

Sweeping awards in innovation expos

PolyU inventions scored a total of nine awards in the 19th International Invention, Innovation and Technology Exhibition (ITEX 2008) held recently in Kuala Lumpur, Malaysia, and the Korea International Women's Invention Exposition (KIWIE 2008) held in Seoul, Korea. Altogether, PolyU researchers won two Grand Prizes, two Gold, two Silver, two Bronze medals and one Special Prize from the Ewha Womans University in recognition of the University's outstanding and innovative inventions. The six winning projects are listed as follows:

ITEX 2008

ITEX 2008

- ◆ Best Invention for Overseas Category
- ◆ Gold Award
- ◆ British Invention Show Award

Chinese Chess for the Visually Impaired

Led by Prof. Michael Siu Kin-wai, *School of Design*

The invention is the first set of Chinese chess with an inclusive and universal concept which allows people with different vision capabilities, including the visually impaired and the blind, to enjoy playing chess together.

The chess set, specially designed by PolyU designers in collaboration with the Hong Kong Blind Union, can help visually impaired people distinguish different chess pieces; search, read, locate, move and pick up pieces; read pieces from different directions without any confusion; realize the whole setting of the chess game; and learn and become familiar with the game easily.



- ◆ Silver Award

SmartBin – Flexible Modular Recycle Bins

Led by Prof. Michael Siu Kin-wai, *School of Design*

Jointly developed by PolyU and Poon Kei Engineering Co., this first set of interlocking and knockdown recycle bins is designed to suit the needs of different countries and territories according to their own regulations or requirements on waste separation.

The interlocking design, the extendable framework and various panel options make the SmartBin remarkably flexible. This set of modular recycle bins can be assembled, disassembled and stacked into an easily carried unit for storage and transport. The design also facilitates the replacement of individual worn-out or damaged parts



without the need to replace the entire bin, saving a substantial amount of money and resources. The bins can be made of recycle materials like stainless steel, plastics or aluminium, which are not only environmentally-friendly but also robust and easy to clean.



KIWIE 2008

KIWIE 2008

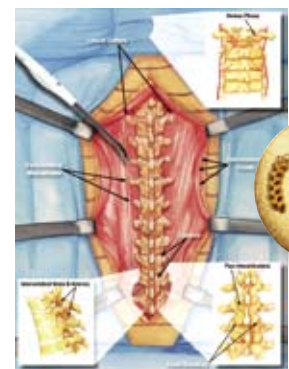
- ◆ Gold Award

Ultrasonic Decalcification: Technique and Agents

Led by Dr Guo Xia, Associate Professor, *Department of Rehabilitation Sciences (RS)*; Dr Zheng Yong-ping, Associate Professor, *Department of Health Technology and Informatics (HTI)*; Miss Lam Wai-ling, PhD student (*RS*)

This technique is designed to accelerate the process of bone decalcification for pathological diagnosis or bone-grafting in orthopaedic or plastic surgeries. Bone decalcification, or the removal of calcium ions from the bone, is a key step for making bones soft and easy to be processed into thin sections for microscopic investigation. While traditional decalcification procedure is complicated, taking

months to complete, this new method works on a custom-made ultrasound machine and foaming agent and can achieve decalcification within a few days or even hours. The system is also built-in with an end point detection and temperature controlling function which prevents deterioration of biological properties of decalcifying bone.



This technique can shorten operating hours and reduce blood loss during spine fusion and speed up decalcification for preparing bone allograft.

◆ Silver Award

Bone Morphogenetic Protein (BMP) Combining Therapeutic Ultrasound Inducing Fast Ectopic Ossification

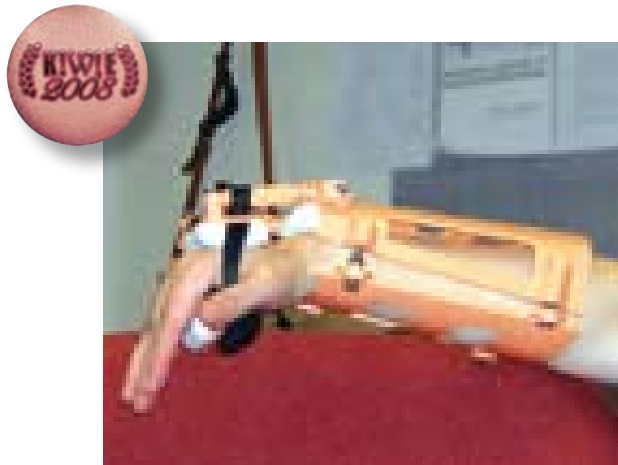
Led by Dr Guo Xia, Associate Professor, and Miss Wang Xiao-yun, Research Assistant, *RS*

