of Aeronautics and Astronautics (AIAA) in recognition of his seminal work in thermophysics.

- **Prof Professor Emeritus Pin Tong** (Mechanical Engineering) was awarded the 2003 T.H.H. Pian Medal for his pioneering contributions to finite element methods in computational mechanics.

- **Prof Ricky Lee** (Mechanical Engineering) was appointed as a Member-at-Large to the IEEE Components, Packaging & Manufacturing Technology Society (CPMT) Board of Governors (BoG) in March 2003. Prof Lee is the only non-Japanese Asian CPMT BoG member.

- **Prof Tongxi Yu, Prof Ricky Lee and Prof Yitshak Zohar** (Mechanical Engineering) were honored with the Fellow Award of the American Society of Mechanical Engineers (ASME) 2003.

- **Prof Tongxi Yu** (Mechanical Engineering) was honored with the Fellow Award of Institution of Mechanical Engineers (IMechE) 2003.

- Prof T ongyi Zhang was one of the five scholars in Hong Kong who received the 2003-2004 Croucher Senior Research Fellowships Award for his contribution in material science. Being an expert in material science and solid mechanics, Prof Zhang has published more than 100 papers in leading academic journals and co-holds two US patents. Established in 1997, the Croucher Senior Research Fellowships scheme recognizes research achievements made by local scientists. Awardees are released from teaching and administrative duties for a year to concentrate on research.
Students from Stanford University bade HKUST students farewell in a restaurant in the US.

Artificial Law and Catherine Leung received the President's Cup from President Prof Paul Chu (right).

Mobile E-credit Card System brings new way to finance management

Computer Science PhD student Xing Jin received the Gold Award of the Mobile Multimedia Communications Design Contest (MMCDC) 2003 organised by The Hong Kong Institution of Engineers (HKIE).

The project "Mobile E-credit Card System (MECS)" is presented by Xing Jin and two other team members from City University of Hong Kong and The University of Hong Kong. MECS is designed to integrate all the necessary functions in personal financing service, such as paying goods without the need of cash or credit cards, as well as bank online, bank on phone and ATM.

Supervised by Prof Gary Chan of the Computer Science Department, the project was only the first step in applying modern technologies to personal financing services, particularly emphasizing the users' feelings in using the services. It is expected that MECS will enable users to make financial investments and shop conveniently via their mobile phones in the near future.

The winning team received a cash prize, a trophy and a certificate of merit, plus a 2-year rent free period at the Incubation Centre of the Hong Kong Science and Technology Parks.

Two third-year Civil Engineering students have taken the top honor in this year's President's Cup for undergraduate research and innovation. Catherine Leung Tik Yan and Arthur Law Wing Chun were the joint overall winners in the annual, University-wide contest with their final-year project, "Steel plate reinforced beams: an innovative solution to shear design of reinforced concrete."

Ms Leung said: "I was interested in this project because it required both experimental investigation and theoretical development. I also knew it involved pioneering work in the field of shear design."

Both students, now working in engineering consultancy firms, said entering the contest had been a rewarding experience. Mr Law had been inspired to be more creative and Ms Leung had been encouraged to further her studies in the future.

The Gold Award went to another Civil Engineering student, Jenny Ng Tsz Man, for her project, "An analogous grillage system: accurate short cut to transfer plate design."

The President's Cup was started by the University in 2002 to encourage undergraduates' interest in innovation and to develop students' expertise in all aspects of research.

Eighteen Industrial Engineering and Engineering Management (IEEM) students flew to the United States in January 2003 to participate in a joint course with Stanford University.

Since 1995, a Global Manufacturing course has been jointly offered by HKUST and Stanford University every Spring semester. It brings students together to expand their international outlook and solve industrial problems. The course focuses on issues that are global in nature and are related to the product development, strategic planning and design of supply chains.

Three to four students from each institution worked together as a team to tackle a defined problem sponsored by an industrial company that has interests in North America and the Asia-Pacific region. Students from Stanford had more intensive interaction with the North American portion of the sponsoring company, while students from HKUST focused more on the corresponding issues in the Asia-Pacific region. Managing cross-border, cross-function and cross-culture aspects were also discussed.

