



THE HONG KONG  
POLYTECHNIC UNIVERSITY  
香港理工大學

# ***THE HONG KONG POLYTECHNIC UNIVERSITY***

## SPEAKERS



### Professor Angelina Yuen

Vice President (Institutional Advancement and Partnership)

The Hong Kong Polytechnic University

#### Biography

Prof. Angelina Yuen is currently Vice President (Institutional Advancement and Partnership) of The Hong Kong Polytechnic University where she has served since 1986.

Angelina holds a Bachelor's degree in social work, a MSW, a MEd. and a PhD degree from Hong Kong, Canada and U.K. Her research interests and areas of specialism are mainly on social support networks and community care, social work education, social work practice in China, corporate social responsibility and occupational social work.

Angelina was President of the Hong Kong Social Workers Association and is serving/served as Board Member of numerous Government commissions and NGOs, including the Social Workers' Registration Board, Hong Kong Council of Social Service, Advisory Committee on Social Work Training and Manpower Planning, Hong Kong Press Council, Commission on Strategic Development, and has been appointed Justice of Peace since 2002 and further awarded a Bronze Bauhinia Star by the Hong Kong SAR Government in 2008.

Angelina has helped to spearhead social work education in China since 1988 and has played a key role in the development of social work education in the Chinese mainland. She is also actively engaged in various international organizations.

Angelina has been elected as President of the International Association of Schools of Social Work (IASSW) since July 2008.

#### Abstract

#### Establishment of the PolyU Shenzhen Base as a Strategy to foster Industry-University Partnership in the Pearl River Delta

The Hong Kong Polytechnic University Shenzhen Base (the PolyU SZ Base) is a strategic move of PolyU to engage in education, research, knowledge transfer and commercialization of its outcomes targeting at the needs of Hong Kong, Shenzhen and the Pearl River Delta (PRD). The Base builds on PolyU's strengths in applied research, its pioneering experience in offering postgraduate award programmes in the Chinese Mainland, and its long-term connections with industries in the region. The SZ Base supports the strategic goal of PolyU to excel as a world-class applied university.

The mission of the PolyU SZ Base is to become the headquarter of PolyU in PRD and to provide one stop service for the region. The PolyU SZ Base is an interdisciplinary and multi-purpose platform where the research expertise, innovative power, knowledge transfer experience, education and executive development strengths of PolyU congregate to meet the challenges of the real world at one of the world's fastest growing economic regions.

The PolyU SZ Base will also serve as a one stop service centre for PolyU colleagues in PRD to develop research, consultancy, training and other professional endeavours. Through its support services, the PolyU SZ Base will facilitate academic colleagues to develop cutting-edge research projects in Mainland, to establish strategic partnership with renowned scholars and universities, to provide needed consultancy to businesses, industries and government bodies, and to secure national/regional research funds through the legal entity of the PolyU SZ Base.

In this speech, the speaker will present the mission and vision of the Shenzhen Base, its strategies and activities and the work in which PolyU Shenzhen Base foster industry-university partnership in the Pearl River Delta.



## Ir. Professor Alex Wai

Vice President (Research Development)  
The Hong Kong Polytechnic University



### Biography

Ir Professor Ping-kong Alexander Wai is Vice President (Research Development) of The Hong Kong Polytechnic University (PolyU). He received the BSc(Hons) degree from the University of Hong Kong, and the MS and PhD degrees from the University of Maryland, College Park, USA. After graduation, he joined Science Applications International Corporation in McLean, VA, where he worked on the Tethered Satellite System project – a joint United States-Italy Space Shuttle mission. Later, he worked in the Electrical Engineering Department of the University of Maryland, Baltimore County, USA. He joined PolyU in 1996. Between 2002-10, Professor Wai served as and Head of Department of the Electronic and Information Engineering, Dean of Faculty of Engineering, and Associate Vice President. Currently, he is Chair Professor of Optical Communications.

His research interests include optical fiber communications and optical networks. Prof. Wai is an active contributor to the technical field, having over 150 refereed international journal publications. He has contributed to the organization, served as an invited speaker and keynote speakers of many international conferences. Professor Wai is Associate Editor of Optics Express. He is a fellow of Optical Society of America and Hong Kong Institution of Engineers and a Senior member of IEEE.

