# Seminar: University Technology Showcase

**20 Nov, 2009 (Friday)**
**2:00pm - 4:00pm**
**HK Science Park, Shatin**

## Introduction:

Hong Kong Science and Technology Parks Corporation (HKSTP) aims to leverage university resources bringing HKSTP partner companies to university's expertise in science researches, product design and development. These years, the Hong Kong universities have been engaged in research over a broad front, and many of its research results can be of immediate benefit to society through technology transfer. The transfer of knowledge resulting from the university research definitely contributes to the transformation of Hong Kong to an innovation-led economy.

On 20 November, HKSTP will host a technology seminar with experts from top Hong Kong universities including CUHK, HKUST and CityU sharing their updated Electronic projects. The seminar is to bridge academia with industry and facilitate knowledge transfer in order to encourage both to maintain a steady exchange of knowledge.

## Program Rundown:

**2:00pm**     **Identity-Based Encryption and its Applications**
- Dr Duncan WONG, Assistant Professor, Department of Computer Science
  City University of Hong Kong (CityU)

**2:30pm**     **A Forensic Chip for Secure Digital Video Recording**
- Dr L M CHENG, Associate Professor, Department of Electronic Engineering
  City University of Hong Kong (CityU)

**3:00pm**     **Can we get more than 1-pixel resolution out of 1 pixel?**
- Dr Oscar AU, Associate Professor, Department of Electronic & Computer Engineering
  Hong Kong University of Science and Technology (HKUST)

**3:30pm**     **Wide Dynamic Range Phase-sensitive Surface Plasmon Resonance Sensor**
**with the Application of Long Range Surface Plasmon Resonance**
- Professor Aaron Ho, Professor and Associate Dean, Department of Electronic Engineering
  The Chinese University of Hong Kong (CUHK)

**Registration Deadline:**
**17 November, 09**

## Duncan WONG

BEng (HK), MPhil (CUHK), PhD (Northeastern)
Assistant Professor, Department of Computer Science, City University of Hong Kong

Duncan Wong received his BEng degree in Electrical & Electronic Engineering with first class honors from the University of Hong Kong in 1994, MPhil degree in Information Engineering from The Chinese University of Hong Kong (CUHK) in 1998 and PhD degree in Computer Science from Northeastern University, Boston, MA, USA in 2002. After graduation, he was visiting assistant professor at the CUHK for one year before joining City University of Hong Kong in 2003. He was awarded the membership of Phi Beta Delta Honor Society for International Scholars and won the Outstanding Research Award in the College of Computer Science during his doctoral study. His publications have continuously appeared in reputable conferences and journals in the fields of cryptography and information security. With extensive experience in designing cryptographic algorithms and protocols, and developing computer security systems, he also provides security consultancy services to the industry and governmental institutions.

**Research Interests:** Applied cryptography, cryptographic algorithms and protocols, information security, network security, wireless security, and e-commerce technology

\* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \*

## Topic: Identity-Based Encryption and its Applications

Conventional PKI (Public Key Infrastructure) is certificate based, meaning that a key for encryption or signature verification has to be certified by a certification authority to ascertain its authenticity with respect to key ownership. Almost all public key cryptographic techniques used to protect our enterprise data in both storage and communication are based on the conventional PKI technology. An alternative PKI, "Identity-Based Cryptography", is developed and has recently received great attention. Using this new model, the identity of a user can be directly used as the key for encryption or signature verification. In this talk, we will introduce Identity-Based Cryptography and its applications on secure messaging, short signature and many others.

\* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \*

## Lee Ming CHENG

BSc, PhD (London), CEng CITP, FIET, SMIEEE, MHKIE, MBCS
Associate Professor, Department of Electronic Engineering, City University of Hong Kong

Dr Cheng obtained his PhD degree from King's College, London, UK, in 1982. He is currently Associate Professor of Electronic Engineering at City University of Hong Kong and team leader of Computer Engineering Group. He has published over 130 technical papers in journals and conference proceedings, over 20 classified publications, and four Book Chapters and one Book in Cryptography, with 11 patents granted and four patent applications pending. He received the CityU Teaching Excellent Award, the Innovator Award by EDN, the Certificate of Merit from the CityU Applied Research Excellent Award, the Certificate of Merit from the Chinese International Invention Expo '98, and the Best Paper Award in CFTC '09. Dr Cheng is also Director of MaCaPS International Limited, an associate company of CityU Enterprises Limited.

