Donations Made Easy
輕鬆捐款新體驗

Developed by Prof. Michael Siu and Ms Catherine Hu, Associate Professor of the School of Design, the i-Give Interactive Donation System has recently won the Industrial Design Prize and Gold Medal with Jury's Congratulations at the 37th International Exhibition of Inventions, New Techniques and Products held in Geneva. A user-friendly multimedia interface, the system can facilitate people to make donations electronically anytime, anywhere.

The two-way system also provides multimedia entertainment response to acknowledge donations, such as downloading ring tones or wallpaper images to donors' mobile phones. The system can be customized for different applications of charities.

It not only caters to the special needs of the physically disabled and visually impaired, but can also be connected to contactless smart devices like Octopus and Visa payWave systems, overcoming the limitations of coin-and-banknote

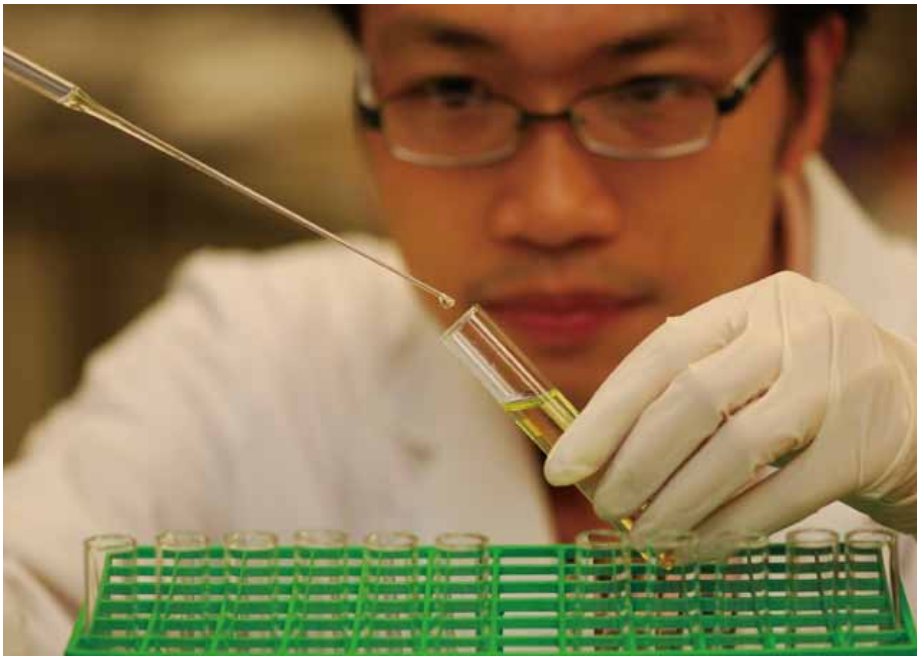
由設計學院邵健偉教授及副教授胡嘉芝女士設計的「i-Give互動捐款系統」在日內瓦舉行的第三十七屆國際發明及創新技術與產品展覽中奪得工業設計大獎及評審團特別嘉許金獎。該系統通過簡單易用的多媒體介面，鼓勵公眾隨時隨地通過電子方式捐款。

