Research breakthroughs in E-textiles and devices

Scientists at the Nanotechnology Centre for Functional and Intelligent Textiles and Apparel of the University's Institute of Textiles and Clothing (ITC), after three years' efforts, have made a breakthrough in the research of electrical conducive fibre. By depositing a nano-layer of conducting material on fabric, the researchers have successfully developed flexible e-textile sensors which can be woven into a nylon or polymer fabric. The sensors can detect large strain deformation, up to 50 per cent strain extension, and are sensitive to changes in temperature and humidity.

According to Prof. Tao Xiaoming, Head of ITC, the fibre sensor is like a second skin that can record body motions. It can be widely applied to monitor health or rehabilitation progress and correct posture of sportsmen. It can also function as soft switches for electrical appliances.

The centre, supported by the Government's Innovation and Technology Fund, has been established since 2003.

Sensing glove: Just by moving the fingers inside the glove, in which e-textile sensors are attached in the positions of finger joints, the demonstrator controls the motion of the racing car.

Dancing garment: Every movement of the dancer in the outfit, attached with e-textiles sensors as soft switches, triggers off a drumbeat. Resistance changes by stretching the fabric during dancing will trigger the switch function. The signals are then transferred to a computer for remote control of an electronic piano to give drum sounds or music.

The fabric, produced by the ITC research team, has a strain sensitivity rating of 160 to 400, compared to 15 to 20 for similar fabrics.

PolyU plays a role in Shenzhou VI space mission

At the invitation of the China National Space Administration (CNSA), the University's Institute of Textiles and Clothing (ITC) has designed new sets of work clothes for CNSA staff at the Control Centre in support of the China Space Mission, including the recent Shenzhou VI Mission. In designing the work clothes, the researchers are also responsible for choosing, developing and testing the fabrics used so that the Administration's stringent requirements are met in full. The anti-static property of the fabrics successfully prevents the normal operation of delicate equipment in the Control Centre from being affected.

Dr Allan Chan of ITC, shows samples of the anti-static uniforms, which are jointly developed with Cha Textiles Ltd.

Signing of pact with AWI witnessed by Nino Cerruti

The University recently signed a pact with the Australian Wool Innovation (AWI), a public Australian research and development company, to carry out applied R&D projects and facilitate technology transfer to commercial partners in the wool industry. Under the agreement, AWI will earmark a funding of about HK$11 million for the first year of the collaboration.

The agreement was jointly signed by Mr Graham Stewart, General Manager of AWI, and Dr Lui Sun-wing, PolyU Vice President, in the presence of special guest Mr Nino Cerruti, world-renowned designer and helmsman of the Cerruti family business. A new AWI–Cerruti Fashion Innovation and Design Award, to be launched for fashion design students and designers from different parts of world, was also announced during the signing ceremony.

(Right) Dr Lui Sun-wing exchanges the agreement with Mr Graham Stewart.

Mr Cerruti (front) is introduced to the state-of-the-art facilities of the University's Institute of Textiles and Clothing by its head Prof. Tao Xiaoming.

Distinguished Chinese scholars honoured

The University publicly honoured six members of the Chinese Academy of Sciences/Engineering at a special ceremony held under the University's "Distinguished Chinese Visiting Scholars Scheme 2005".

Officiating at the ceremony were Mr Li Gang, Deputy Director of the Liaison Office of the Central People's Government in the HKSAR and University President Prof. Poon Chung-kwong.

Since the inception of the Scheme in 1994, PolyU has invited over 60 prominent Chinese scholars, who were nominated by the University's academic departments, to take part in this large-scale exchange activity.

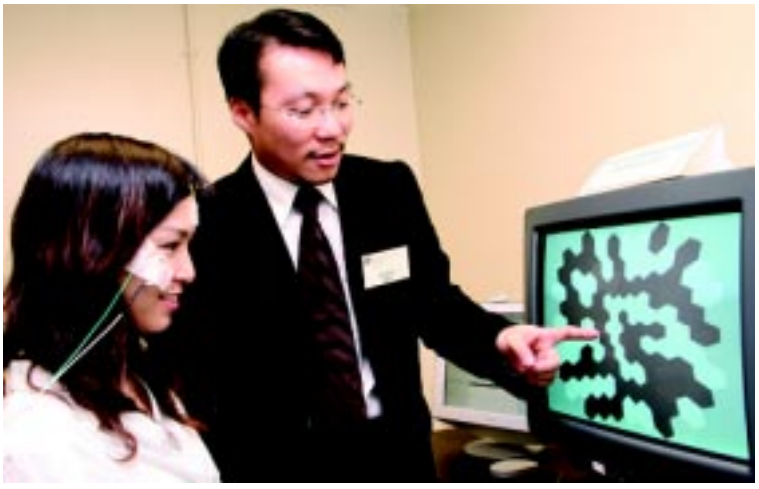
The distinguished scholars: (from left) Prof. Wang Sijing, Prof. Li Deren, Prof. Ji Guobiao, Prof. Guo Guangcan, Prof. Liu Renhuai and Prof. Xue Yusheng
（左起）王思敬院士、李德仁院士、季國標院士、郭光燦院士、劉人懷院士及薛禹勝院士。