Julian Wong, one of the IEEM students, shared his experience, "This course offered me a challenging and rewarding opportunity to learn about specific industries and work with foreigners. I am sure this valuable experience has enhanced my communication skills and analytical thinking which will benefit my future career."

Another IEEM student, Fiona Yip, said: "Through working on a collaborative project with Stanford students, I have explored cultural differences and strengthened my knowledge."
Dongsheng Ma (PhD ELEC 2003) has taken up the post of Assistant Professor in the Department of Electrical and Computer Engineering at Louisiana State University, becoming the School of Engineering's first PhD graduate to teach in the United States. Dr. Ma said he looked at his new role as an exciting and challenging adventure. "I have great passion and am determined to become a good teacher. I also hope to continue my current research work and keep at the forefront of international discovery," he said.

Dr. Ma has gained more than 10 scholarships and awards for academic and research excellence, including the Schmidt Award of Excellence and the STMicroelectronics Ltd Scholarship. His research interests include analog and mixed-signal integrated circuit designs, integrated power management system designs, control method and modeling of nonlinear circuit systems.

Meanwhile, Helen Cheng (BEng CIVL 1996, MPhil CIVL 1999) and Gary Choy (BEng CIVL 2000) have been elected to research fellowships at the University of Cambridge where both have been studying for PhDs. Ms Cheng, who specializes in granular soil mechanics and has been working with the Geotechnical and Environmental Research Group in the Engineering Department at Cambridge, has been elected to the Maudslay Research Fellowship at Pembroke College. Mr. Choy has gained a Research Fellowship at St. John's College which will support his work in developing and evaluating prototype Wireless Sensor Network systems for assessment and monitoring of old pipeline and tunnel networks. "HKUST's intensive education trained me to be tough and ready to face challenges," he said.

School of Engineering professors also played a central role in developing Ms Cheng's interest in academic research. "I was told 'research' means 'search and search again'. The process takes time but it can be very exciting when ideas are finally proven," she said.

AD epartment of Computer Science postgraduate increased the pace of hi-tech research in Hong Kong earlier this year when she was awarded Best PhD Paper at the 4th ACM Postgraduate Research Day. PhD student Jing Liu said she was delighted with the award for her paper, "Efficient and practical scheduling algorithms for high speed virtual output queuing switches," and to be able to share her research experience with postgraduates and researchers from other universities. "This is not only an honor for me, but a tribute to the department and the University," she said. "I wish to thank my advisor, Prof Mounir Hamdi, for his guidance on the award-winning paper and on how to conduct PhD research."

Postgraduate Research Day is an annual event organized by the Association for Computing Machinery-Hong Kong Chapter (ACM-HK) to promote interaction among postgraduates and higher R&D awareness in Hong Kong. Highlight of Student Achievements: • Henry Cheung (Civil Engineering) won the Best Final-year Project Award from the Geotechnical Division of the Hong Kong Institution of Engineers, under the supervision of Prof Charles Ng. • Gerhard Trippe and Zhou Zhen (PhD, Computer Science) were awarded Mathematical Sciences Research Institute (MSRI) scholarship to attend the MSRI workshop "Mathematical Graphics" in Portland, Oregon, in July 2003 and "Triangulations of Point Sets: Applications, Structures, Algorithms" in Berkeley, California, in July 2003, respectively. • The Final Year Project of Hung Lau Yung, Ip Tak Shun and Siu Po Wa (Computer Science) "Mobile Commerce - Digital Meeting Support System" has won the Best Application of Internet Technology Award in the Intervarsity Internet Technologies Exposition and Conference 2003. This event is organized by the Internet Professionals Association (iProA) and co-organized by six local tertiary institutions.

The award-winning team: (from left) Siu Po Wa, Ip Tak Shun and Hung Lau Yung.
Three new forward-looking part-time Master's degrees in the School of Engineering are providing an exciting way for engineers to keep up-to-date and extend their skills in today's rapidly changing world of work.