### Abstract

#### Capturing Research Value with Application

The vision of PolyU is to be a leading University that excels in professional education, applied research and partnership for the betterment of Hong Kong, the nation and the world. The University devotes a great deal of effort to research. PolyU is a place where innovation meets application. Our research is meant to serve the practical needs of society.

PolyU's ability to transfer cutting edge knowledge to industry and business has led to numerous life-changing inventions and innovations which have reaped international awards. Many of them have been put to good use benefitting the community. A vast range of researches and technologies have found their place in the real world, including aerospace, infrastructure, engineering, textile, biotech and healthcare.

Over the years, PolyU has lined up many successful partnerships with business and industry in Hong Kong and the Chinese Mainland through the University's high impact research projects, creating great societal impetus and strategic significance for the nation. In this speech, Prof. Wai will present a number of cases, demonstrating how PolyU has successfully captured research value with application. These include: National and International Space Programs, China High Speed Railway Monitoring System, novel multi-potent anti-cancer drug, etc. These home-grown innovations are of high relevance to the community, at the same time, it illustrates well how Hong Kong can contribute to advancement of frontier technologies through academic knowledge transfer.





## Mrs. Dorinda Fung

Director of Student Affairs

The Hong Kong Polytechnic University

### Biography

Dorinda Fung is the Director of Student Affairs at Hong Kong Polytechnic University. Mrs. Fung has a passion of providing opportunities to help students' holistic development.

Aligning with HKPU's mission of being an application-oriented university, Mrs Fung has been exploring for different internship platforms and models to connect students with the real world where they can experiment on applying what they have learned inside the classroom. Meanwhile it is HKPU's institutional policy to make work-integrated education mandatory. All undergraduates will have to undergo some internship experience before graduation. Mrs. Fung and her team have been instrumental to the successful realization of this institutional commitment.

Mrs. Fung is also keen to add cultural exposure to work experience and thus she works diligently to expand students' internship horizons beyond Hong Kong. Since the mid nineties, HKPU has been enabling over 7,000 HKPU students to have internship experience offshore, to over 30 different countries and over 25 cities in the Chinese mainland. From 2004 to 2006, with a generous donation of \$16M from The Hong Kong Jockey Club Charities Trust, Mrs. Fung was the Chairman of a joint-institution initiative that facilitated 1,000 students from the 8 local tertiary institutions to participate in offshore placements.

Dorinda has a background as an educator, and in various fields of psychology. She has been the Director of Student Affairs at HKPU since 2002. She provides leadership to 120 full-time staff and her responsibilities include overseeing psychological and careers counselling, personal and professional skills development, financial support, physical education, hall residences, scholarships and amenities.

### Abstract

#### Connecting students to the Real World : the PolyU Experience

With the mission of providing high quality application-oriented education, The Hong Kong Polytechnic University offers a wide range of courses which directly meets industrial, commercial and community needs. It is a prime aim of the University to equip students not only with professional competency but also the ability of independent thinking, good communication skills and a global outlook. In view of this, the university-wide "Work-Integrated Education" (WIE) was launched as a mandatory graduation requirement for all full-time undergraduate students starting from the intake of 2005-06. It aims to help students to become 'all-round students with professional competence' and to produce 'preferred graduates'.

Work-Integrated Education in PolyU refers to "structured and measurable work-based learning experiences which take place in an organizational context relevant to a student's future profession, or the development of generic skills that will be valuable in that profession. It offers students the opportunity to learn to connect classroom theory with practical workplace applications through on-the-job work placements. Through the implementation of WIE, it is wished to reaffirm the positioning of PolyU as a University offering academic programmes in a professional context and to strengthen the competitive edge of the University's professional-based programmes with a view to attracting more quality students and to enhancing the employability of students.

We have implemented the WIE for 5 years already and the learning curve has been steep for both the faculty and students.