**Research Interests:**
Security encoding, card technology, digital right management and digital watermarking, RFID, security technology, encryption, optical computing and signal processing, system engineering, artificial neural network and image processing.

\* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \*

## Topic: A Forensic Chip for Secure Digital Video Recording

The talk focuses on the rapid advancement of digital multi-media hardware devices, such as documents, photos and videos, storage, retrieval and reproduction devices. The ease of modifying digital content by using editing tools makes the identification of original material difficult, and forgeries present challenges to identification, authentication and law enforcement. The demand for security protection chips grows as digital media, in particular digital video, gains popularity, and the detection of forgeries by forensic approaches becomes vital. In this talk, a real time forensic chip will be described. The chip can be used to encode and decode forensic marks in a stego-video.

# Oscar AU

PhD, Princeton
Associate Professor, Department of Electronic & Computer Engineering, HKUST

Oscar C. Au received his B.A.Sc. from Univ. of Toronto in 1986, his M.A. and Ph.D. from Princeton Univ. in 1988 and 1991 respectively. After being a postdoctoral researcher in Princeton Univ. for one year, he joined the Hong Kong University of Science and Technology (HKUST) as an Assistant Professor in 1992. He is/has been an Associate Professor of the Dept. of Electronic and Computer Engineering, Director of Multimedia Technology Research Center (MTrec), and Director of the Computer Engineering (CPEG) Program in HKUST. He has published about 260 technical journals and conference papers. His fast motion estimation algorithms were accepted into the ISO/IEC 14496-7 MPEG-4 international video coding standard and the China AVS-M standard. His light-weight encryption and error resilience algorithms are accepted into the AVS standard. He has 3 US patents and is applying for 50+ more on his signal processing techniques. Dr. Au is an active senior member of the Institute of Electrical and Electronic Engineering (IEEE). He is/was Associate Editors of IEEE Trans. On Circuits and Systems for Video Technology (TCSVT), IEEE Trans. on Image Processing (TIP), and IEEE Trans. on Circuits and System, Part 1 (TCAS1). He is on the Editorial Boards of Journal of Signal Processing Systems, Journal of Multimedia, and Journal of Franklin Institute. He is/was the Chairman of CAS Technical Committee on Multimedia Systems and Applications (MSATC) and a member of CAS TC on Video Signal Processing and Communications (VSPC), CAS TC on DSP, SP TC on Multimedia Signal Processing (MMSP) and SP TC on Image, Video and Multidimensional Signal Processing (IVMSP).

**Research Interests:** Video coding, MPEG-1/2/4, H.261/3/4, JPEG/JPEG2000, wavelet video coding, rate control, fast motion estimation, fast intra-prediction, error concealment, pre/post-processing, image/video characterization, watermarking and data hiding, half-toning and inverse half-toning, speech processing, speech characterization, etc.

* * * * * * * * * * * * * * * * * * * * * * * * * *

## Topic: Can we get more than 1-pixel resolution out of 1 pixel?

In this talk, I will talk about some of our latest research results on image and video display. In particular, we recently developed a novel way to display a large image or video on small displays. Very often, digital camera and camera phones can capture images of 2 mega pixel or higher resolution, but the typically resolution on a portable device or photo frame is significantly less than half a million pixels. The large image or video would need to be lowpass filtered and downsampled before they can displayed, with lots of precious details lost. Is it possible to display such large image with enhanced resolution in a low-resolution display? We found a way to do it and will discuss it in the talk.

* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

# Ho Pui, Aaron HO

Professor and Associate Dean, The Chinese University of Hong Kong
B.Eng, PhD (Nottingham), CEng, CPhys, MIEEE, MSPIE, MOSA

Aaron H.P. Ho received his B.Eng and Ph.D. in Electrical and Electronic Engineering from the University of Nottingham in 1986 and 1990 respectively. His project title was on interdiffusion of semiconductor superlattices. During 1990-1992, he was a post-doctoral research fellow in the University of Leeds working on the growth and characterization of ferromagnetic superlattices. He then returned to University of Nottingham to participate in an industrial research project on laser ultrasound evaluation of engineering ceramics using high sensitivity laser interferometers. In 1994, he joined the Fiber Optics Components Operation of Hewlett-Packard as a senior process engineer in the semiconductor laser device fabrication division. He returned to Hong Kong to take up a lecturing position in the Department of Physics and Materials Science, City University of Hong Kong in 1996. He joined The Chinese University of Hong Kong in 2002.

**Research Interests:**
Optical instrumentation, particular biosensors based on the surface plasmon resonance effect, biophotonics and materials for optical applications. He has published over 150 journal/conference/book chapter articles.

* * * * * * * * * * * * * * * * * * * * * * * * * *

**Topic: Wide Dynamic Range Phase-sensitive Surface Plasmon Resonance Sensor with the Application of Long Range Surface Plasmon Resonance**

Founded in 2008, E-Lab Technology Ltd. (E-Lab) is a start-up company from The Chinese University of Hong Kong focusing on the development of high-performance Surface Plasmon Resonance (SPR) instruments for life science and clinical diagnostic markets. Interferometric phase-sensitive (pSPR) technology, the core technology of E-Lab, is developed by the research team led by Professor Aaron Ho of the Department of Electronic Engineering of The Chinese University of Hong Kong.  pSPR offers unparalleled bio-detection sensitivity, dynamic range and ease of achieving micro-array label-free biochip. These performance advantages have been achieved through several important measures. First, the phase information of the SPR phenomenon has very sharp change across the resonance peak, hence providing inherently high figure-of-merit. Second, E-lab was the first group to introduce differential phase detection, which can substantially reduce detection fluctuations. Third, the incorporation of multiple incident angle self-reference phase detection dramatically increases detection dynamic range, which is a common problem encountered by typical pSPR schemes. Because of its label-free and real-time bio-affinity monitoring capability, SPR systems are now in great demand by life science laboratories. Further business opportunities will arise for detecting health-related species, e.g. pathogens, viruses, DNA, pollutants etc, when pSPR systems finally become more widely used and affordable.

In addition to pSPR, E-Lab is currently considering other biotech-related instrument products, including a loop-mediated isothermal polymerase chain reaction (LAMP) device, an enzyme-linked immunosorbent assay (ELISA) and immunodiffusion education kit for the education market, in order to ensure that E-lab's expertise gets efficiently utilized in tech-transfer business.

* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
*Speakers' biography provided by the universities*



Location map of Science Park: http://www.hkstp.org/HKSTPC/en_html/en_corporation1_3.jsp
Transportation: http://www.hkstp.org/HKSTPC/en_html/en_corporation1_2.jsp

# REGISTRATION FORM

## Seminar: **University Technology Showcase**

Date           : **20 November, 2009 (Friday)**
Time           : 2:00pm - 4:00pm
Venue        : Convention Hall 1, G/F., Core Building 1, Hong Kong Science Park, Shatin
Fee            : **Free of Charge** (Limited seats. First-come, first-served)
Language   : English

### For ONLINE REGISTRATION, please click on the following link:

http://www.hkstp.org/HKSTPC/onlineRegistration.jsp?lan=en&formId=OF_0000065

OR

Please fill in the form and return it to us before **17 Nov, 2009**
BY EMAIL: seminar.iuc@hkstp.org / FAX:  2607 4040.

| Company Name: | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Please tick as appropriate:** | **SP Tenants** | | **Incubatees** | | **Others** | | |
| No. | Name | Job Title | | Email | | | Telephone |
| 1. | | | | | | | |
| 2. | | | | | | | |
| 3. | | | | | | | |
| 4. | | | | | | | |

**Enquiries:**

Tel: 2629 6695/ 2629 6718        Email: seminar.iuc@hkstp.org

(Transportation: http://www.hkstp.org/HKSTPC/en_html/en_corporation1_2.jsp )
(Location Map: http://www.hkstp.org/HKSTPC/en_html/en_corporation1_3.jsp )

If you would like to know more about our upcoming events, please visit: www.hkstp.org and click on "Upcoming Events".