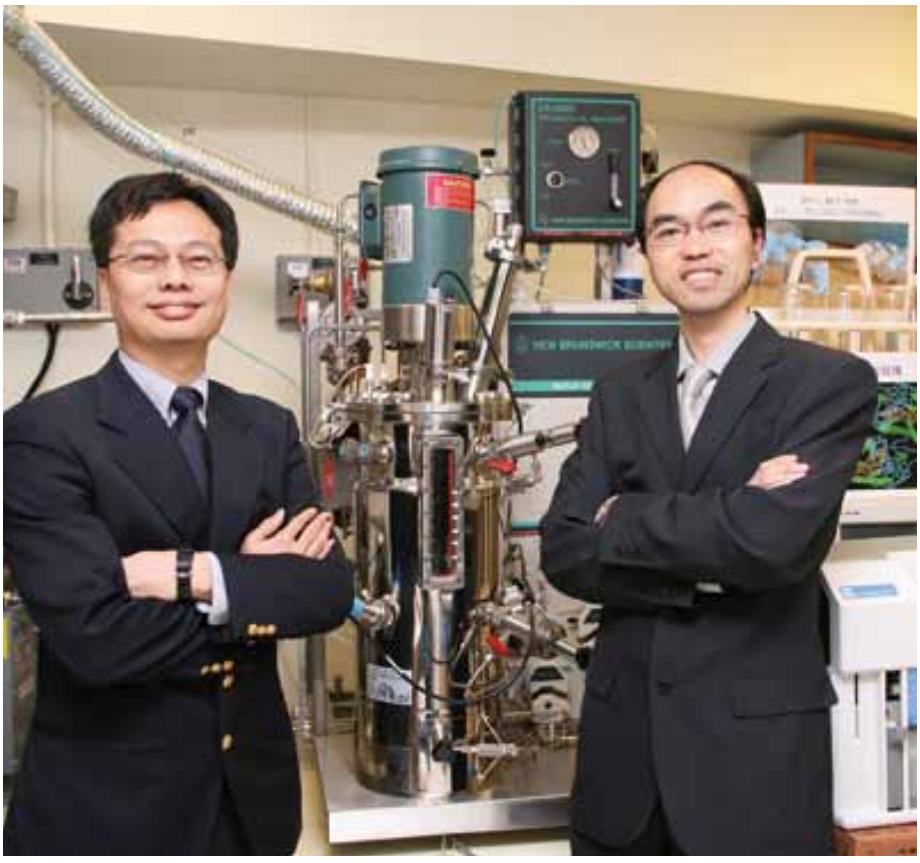
這雙向系統亦可讓捐款者透過下載手機鈴聲或牆紙，作為對捐款的確認。系統亦可根據要求作出特別調較，以配合個別慈善團體的需要。

該系統的共融設計不但可迎合殘障或視障人士的特別需要，更可接駁不同類型的感應式付款系統(如八達通、Visa payWave系統)，克服了使用硬幣和紙幣捐贈方式的限制。

Prof. Michael Siu (left) and Ms Catherine Hu jointly invented the i-Give Interactive Donation System.
發明「i-Give互動捐款系統」的邵健偉教授(左)及胡嘉芝女士。

New Multi-potent Drug Kills Cancer Cells
多功能治癌藥物





Dr Thomas Leung (right) and Dr Thomas Lo.
梁潤松博士 (右) 及勞偉雄博士

A new anti-cancer drug was invented by Dr Thomas Leung Yun-chung, Associate Professor, and Dr Thomas Lo Wai-hung, Assistant Professor, of the Department of Applied Biology and Chemical Technology. The drug works through starving cancer cells by depleting arginine in the blood — a key nutrient for many cancer cells.

The main constituent of the drug is arginase, an enzyme that degrades arginine, with urea as an end-product. Naturally occurring arginase has a very short biological half-life and thus cannot be effectively used for therapeutic purpose.

Using DNA technology, the two researchers produced a recombinant human arginase in 2005, which, after chemical modification, has a significantly prolonged half-life for therapeutic use. Recently they invented a cancer drug based on naturally occurring thermostable Bacillus Arginase.

In laboratory settings, this drug works in cell cultures for liver, breast, cervical, skin, pancreatic, lung, colorectal and gastric cancers.

At the 37th International Exhibition of Inventions, New Techniques and Products held in Geneva, the drug won the Prize of the State of Geneva and Gold Medal with Jury's Congratulations.