## Professor Kaye Chon

Dean of School and Chair Professor  
School of Hotel & Tourism Management  
The Hong Kong Polytechnic University



### Biography

A former hotel manager and tourism industry consultant, Professor Kaye Chon (Ph.D., CHE, FIH) is Dean and Chair Professor of the School of Hotel and Tourism Management at The Hong Kong Polytechnic University. Prior to being appointed as Dean, Dean Chon has assumed the roles of Director and Chair Professor of the School of Hotel and Tourism Management since year 2000.

Under Dean Chon's leadership, the School has arisen as one of the world's leading institutions in hospitality and tourism management. In 2009, the School was ranked no. 2 in the global ranking of hospitality and tourism schools based on research and scholarship, according to a study published in the *Journal of Hospitality and Tourism Research*.

Dean Chon was previously Professor and Director of Research and Director of Tourism Industry Institute at the University of Houston's Conrad N. Hilton College in the United States.

He is the past Chairman of the **International Society of Travel and Tourism Educators** and currently Chairman of **Pacific Asia Travel Association Education and Training Committee**. Dean Chon is honoured by the United Nations World Tourism Organisation (UNWTO) with the prestigious **UNWTO Ulysses Prize 2011**.

He has been listed in *Who's Who In The World*.

### Abstract

#### Industry and University Partnership

Experiential learning is an important pedagogy in a field like hotel and tourism management studies which are closely related to industry practices. The School of Hotel & Tourism Management (SHTM) at the Hong Kong Polytechnic University was able to implement successful industry partnership programs in several unique ways.

First, the School has successfully launched the "Professor For A Day" program with a great amount of success. Prominent managers from the industry are invited to spend a day in the School. They have lunch with a group of invited staff and students, talk with students individually, and give a lecture to students and staff, so they can share with students the current issues and trends in the industry and also have a chance to motivate and inspire the students. Upon completion of the visit, they are presented with a certificate of participation as Professor For a Day, which many of them hang in their offices.

Second, the School has implemented an industry mentorship program. This scheme allows students the chance to receive expert guidance and advice from external mentors. The mentors include senior alumni and industry executives. The mentors meet with their mentees on a one-to-one basis to have lunch and a chat, and to give them some career advice.

Third, several industry relevant subjects are taught entirely in an experiential learning environment. For example, a Restaurant Management subject would involve the students to learn the entire process to plan and price the menu, prepare the food, serve the food and fully responsible for profit and loss of the restaurant for the day. A meetings and conventions management class would involve students to organize professional conferences which are often organized by the School, wherein a class of approximately 30 students would be fully responsible for planning, organizing and executing a professional conference.

As the latest development of the School, a teaching and research hotel "Hotel ICON" has been developed and started operation in the second quarter of 2011.





## Dr. Alwin Wong

Associate Director  
Institute for Enterprise

The Hong Kong Polytechnic University

### Biography

Dr Alwin Wong is the Associate Director of the Institute for Enterprise at the Hong Kong Polytechnic University, actively driving university-wide knowledge transfer initiatives, addressing needs and interest in commercialization and entrepreneurship. His team's recent efforts are associated with the nurturing of innovative and entrepreneurial culture through the PolyU Micro Fund for both students and alumni. He also leads a team to support the development of the commercial, industrial and public sectors, by offering professional services in management consultancy, customized training for corporations, and executive development for focused sectors.

Concurrently serving as the General Manager of PolyU Technology & Consultancy Co. Ltd., Dr Wong oversees consultancy, professional services and licensing for the University rendered to the public.

Dr Wong also serves as Secretary-General of the International Strategic Technology Alliance (ISTA) comprising 24 top science and technology universities in China, UK and the USA. He is responsible for facilitating interest, exchange and development of activities/programs for R&D commercialization, knowledge transfer and international collaborations for members in the Alliance.

He has over 20 years of business development, project management and technology transfer experience for various industrial sectors, with engagements in turnkey engineering projects dating back to the early 1980's in China.

### Abstract

#### Cultivating Entrepreneurial Learning: An Out-of-Classroom Approach

To stay competitive in this globalized, dynamically changing world, our society needs to have creative and socially responsible younger generation of leaders and entrepreneurs.