Breakthrough in glaucoma detection

With the use of advanced multifocal electro-retinogram (mfERG) technology, researchers from the School of Optometry (SO) have developed a novel method which can improve the accuracy of glaucoma detection to as high as 93 per cent. This new method provides a more objective and comprehensive measurement of retinal function.

This pioneering study was conducted by PhD student Mr Patrick Chu Ho-wai under the supervision of Associate Professor Dr Henry Chan Ho-lung. The findings have been accepted for publication in the journal *Investigative Ophthalmology and Visual Science*.

The new protocol of mfERG measurement is based on the responses of retinal adaptation under different contrast stimulations which can help quantify the adaptive mechanism in our retina. Dr Chan pointed out that the narrowing of visual field is usually clinically detected at a stage when the patient has already lost about 30 per cent of the total number of retinal nerve fibre. Hence there is an urgent need to develop new technique for more accurate detection of glaucoma. The new procedure can be used in conjunction with other existing methods such as measurements of intraocular pressure and visual field. It is expected that the new technique can be enhanced for earlier detection of glaucoma before the problem comes to a later stage.



Dr Henry Chan (right) says that with the new test to detect glaucoma, mild sufferers can be detected sooner.

Smart Fabrics for Magic Cosmetics

Making use of patented shape memory fabric technology, Prof. Hu Jinlian from Institute of Textile and Clothing has produced a new generation of magical facial masks which can "sense" the temperature of human skin and then release nutritious ingredients. This breakthrough is a further development of the world's first cellulose-made shape memory fabric.

Prof. Hu and Mr Liu Baohua, who is a PhD student working under her supervision, have won the "Best Original Paper Award" and the Herman and Myrtle Goldstein Student Paper competition award by the US-based Fiber Society and the American Association of Textile Chemists and Colorists (AATCC) respectively.

According to Prof. Hu, the temperature-control function of these facial masks will be triggered by contact with human skin, whose temperature is around 36°C. Not only can the facial masks release ingredients such as vitamins and aloe vera, they are also less sticky and more comfortable to delicate human skins. Moreover, these facial masks can preserve ingredients much better and hence avoid unnecessary wastage of expensive ingredients in the process of packing and storage. With the addition of chitosan, an ingredient extracted from the shells of seafood such as crabs and shrimps, anti-bacterial function can be further achieved. This makes material made from shape memory fabrics more versatile for other purposes, for instance, in making anti-bacterial wound dressings.

Prof. Hu and the newly-developed magical face mask she produced.

Environmental expert takes the lead in acid rain research

Prof. Wang collects air-quality data at Hok Tsui and finds that the reading indicates the worsening of regional air pollution.

Prof. Wang poses with department head Prof. Y.S. Li.

Prof. Wang Tao from the Department of Civil and Structural Engineering, has been appointed Chief Scientist of a National Basic Research Programme on the formation, transport and control of acid rain initiated by the Chinese Research Academy of Environmental Sciences (CRAES). The large-scale project is supported with a research grant of RMB26 million.

This project, which is affiliated with the State Environmental Protection Administration of China, brings together expertise from Peking University, the Chinese Academy of Sciences, Tsinghua University, PolyU, Beijing Normal University and the Chinese Academy of Meteorological Sciences. The project team comprises over 140 research personnel, including over 80 full-time staff and more than 60 research students.

According to the current research statistics, about 30 percent of the land in the Chinese mainland is being affected by acid rain. It is also one of the three territories around the world with expanding area of acid rain. Since China is undergoing rapid economic growth, active steps must be taken to control the spread of acid rain. The direct and indirect economic losses which caused by acid rain have added up to over RMB110 billion per year, hindering the sustainable development of China's economy.

It is anticipated that the findings of this five-year study will provide further insight on the formation of acid rain and its impact on the environment. In the course of studying this subject, researches will also come up strategies to tackle this problem.

Prof. Wang, also a Research Professor of CRASE, has a wealth of experience in atmospheric chemistry.