應用生物及化學科技學系副教授梁潤松博士及助理教授勞偉雄博士研發出一種抗癌新藥物，透過消除血液中癌細胞生長所必需的養料 — 精氨酸，使癌細胞因為失去營養補充而死亡。

這項新藥物的主要成分是一種名為精氨酸的天然酵素，它的功能是將精氨酸分解成尿素等代謝物。由於天然精氨酸　的半衰期 (在血液循環中的壽命) 較短，限制了其對癌細胞的殺滅能力。

二零零五年，兩位研究員利用基因工程，對人類重組精氨酸　進行分子修飾，成功延長了其半衰期，大大增加了它的藥用價值。近期，他們轉用了一種天然的耐熱性精氨酸　，研發出新一代高療效抗癌藥物。

經過體外細胞抗癌測試，新一代的抗癌藥物證實適用於抑制肝癌、乳癌、子宮頸癌、皮膚癌、胰臟癌、肺癌、結腸癌及胃癌等癌細胞的生長。

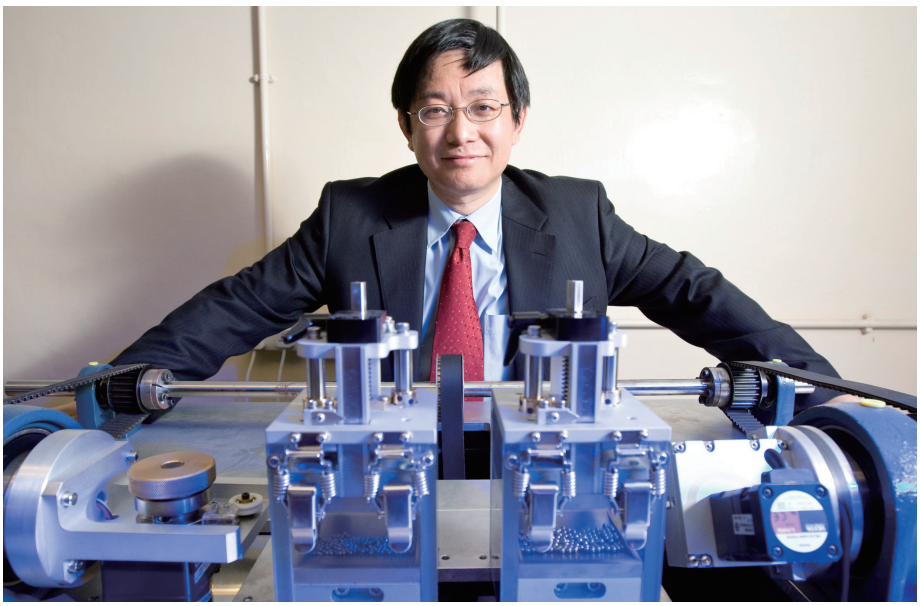
這項發明在日內瓦舉行的第三十七屆國際發明及創新技術與產品展覽中奪得日內瓦州政府大獎及評審團特別嘉許金獎。

Advanced Nanotech Research
先進納米科技研究

Prof. Lu Jian, Chair Professor and Head of the Department of Mechanical Engineering, is spearheading two projects which will enhance the University's leading position in nanomaterials research for structural applications.

Funded by the Innovation and Technology Fund-affiliated "Nano and Advanced Materials Institute Ltd", the first project – "Development of Layered Nanostructured Metallic Sheet/Plate for Structural Applications" - has won the support of China's Baosteel Group Corporation and European Aeronautic Defence and Space Company. Prof. Lu's team will explore the potential of their newly-developed nanomaterials in structural applications for the aerospace and steel industries.

The platform to be applied in the investigation of residual stress distribution measurement in nanostructured materials is considered unique and its application could be extended to other alloys and composites based on nanocrystalline or amorphous materials.



Prof. Lu Jian and the equipment used in nanotech research.
呂堅教授與納米科技研究設施。

The second project – "Design and Realization of Structural Materials with High Strength and High Ductility" – Prof. Lu will work with nanotechnology experts from local universities and collaborate with the University of California at Berkeley, Pennsylvania State University in the US and France's national institute for research in computer science and control (INRIA). The theories and tools developed under this project could be applied to the production of cars and aircraft. This project is funded by the Research Grants Council.