Universities offer an excellent environment to cultivate youngsters' creative and entrepreneurial thinking, skills, and knowledge. Similar strategic focus on entrepreneurship education has also been advocated in China although they are mostly permeated through conventional business plan competitions and entrepreneurship talks. Such education endeavours can leverage on the popularization of social networking across internet and mobile communication domains, as people are very much connected to the world with rich information on new concepts, ideas and opinions on current and social issues.

In this regard, entrepreneurial learning may be facilitated outside conventional teaching environments, putting creativity to innovation and even entrepreneurial engagements with experiential learning.

In 2011, The Hong Kong Polytechnic University launched the PolyU Micro Fund, as a pilot scheme associated with the University's knowledge transfer enhancement initiatives, aiming to cultivate innovation and "Do Well Do Good" entrepreneurial ambiance to stimulate creativity and social entrepreneurship among students and young graduates. The Scheme itself offered out-of-classroom learning platform on major aspects of entrepreneurial thinking for student and young graduates. Participants are enriched with experience gained through actual implementation of their awarded business propositions / innovative projects, supported by seed funding from the Scheme.

In addition to gaining financial, networking and mentoring support for execution of their businesses and projects, awardees also participated in a study mission to visit selected university incubators, start-up ventures and young entrepreneurs in Chinese mainland, with structured training workshops to help equip their skills to kick start their business endeavour.

In the long run, we aim to nurture a group of creative and socially responsible entrepreneurs and leaders as core members of the society to support Hong Kong's knowledge-based economy.



\* This speaker was invited by The Hong Kong Polytechnic University

## Ir. Allen Yeung

**Vice President  
Business Development & Technology Support  
Hong Kong Science and Technology Parks Corporation**

(Speaker invited by The Hong Kong Polytechnic University)



### Biography

Ir. Allen TB Yeung holds the positions of Vice President, Business Development and Technology Support at Hong Kong Science and Technology Parks Corporation (HKSTPC). Ir. Yeung is responsible for incubating technology and innovative design startup companies, creating synergies among industry and academic sectors, and providing advanced laboratory support facilities for innovation and technology development. In this capacity, he works with government organizations, non-profit organizations, industry, associations and investment community groups to promote technology development in Hong Kong.

Ir. Yeung has over 20 years experience with extensive business and management background across private equity investment, information technology, and electronics industries.

Ir. Yeung serves as Founding Chairman of Hong Kong Business Angel Network (HKBAN); Chairman at the Hong Kong Technology & Renewable Energy Events (HKTREE) organizing committee; and Preliminary Judge Panel of Hong Kong Award for Industries - Technological Achievement.

He is the Board Member of Monte Jade Science & Technology Association of Hong Kong; the Fellow Member of The Hong Kong Institute of Engineers (FHKIE); and the Executive Committee Member of Green ICT Consortium (GICTC).

Ir. Yeung is an advisor to the Department of Electronic Engineering, the Chinese University of Hong Kong; the member of Dept Advisory Committee DAC of HK Polytechnic University's Electronic & Information Engineering Dept.; and the Advisory Committee (AC) of the Hong Kong Information Technology Industry Council (HKITIC) under Federation of Hong Kong (FHKI).

### Abstract

#### Experience Sharing on Technology Entrepreneurship

Hong Kong Science & Technology Parks Corp runs technology incubation programme since 1992. During the course of the programme, we conduct periodic milestone reviews with each incubatees, in which we monitor their development and provide guidance to incubatees. In this talk, I will share my observations on some key areas where some incubatees are doing better than others, hence improving their chance of successes. I will also highlight some key services and financial support provided to incubatees. Key statistics of the programme will be shared.



## POSTER PRESENTERS



### Professor K.L. Yung

Professor and Associate Head  
Department of Industrial and Systems Engineering  
The Hong Kong Polytechnic University

### Biography

Professor Kai Leung, Yung obtained his BSc in Electronic Engineering (1975), MSc, DIC in Automatic Control Systems (1976), PhD in Microprocessor Applications in Process Control (1985) in the UK and became a Chartered Engineer (C.Eng.,MIEE) in 1981. Since graduation, he has been working in the UK for companies such as BOC Advanced Welding Co. Ltd. British Ever Ready Group, and the Cranfield Unit for Precision Engineering. In 1986, Professor Yung returned to Hong Kong to join the Hong Kong Productivity Council as Consultant and subsequently switched to academia to join the Hong Kong Polytechnic University where he is now as an Associate Head of the Department of Industrial and Systems Engineering and Director of the Microsystems Technology Centre. His research interests include precision motion control and system aspects of Computer Integrated Manufacturing and Management, and logistic planning and optimization.