Chinese Consortium for Higher Nursing Education established

The University signed pact with 21 higher institutions in the mainland, Taiwan and Macau to form the Chinese Consortium for Higher Nursing Education to foster collaboration. It is expected that resulting from the increasing exchange activities among the member institutions of the Consortium, teachers' and students' vision on quality nursing education would be broadened.

Consortium members also agree to compare and evaluate the curricula in nursing studies now being used in different regions of China in order to develop nursing curricula at an international level. The Consortium also aims to compile a Chinese-English nursing lexical dictionary to meet the growing needs for a nursing research repository which helps clarify Chinese nursing expressions and terms.

Conferences at a glance

PolyU and HK Design Centre jointly organize 1st International Conference on Brand Strategies and Management

Hundreds of world-class experts on branding and industry leaders attended the first International Conference on Brand Strategies and Management, which was jointly organized by PolyU's Faculty of Business and the Hong Kong Design Centre.

This conference aimed to promote brand management and design innovation activities to multi-national executives in Hong Kong and the Region. It also helped identify global trends and opportunities in developing brand strategies and explore the use of innovative design in brand building and enhancing brand image and equity.

Symposium on Molecular Technology

Prof. Ryori Noyori, a co-recipient of 2001 Nobel Prize in Chemistry and Director of the Research Centre for Materials Science of Nagoya University in Japan, made a special trip to deliver a keynote address on "Pursuing Practical Elegance in Chemical Synthesis" at the Symposium on Molecular Technology for Drug Discovery and Synthesis.

Symposium on outcome-based approach in higher education

Mr Michael Stone, Secretary-General of University Grants Committee, kicked off the Symposium on Outcome-based Approach to Teaching, Learning and Assessment in Higher Education, which attracted more than 200 educators to attend.

Convention and Expo Summit

Leading academics and industry professionals from different countries attended the "International Convention and Expo Summit", which was jointly organized by the School of Hotel and Tourism Management and the William F. Harrah College of Hotel Administration, University of Nevada, Las Vegas.

Biometrics is the topic

The International Conference on Biometrics 2006 was organized by the Department of Computing. An exhibition was also held during the Conference to demonstrate the latest biometric products and prototypes.

PolyU and CII-HK release report on healthy buildings

PolyU academics from different disciplines have since September 2003 teamed up with the Construction Industry Institute Hong Kong (CII-HK) to conduct a study to formulate measures for the implementation of healthy residential buildings as a post-SARS precautionary measure. The joint research project was completed after 12 months' study, and the report was officially released after consolidating views and inputs from the industry.

The project aimed to identify and evaluate factors that affect the implementation of healthy residential buildings in Hong Kong, to develop guiding solutions and to propose a mandatory or self-regulatory framework for the implementation, in an attempt to avoid risks of communicable diseases transmission in future. Led by Prof. Edwin Chan of the Department of Building and Real Estate (BRE), the study was conducted by a 13-member research team of BRE, drawing together the expertise from other PolyU departments.

The followings are some key recommendations of the study, taken into account the feedback from the industry:

(1) General considerations

Although it is not possible to establish a direct causal relationship between building parameters and an occupant's health, the analysis indicates that a statistically significant correlation exists between the condition of residents' health and the built environment, in particular the building orientation, the level of the flat above ground, and the immediate outdoor environment of the flat.

(2) Indoor environmental quality control

Buildings should be designed and constructed for minimum air leakage, they must include purposely-designed features to provide a desirable level of natural ventilation. The re-entrant of a residential building is recognized as a contaminated area, which should be used for air exhaust only. To achieve this goal, trickle ventilators could be installed to control "vent-out" only to re-entrants.

(3) Drainage design and installation works

Good housekeeping (filling the floor drain traps periodically) can help to address the problem of drying out of the trap seal induced by current drainage design. The provision of cross vents and the separation of drainage stacks in upper and lower zones are recommended.

(4) Refuse management systems and property management

An in-depth study on the costs and benefits of Automatic Refuse Collection Systems, and the actual impact of the refuse collection methods on health should be conducted to decide whether the systems should be promoted in future.

(5) Implementation

The research team suggests the Government should consider the mandatory requirements of the provisions of: a minimum required level of background natural ventilation rate to habitable spaces under all situations; openings/ windows to external walls of lift lobby and common corridor to induce desirable natural ventilation; louvres in every toilet door/ kitchen door to facilitate air flow through a desirable path; and the separation of drainage stack for the lower floors (to include the lowest 5 floors) for better safety margin against backflow.