When integrating nanostructured materials for structural applications, the project will aim to:
(1) Improve the ductility of nanostructured materials and produce the materials on a large scale;
(2) Develop advanced numerical simulation tools for studying strength and ductility - two highly conflicting key mechanical properties;
(3) Develop advanced experimental methods for investigating the fundamental fracture mechanisms;
(4) Develop joining technology for nanostructured materials using "pulsed laser welding" and to optimize welding conditions for conserving the nanostructures and the strength of nanostructured materials.

機械工程學系講座教授兼系主任呂堅教授正領導兩個研究項目，有助理大鞏固納米結構研究與技術應用方面的領導地位。

其中一項目—「應用於工程結構的多層的納米結構金屬片/板的研發」由創新科技基金轄下的納米科技及先進材料研發中心資助，並獲中國寶鋼集團及歐洲航太防衛與太空科技公司支持。他將會領導研究人員探討新研發的納米材料在結構方面的應用，以迎合航空業及鋼業的需要。

研究納米結構材料的殘餘應力分佈測量這應用平台屬首創；其應用範圍影響深遠，甚至可延伸至其他納米晶體結構的合金和合成物料及複合材料或非晶材料。

另一項研究名為「高強度高韌性結構材料的設計與研究」，呂堅教授會與本地大學的納米學家，以及美國加州大學栢克萊分校、賓夕凡尼亞州大學、法國國立電算與控制科研究學院等院校合作，有關理論與分析工具可用於製造汽車及飛機。此項目由研究資助局撥款支持。

有關項目可處理將納米結構材料用於大型結構所衍生的課題，包括：
（一）改善納米結構材料的韌性，並可大規模生產納米材料；
（二）研發先進的數值分析工具，探討強度與韌度這兩種對立的機械特性；
（三）研發先進實驗方法探討物料斷裂的機理；
（四）研發使用「脈衝鐳射」焊接納米結構材料的新技術；並優化焊接工藝條件以保留納米材料的組織結構與強度。

A noticeable improvement of luminous efficacy is observed with the new LED driver (left) when compared with conventional driver (right).
新系統(左)在發光效能上明顯比傳統二極管驅動器(右)更佳。

New LED Driver Boosts Brightness and Energy Efficiency

新照明系統提升光度輸出　減少熱能損耗

A new light-emitting diode (LED) driver with dimming function, produced by Prof. Michael Tse of the Department of Electronic and Information Engineering, increases luminous output and lowers heat loss by using two-level pulse-width-modulated (PWM) current.

Using conventional PWM technique, the low-level current is set to zero and the LED is driven by periodic on-off pulse for better dimming functionality. But this degrades the LED's luminous efficacy.

The new device raises the low-level current above zero, resulting in a significant improvement in brightness. Also, since the current waveform remains pulsating, the outstanding dimming functionality and colour stability available from the PWM technique is retained.

When the prototype was tested on LEDs produced by CREE and Philips, their luminous efficacy increased by 18 per cent on average.

This innovation won a Gold Medal with Jury's Congratulations at the 37th International Exhibition of Inventions, New Techniques and Products held in Geneva.