### Poster - PolyU-1



#### Project Objectives

These days, we assume that most of the item we buy will be compact and multi-functional. As a result, factory owners are continuously called upon to make tiny parts. The PolyU-designed Micro Injection Molding Machine combines micromachining and advanced micro-electroforming processing which can produce extremely high precision molds at inexpensive prices.

#### Brief Description of the Project

A first bottom-up high precision plastic micro-injection molding machine which helps the miniaturization of products and producing high precision micro plastic parts such as micro biomechanisms, micro-pumps, micro nozzle, medical parts, micro lenses and optical connectors. Other machines only attempt to reduce the size of conventional designs while our machine adopts a revolutionary upward injection design eliminating the air entrapment problem and the need for shutoff valves that restricts melt flow. There are four servos each at the four corners of the mold clamping to automatically adjust clamping pressure for minimum mold distortion. Two linear motors are used to propel the plastic into the mold giving unmatched acceleration and precision well below milligram level. The precision is further enhanced by real-time pressure signature analysis to account for any variations. The mechanical design is simple with mechatronic control for future performance optimization through software upgrades.



SP-5 Micro Injection Molding Machine



Micro Filter



#### Impact and Contributions

This invention is designed to produce precision micro components, such as micro switch and sensor for automotive industry, inkjet printer nozzle for computer industry, hearing aids or implants for bio-medical industry, micro lens for optics industry, gear wheel, latches and micro transmission for watch industry.

#### Project Team

Department of Industrial and Systems Engineering  
Prof. K.L. Yung, Professor and Associate Head





**Professor  
Thomas Yun-chung Leung**  
Professor  
Department of Applied Biology &  
Chemical Technology and  
Director of Lo Ka Chung Centre for  
Natural Anti-Cancer Drug Development  
The Hong Kong Polytechnic University

Prof. Thomas Leung was trained as a molecular biologist at Imperial College (University of London). He earned his PhD from Sir William Dunn School of Pathology (University of Oxford). After completing postdoctoral training at Centre for molecular sciences (University of Oxford) and the Chinese University of Hong Kong, he joined the Hong Kong Polytechnic University in 1996.

For applied research and development, Prof. Leung has filed 4 US Patent applications and a number of patent applications in HKSAR, China, UK, and Taiwan. He received an international Gold Medal Award for the invention of a biosensor that can detect antibiotics in food. For technology licensing, Prof Leung has built a strong network with biotech companies, universities and hospitals to collaborate and deliver cutting-edge technology for the community. He has developed a new anti-cancer drug with Dr. Thomas Lo, and the drug has been successfully licensed to a biotech company. More importantly, the drug has been undergoing its clinical trial in Hong Kong. This invention has been hailed as a breakthrough for “made by Hong Kong” anti-cancer drug.



**Dr. Thomas Wai-hung Lo**  
Associate Professor  
Department of Applied Biology  
& Chemical Technology  
The Hong Kong Polytechnic University

Dr. Lo is Associate Professor in the Department of Applied Biology and Chemical Technology and the Deputy Director of Lo Ka Chung Centre for Natural Anti-Cancer Drug Development at the Hong Kong Polytechnic University. He received his B.Sc. and M.Sc. in Chemical Engineering from Massachusetts Institute of Technology in 1985 and his Ph.D. from Purdue University in 1991. After postdoctoral research work at Cornell University, he joined the Hong Kong Polytechnic University in 1994. His research interests include development of novel anti-cancer protein drugs, bioprocesses for efficient production of enzymes, protein drugs and biomaterials, environmental bio/technology for the removal of pollutants, and biosensors for monitoring and control of environmental and biochemical processes. He has co-authored 60 research publications in SCI journals, 29 papers in referred proceedings, 4 book chapters, 1 US patent and 5 pending patents. He has also co-authored the Environmental Science and Technology's Second Runner-up Environmental Technology Paper of 2007, Best Paper Award of 2007. He received the President's Award for Excellent/Achievement in Research Scholarly Activities, 2 Technology Transfer Awards and the 2009 High Impact Achievement Award for Research Achievement from the Hong Kong Polytechnic University.