The first MSc in IC Design Engineering helps IC design professionals expand their knowledge and boost the talents available to the semiconductor industry in Hong Kong and the region. In a pioneering move, the program is being offered in partnership with the Shenzhen campus of Peking University. “The new program offers a wide array of unique, specialized courses in IC design, analysis, microelectronic fabrication technology, testing and packaging,” said Prof Chi-Ying Tsui, Program Director and Associate Professor of Electrical and Electronic Engineering. HKUST is the only university in Hong Kong with the expertise and infrastructure to provide such training.

Separate programs commenced in Hong Kong and Shenzhen in September, with classes in both locations taught mainly by HKUST faculty.

The MSc in Engineering Enterprise Management is also now underway. Jointly offered by the School of Engineering and the School of Business and Management and first launched in September, the MSc(EEM) program equips working engineers in all fields for a move into management and technical managers in both service and manufacturing industries with advanced training. Courses include management of product development, the global supply chain, IT systems for global enterprises, transportation and logistics and the latest accounting, financial and marketing theories and techniques. Prof Gary Biddle, Associate Dean of the School of Business and Management, said the School was delighted to be able to offer “world-class business education to students recruited by the Engineering School.”

Meanwhile, a MSc in Intelligent Building Technology and Management starts in February giving professionals in the building services industry comprehensive training in intelligent building design, operation and facility management. The program includes both fundamental and practical elements and is taught by HKUST faculty and industry practitioners. All three Master's degrees are self-financed and run over two years. For details of future intakes, please contact Mr Tin-yu Wang, Director, Professional Program and External Development. Tel: (852) 2358-6953.

The Master of Technology Management Alumni Association (MTMAA) got off to a memorable start earlier this year with an inauguration ceremony officiated by HKUST President Prof Paul Ching-Wu Chu and HKUST Alumni Association President Sean Lin at Clear Water Bay Golf and Country Club. Speaking at the event, Prof Chu said: “I am delighted to see the establishment of the MTMAA, which will keep up the momentum of learning among MTM graduates through networking.” Over 70 guests, faculty members, MTM alumni and students attended the ceremony held on 29 March 2003.

The MTMAA vision is to encourage life-long learning, knowledge and experience-sharing, and networking among the growing community of MTM graduates. MTMAA President Antonio Leung said the association also aimed to assist HKUST in developing the MTM program further. The MTM offers two study options: Global Logistics Management; and Information Technology Management. It is one of the first in Hong Kong to use a live-in weekend study formula to facilitate opportunities for networking among participants. Its first graduates gained their degrees in November 2002.
The first time in September. Engineering and School of Business and Management, got underway for administration/management.

Of the School's 394 full-time and self-employed graduates in 2002, 46% gained jobs in engineering, 25% in system analysis and 20% pursuing further studies. Employment, 4.5% working in temporary or part-time jobs, and nearly the 577 respondents, more than 68% were engaged in full-time or self-employment. 4.5% working in temporary or part-time jobs, and nearly the 577 respondents, more than 68% were engaged in full-time or self-employment.

The commerce and business sector has proved the most attractive of Hong Kong. More than 80% of the School's first-degree graduates in 2002 took part SENG respondents to a HKUST graduate employment survey taking up a HKUST graduate employment survey taking up.

An innovative Dual Degree Program in Technology and Management Bridges Engineering and Management. Elite Double Degree Business Administration in General Business Management. Bachelor of Engineering in their respective disciplines, and Bachelor of completion of their studies, students are awarded two degrees: a and opportunities of an increasingly globalized marketplace. On the 577 respondents, more than 68% were engaged in full-time or self-employment.

The four-year dual bachelor's degree program equips students with both technical knowledge and managerial skills to meet the challenges of Hong Kong.

2002 Graduates

Employment Sectors of 2002 Engineering Graduates

- 55.6% in engineering
- 23.1% in system analysis
- 20% pursuing further studies
- 4.5% working in temporary or part-time jobs
- Nearly 68% engaged in full-time or self-employment

Get Down to Work

Don't be the Missing Link ... 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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