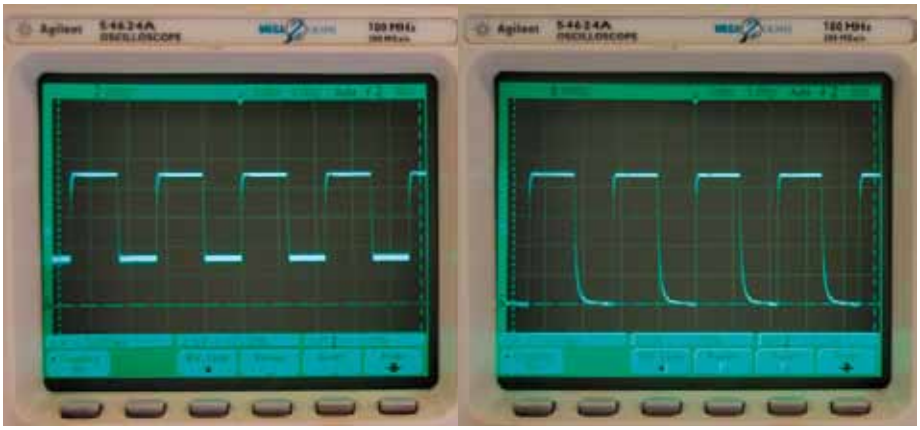
電子及資訊工程學系謝智剛教授研發出具備光控效果的高能源效率發光二極管照明系統，此系統採用二級脈衝寬度調整的電流波形設計，以提升光度輸出及減少熱能損耗。

傳統二極管驅動器利用週期性的開關技術調光，把低平電流設於零點，這方法雖然能達致光控的效果，卻同時降低發光效能。

新系統將低平電流從零點提高，使照明系統的發光效能顯著改善。另外，由於電流維持脈衝的波形，傳統驅動器的光控效果和顏色穩定性仍然能夠於這系統中被保留。

謝教授開發了一款驅動器以作檢驗，並利用科銳及飛利浦的發光二極管進行測試，結果顯示這新式高能源效率照明系統在發光效能上平均提升了百分之十八。

這系統於第三十七屆國際發明及創新技術與產品展覽中奪得評審團特別嘉許金獎。



The two-level PWM current waveform (left) and conventional PWM current waveform (right).
二級脈衝寬度調整的電流波形設計(左); 傳統脈衝寬度調整的電流波形設計(右)

Smart Pressure Monitored Suit
智能壓力衣

The Smart Pressure Monitored Suit developed by Prof. Cecilia Li-Tsang of the Department of Rehabilitation Sciences (pictured) won a Gold Medal at the 37th International Exhibition of Inventions, New Techniques and Products held in Geneva this year.

Asia's first medically prescribed pressure therapy suit uses the best available fabrics which are tested for tension, softness, permeability, comfort and durability.

Using a 3D scanner and computerized pattern drafting system, patients' injured body regions are transformed into two-dimensional paper patterns for quickly

The suits' pressure range can be adjusted based on medical conditions of patients.
智能壓力衣的壓力範圍可因應病者的診斷情況而調節。

tailored, tight-fitting suits with the pressure ranges based on medical conditions of patients.

The suits can be worn by patients with post-burn hypertrophic scars, post-surgery lymphoedema, varicose vein and deep vein thrombosis. Its elastic property is also good for reshaping body contour after plastic reconstructive surgery, such as mastectomy. The suit also has potential for use in orthopaedic conditions to reduce joint pain, inflammation and body protection.