## Poster - PolyU-2

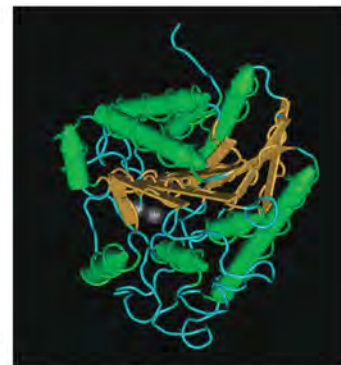
### Rational Design of Engineered Arginine Depleting Enzymes as Multi-potent Anti-cancer Agents

#### Project Objectives

Liver cancer is one of the world's deadliest diseases, which kills 700,000 people globally each year. Conventional therapy such as chemotherapy is poisonous with lots of side effects, creating a lot of pain to the patients, yet still not able to remove cancer cells completely. Thus, there has been a call for the development of drugs that can effectively treat cancers with minimal side effects, and are affordable to patients.

#### Brief Description of the Project

Arginine deprivation has become a new cancer treatment paradigm and has exploited for treatment of various cancers. Arginine is an essential amino acid for the growth of cancer cells. Deprivation of arginine induces cancer cells death but it is generally well tolerated in normal cells. The successful use of Arginine Deiminase (ADI) to treat argininosuccinate synthetase (ASS) – deficient tumors has opened up new possibilities for targeted therapy. Nevertheless, many ASS-positive cancers are resistant to ADI. By rational drug design, we have developed a thermostable arginase (BCA-PEG20) to treat both ADI-sensitive and ADI-resistant cancers. This engineered multi-potent drug can inhibit proliferation of multiple cancer types including drug-resistant liver cancer and breast cancer.



Three dimensional molecular structure of thermostable *Bacillus arginase* (BCA)



Thermostable *Bacillus arginase* (BCA) can be isolated from a hot spring bacterium

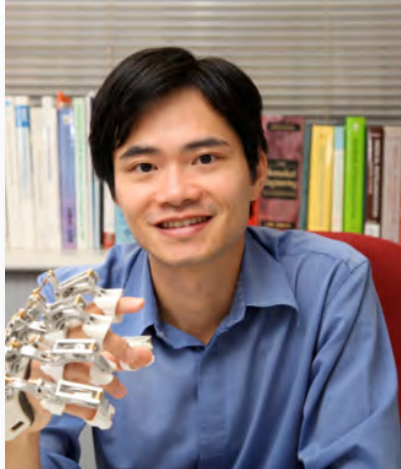
#### Impact and Contributions

BCA-PEG20 is a safe and effective drug as it converts arginine to ornithine and urea. BCA-PEG20 demonstrates in vivo antitumor activities in lung cancer, breast cancer, gastric cancer, cervical cancer and oesophageal cancer. Besides, it is actively against other arginine auxotrophic cancers, including leukaemia, melanoma, pancreatic cancer, prostate cancer and eye cancer.

#### Project Team

Department of Applied Biology and Chemical Technology  
Prof. Thomas Yun-Chung Leung, Professor and Director of Lo Ka Chung Centre for Natural Anti-Cancer Drug Development  
Dr. Thomas Wai-Hung Lo, Associate Professor





## Dr. Raymond Kai-yu Tong

Associate Professor  
Department of Health Technology and Informatics  
The Hong Kong Polytechnic University

### Biography

Raymond Kai-yu TONG received his PhD in Bioengineering from the University of Strathclyde, Glasgow, UK. He is Associate Professor in the Department of Health Technology and Informatics, the Hong Kong Polytechnic University(PolyU). He is Programme Leader in the BSc. in Biomedical Engineering in PolyU. His research interests include rehabilitation robotics (e.g. PolyJbot, Exoskeleton Rehabilitation Hand Robot), functional electrical stimulation(FES) and stroke rat model. Projects have been funded by Innovation and Technology Fund, UGC CERG/GRF and PolyU Niche Areas Fund as principal investigator. His inventions have received HKIE innovation awards for young members(2008), three gold awards in international invention exhibitions(2010[Germany], 2007[Belgium],2004[China]) and Hong Kong Award for Industry(2003). Patent has been filed in US and licenses to US and Hong Kong companies.