This is a new method to induce and enhance fast ectopic ossification, as well as safely enhance bone healing. In this method, BMP is applied locally at the paraspinal muscles for inducing ectopic bone formation, followed by daily therapeutic ultrasound treatment to further accelerate the process. This invention can be applied in:

- Fast induce ectopic ossification in spinal fusion
- Enhancement of bone healing safely and rapidly in spinal fusion
- Establishment of animal model for investigating the biological process of ectopic ossification
- Development of a new therapy method for spinal deformation



Ultrasound apparatus



◆ Bronze Award

Flexi-Wrist Fracture Balance Brace

Led by Dr Guo Xia, Associate Professor, *RS*; Prof. Man Hau-chung, *Department of Industrial and Systems Engineering*; Dr Liu Mu-qing, Research Associate, *RS*

This invention is based on the concept of splint technique in traditional Chinese medicine. It is considered a major improvement, as compared to the rigid form of plaster cast, especially for elderly patients. This ingenious invention concerns a three-dimensional dynamic and multifunction forearm brace which is adopted to allow reduction and immobilization of fractures of distal radius while permitting regulated movement, distal traction or position of the wrist joint. The design of the interface connectors allows controlled movement of the hand brace along the proximal-distal direction, and rotate above the forearm brace in the anterior-posterior or lateral direction, thus enable immobilization of the wrist at various positions for different type of fracture.

◆ Bronze Award

The Ferric Reducing Antioxidant Power (fRAP) Assay

Led by Prof. Iris F. F. Benzie, *HTI*, and Prof. Sean Strain, *University of Ulster*

This unique test for measuring antioxidant capacity has been employed by scientists worldwide to probe into the antioxidant and potentially anti-ageing ingredients of different foods, ranging from Lingzhi and green tea to wines and dark chocolate. A lot of evidence has shown that antioxidant-rich diets promote healthy ageing, and the research focuses on the antioxidant properties of fruits, vegetables, teas and Chinese herbs in relation to this, and to lowering risk of chronic disease, such as cancer and heart disease. There is a need to establish if antioxidants in food and Chinese herbs are absorbed and study the mechanisms underlying their health benefits. The research has helped the University establish an extensive research network with international experts in human nutrition, cancer biology, DNA damage and repair, ageing and diabetes.



Making strides in construction virtual technology

The Department of Building and Real Estate (BRE) has recently tailored the construction virtual technology to facilitate scenario planning for mammoth projects, thus enabling property developers and project managers to achieve better cost-saving and avoid unnecessary delays. Using this prototyping technology, Prof. Li Heng of BRE and his 12-strong team can turn two dimensional technical drawings into vivid 3D images of skyscrapers and other complex building structures with details of nuts and bolts. More importantly, they can mimic every step of the actual construction process through visualizing the workflow as well as the logistics arrangement.

This advanced technology has been adopted by major construction contractors such as Gammon Construction Ltd and China Overseas Holdings Ltd in the planning process of complex construction projects. They include the Island East Commercial

Building in Quarry Bay, Tseung Kwan O Sports Stadium (the venue for East Asian Games), Tuen Mun Police Quarters and the Venetian Hotel in Macau.

To support the further advancement of this technology, PolyU has established a Construction Virtual Prototyping (CVP) Laboratory with strong industrial support from China Overseas Holdings Ltd and Gammon Construction Ltd which have each donated \$1 million for the establishment of this Laboratory. Earlier this year, the Central Government's Ministry of Construction has also given research funding amounting to RMB500,000 to support the operation of the Laboratory. This was the first time that a local tertiary institution received funding from the Ministry.



BRE staff explaining the application of the new prototyping technology to industrial partners inside the Laboratory. When viewing with 3D glasses, complex building structures can be shown clearly.

The CVP Laboratory currently offers two types of professional services: rapid prototyping of projects at the tender stage for contractors to vividly present the feasibility of construction methods; and visual prototyping of project at the construction stage to develop a detailed and improved construction programme with minimum time and optimal use of resources. ❖

Prof. Li Heng (third from right) and his research team members showing the technology in turning two dimensional technical drawings into 3D images.