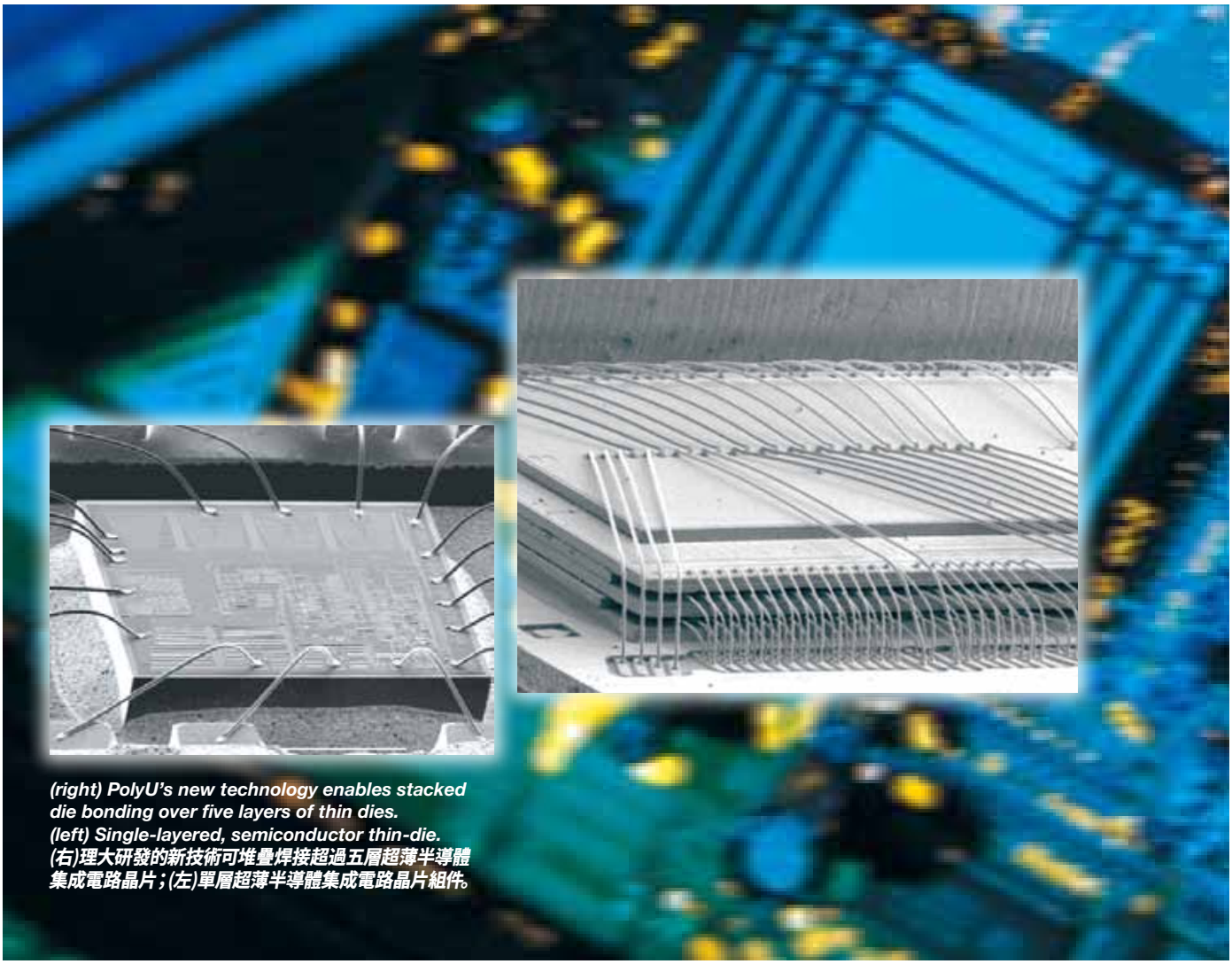
康復治療科學系李曾慧平教授 (見相) 研發的智能壓力衣於第三十七屆國際發明及創新技術與產品展覽中榮獲金獎。

這是全亞洲首個將壓力治療應用於醫學的嶄新產品。製作智能壓力衣的質料經科學測試證實在拉力、柔軟度、透氣度、舒適度及耐用度等方面均為最佳。

透過立體掃描儀及電腦化繪製系統，患者的傷患部位可被轉化成平面紙樣，然後根據紙樣為病人度身訂造緊貼身體的智能壓力衣，並因應診斷情況而調節壓力範圍。

智能壓力衣能有效治療燒傷後增生疤痕、手術後的淋巴水腫、靜脈曲張及深層靜脈栓塞等，它的彈力特性更有助在整形手術（例如乳房切除手術）後重塑人體線條。它亦有應用於整形外科的潛質，為關節痛和發炎患者提供保護性承托。

Thin Die Bonding Made Fast and Green
高效和環保的超聲管芯焊接技術



(right) PolyU's new technology enables stacked die bonding over five layers of thin dies.
(left) Single-layered, semiconductor thin-die.
(右)理大研發的新技術可堆疊焊接超過五層超薄半導體集成電路晶片；(左)單層超薄半導體集成電路晶片組件。

The increasing miniaturization and functionality of electronic products has necessitated further development of semiconductor bonding technology. To support this trend, Dr Derek Or Siu-wing of the Department of Electrical Engineering has invented an ultrasonic technological platform — an automated manufacturing equipment and a green process — within room temperature and high efficiency, for bonding thin semi-conductor dies onto various substrates.