Webpage: <http://www.acad.polyu.edu.hk/~htong>

## Poster - PolyU-3



### Project Objectives

A novel design of a hand function task training robotic system was developed for the active stroke rehabilitation. It detects the intention of hand opening or hand closing from the stroke person using his muscle signals (surface electromyography (EMG)) measured from the hemiplegic side.

### Brief Description of the Project

This training system consists of an embedded controller and a robotic hand module. Each finger assembly can also be adjusted to fit for different finger length. With this task training hand robotic system, stroke subject can open and close their impaired hand using their own intention to practice daily living tasks. There are three special features:

1. Provide continuous active control using EMG;
2. Allow the person to handle and feel the real objects with their own hand while using the robotic system;
3. Light and portable, it allows user to carry the hand robot around to achieve functional daily living tasks.



A training session with a person after stroke



Hand Robot is applied on a human hand

### Impact and Contributions

The hand robotic device has become a rehabilitation service for stroke patients in the Jockey Club Rehabilitation Engineering Clinic. With the use of this light and portable robotic device, stroke patients can practise more easily for the opening and closing of hands at their own will, and handle functional daily living tasks at ease.

### Project Team

Department of Health Technology and Informatics  
Dr. Raymond Kai-yu Tong, Associate Professor





## Professor Eric Ka-wai Cheng

Professor  
Department of Electrical Engineering  
The Hong Kong Polytechnic University

### Biography

Prof Eric Cheng obtained his BSc and PhD degrees both from the University of Bath in 1987 and 1990 respectively. Before he joined the Hong Kong Polytechnic University in 1997, he was with Lucas Aerospace, United Kingdom as a Principal Engineer and led a number of power electronics projects. He received the IEE Sebastian Z De Ferranti Premium Award (1995), outstanding consultancy award (2000), Faculty Merit award for best teaching (2003) from the University, Faculty Engineering Industrial and Engineering Services Grant Achievement Award (2006) and Brussels Innova Energy Gold medal with Mention (2007), Consumer Product Design Award (2008), Electric vehicle team merit award of the Faculty (2009), and Special Prize and Silver Medal of Geneva's Invention Expo (2011). He has published over 250 papers and 7 books.. He has over 100 interviews by media on his research and development. He is now the professor and director of Power Electronics Research Centre of the university. His research interests are all aspects of power electronics, air-conditioning, renewable energy, motor drives, EMI, electric vehicle and energy saving.

## Poster - PolyU-4



### Project Objectives

The Solar Powered Air Conditioning System was developed as a solution to provide alternative energy source for vehicles' air-conditioning with the engine off during idling. It helps reduce CO2 emission and the demand on fossil fuel. It is readily applied to any vehicles to provide electricity and air-conditioning.

### Brief Description of the Project

The vehicle installed with Solar-Powered Air-conditioning System differentiates itself from others with a solar energy panel made up of photovoltaic modules on the top of it. As the vehicle moves along roadside, it will automatically collect solar energy for storage in a specially made battery system supported by an optimized control system.

The power collected will support a stand-alone electric air-conditioner which can be switched on when the car engine is not running. The sophisticated system can also operate during cloudy or rainy days because solar energy is automatically stored in the battery during sunny weather.