The existing bonding equipment, working on the hot bonding technology, needs high temperature (120-160 ºC) and long process time (3-10 seconds), but the new platform enables the bonding process at room temperature (25 ºC) and within two seconds in a safe, green and reliable manner.

It also enables simultaneous stacked die bonding over five layers of thin dies within a single bonding process cycle and for different substrates.

This bonding platform won a Gold Medal at the 37th International Exhibition of Inventions, New Techniques and Products held in Geneva.

隨　電子產品不斷向小型化及多功能化方向發展，半導體集成電路晶片管芯焊接技術亦必須進一步優化。電機工程學系副教授柯少榮博士研發出一個用於超薄半導體集成電路晶片管芯焊接的超聲技術平台，包括自動化生產設備及具有室溫和高效的綠色製程。

現時的超薄半導體集成電路晶片管芯焊接設備及製程以熱壓技術為基礎，其本質受制於過高的製程溫度 (攝氏一百二十至一百六十度) 及較長的製程時間 (三至十秒)。而理大最新研發的超聲管芯焊接設備及製程，不僅具有室溫 (攝氏二十五度) 及高效 (少於兩秒) 的焊接能力，並且安全、環保及可靠。

此外，該技術能於單一的製程週期內，可在各種基板上堆疊焊接超過五層超薄半導體集成電路晶片。

這焊接技術平台於日內瓦舉行的第三十七屆國際發明及創新技術與產品展覽中榮獲金獎。

Silk Fibre Brings Hope for Fracture Patients

善用蠶絲纖維　造福骨折病人

Stainless steel and titanium plates are widely used by surgeons as bone fixators in treating fractures. However, the healed bone's strength diminishes after the plates are removed and excess bone cells can grow around the metal plates and the porosis beneath.

To address these drawbacks, PolyU researcher Dr Karen Cheung Hoi-yan has successfully extracted useful substances from silkworm cocoons and developed a new biocomposite material for repairing bones.

Under the supervision of Dr Alan Lau Kin-tak, Associate Professor of the Department of Mechanical Engineering, Dr Cheung started investigating the use of synthetic biodegradable polymer PLA which has desirable chemical and physical properties. They solved PLA's brittleness problem by blending it with silk fibre to form the new material which has very high strength and toughness, combined with high elasticity, providing necessary support for cell attachment and cell growth.

During the biodegrading process, the biocomposite gradually decomposes into lactic acid, which is metabolized and excreted from the human body, saving another operation to extract the metal plate if metallic substance is used as bone fixator.

The new biocomposite has proven to work on broken animal bones and Dr Cheung has received the "Young Scientist Award" from the Hong Kong Institution of Science for her innovation.

Dr Cheung will now collaborate with material science and medical researchers at the University of Cambridge, University of California and the University of Hong Kong to test its biocompatibility and bioresorbability on animals.

Dr Karen Cheung showing the silk fibre and the new kind of biocomposite material.
張凱恩博士展示蠶絲的纖維及嶄新的生物複合材料。

Dr Karen Cheung (right) and Dr Alan Lau.
張凱恩博士(右) 與劉建德博士。

不銹鋼和鈦被外科醫生廣泛應用作骨外科固定器，但是當金屬片被移除後，骨質的強度便會衰退，而金屬片周圍會出現骨質細胞增生，金屬片下又會出現疏鬆的空間。

針對以上種種問題，理大研究人員張凱恩博士成功從蠶繭中提取有用物質，以研發嶄新的生物複合材料，用於骨折手術。

在機械工程學系副教授劉建德博士的指導下，張博士首先研究人工合成的生物降解聚合物聚乳酸（PLA）的效能，結果顯示其化學及物理性質理想。她再從蠶絲的特質得到啟發，把PLA與蠶絲的纖維混合，製成一種強度和韌性極高、且極富彈性的嶄新生物複合材料，這材料同時提供必要的支持，讓細胞可以依附及生長。