During the 4th Macau International Environmental Co-operation Forum & Exhibition held from 31 March to 2 April 2011, Prof Cheng of PolyU accompanied Mr. Edward Yau, Secretary for the Environment of the HKSAR Government, experienced SAV and claimed it a practical assistance to the industry



Solar Private car



The System Components

### Impact and Contributions

- Complete electric air-conditioning on vehicle, which gives the same performance as conventional counterpart
- Regulate battery condition even after long period of parking
- Reduce CO2 per year per vehicle by 4 tons for 6 hours of operation
- Return of investment is within 2 years for 8 hours commercial operation per day
- Variable speed drive for air-conditioning
- Maximum Power Point Tracking (MPPT) Solar battery charger
- Suitable for private cars, vans and buses
- To enable conventional combustion engine vehicles with air-conditioning whilst engine is switched off



The Solar Panel



### Project Team

Department of Electrical Engineering  
Prof. Eric Ka-Wai Cheng, Professor





## Professor Yi-Qing Ni

Professor  
Department of Civil and Structural Engineering  
The Hong Kong Polytechnic University

### Biography

Dr. Y. Q. Ni is currently a Professor in the Department of Civil and Structural Engineering at The Hong Kong Polytechnic University. He has expertise in structural health monitoring, structural dynamics and control, smart materials and structures, and nonlinear oscillation. He currently serves as a co-chair of the Committee on Sensors and Actuators, Asia-Pacific Network of Centers for Research in Smart Structures Technology. He is a member of the International Structural Health Monitoring (SHM) Guidelines Standing Committee, the International Society for Structural Health Monitoring of Intelligent Infrastructure, and a member of editorial board for the international journals Mechanical Systems and Signal Processing, Structural Control and Health Monitoring, and Advanced Steel Construction. Prof. Ni has been heavily involved in the research assisting the Hong Kong Government Highways Department to implement and operate SHM systems on the large-scale bridges in Hong Kong. He has also acted as a lead consultant in developing SHM systems for a number of landmark structures including the design of SHM systems for the cable-stayed Sutong Bridge with a main span of 1,088 m and the Canton Tower with a height of 600 m. Prof. Ni has co-authored five books, 89 international journal papers, and 194 conference papers. His "Mega-Structure Diagnostic and Prognostic System" received a Gold Medal and a Grand Prize at the 37th International Exhibition of Inventions, Geneva (2009), and a Golden Prize at the 11th China International Industry Fair, Shanghai (2009). He is currently appointed as an Adjunct Professor by University of Notre Dame (USA), Zhejiang University (China) and Dalian Jiaotong University (China).

### Poster - PolyU-5



#### Project Objectives

Mega-structures such as long-span bridges and high-rise structures are vital civil infrastructure. Maintaining their safe and reliable operation is critical to secure the well being of people, to protect the vast investments, and to support the vitality of economy. However, mega-structures cannot last forever; they even begin to deteriorate once they are built. Therefore, it is of paramount importance to diagnose and prognose the safety of emga-structures throughout their whole life-cycle.

#### Brief Description of the Project

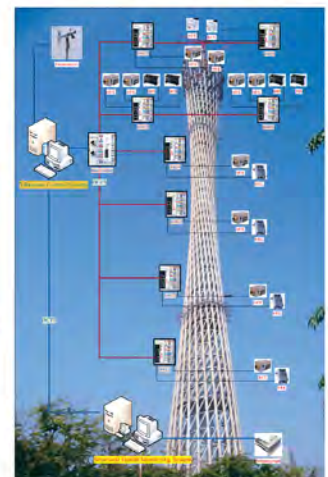
PolyU has devised a comprehensive diagnostic and prognostic system to provide a life-cycle screening for mega-structure's safety. Not only can it identify the structural damage at the earliest possible stage to avoid any catastrophic structural failure, but also can assess structural health immediately after any major hazardous event; Not only does it inform us what/where the severest damage is and when/how rehabilitation should be processed, but also tells us whether immediate evacuation of the occupants/contents is necessary.



A Destroyed Bridge after a Ship Collision Accident



Sensors and Data Acquisition Units Deployed on STB



Sensors and Data Acquisition Units Deployed on Canton Tower

#### Impact and Contributions

The system is applied in long-span bridges, skyscrapers/high-rise structures, tunnels, dams, railways, and mines. In particular, we have developed the system for the world's highest TV tower – Canton Tower, the world's longest main span cable-stayed bridge – Sutong Bridge (STB), as well as Shenzhen Stock Exchange's new headquarter.

#### Project Team

Department of Civil and Structural Engineering  
Prof. Yi-Qing Ni, Professor