在生物降解過程中，生物複合材料會慢慢分解成乳酸，最終透過人體新陳代謝，排出體外，避免病人需要進行另一次手術，移除金屬骨外科固定器。

這種新的生物複合材料在骨折動物身上有顯著效用，亦為張博士奪得香港科學會頒發的「青年科學家獎」。

張博士會與英國劍橋大學、美國加州大學及香港大學的材料科學及醫學研究人員合作，繼續研究用動物身體測試該生物複合材料的兼容性與吸收能力。

Optimum Hotel Co-branding
適當品牌組合　提升酒店形象

The School of Hotel and Tourism Management (SHTM) recently did a study to identify the most advantageous combination of hotel co-branding options as perceived by customers in a hotel room setting, while keeping the hotel's brand identity intact.

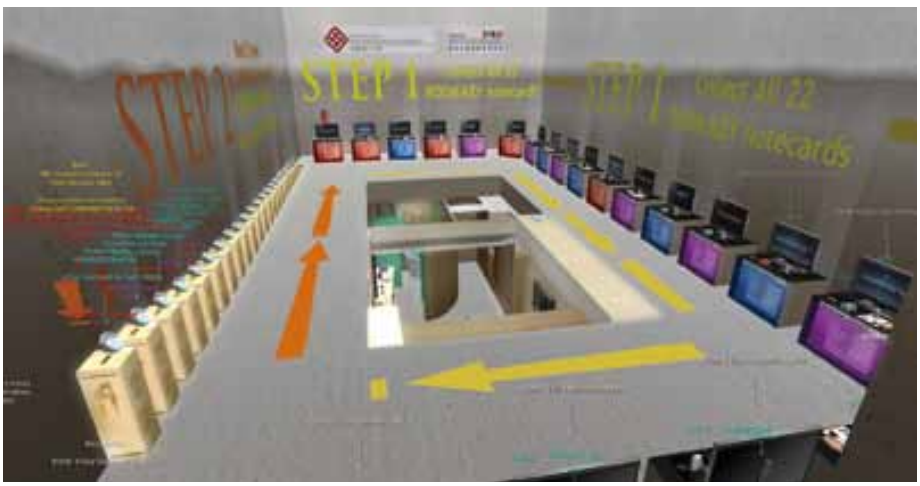
The study was conducted using the 3D virtual world of Second Life, which allows participants access a visually life-like hotel environment where they could visit the hotel, enter the rooms, review the brands on offer and choose the ones they preferred.

To start with, respondents were asked to complete a questionnaire on their preferred brands in a hotel room setting. SHTM then built a 3D replica of its upcoming 25-floor, 262-room teaching and research hotel in Second Life as the venue for the study. In this virtual hotel, 400 participants from 39 countries reviewed the amenities and nominated the brands they preferred. Preliminary results indicated that coffee, TV, toothpaste, shampoo and shower gel were the most preferred features to be branded.

These were used for stage two of the research, which involved conjoint analysis to identify how respondents valued offered components of a multi-branded hotel room. Three hotel room prices were generated and 22 room concepts with different brand options were created for respondents to rank from the most preferred to the least preferred. The data collected will be used to determine the most favourable combinations of amenities and associated brands for respondents with different socio-demographic backgrounds and travel patterns.

Conjoint analysis helps determine the trade-offs that customers are willing to make in their purchase decisions and in developing pricing strategies for hotels. This study will serve as a guideline for multi-branding in a hotel room setting for positioning the hotel brand.

One of the hotel rooms set up for the first stage of the study.
研究的第一階段中設置的其中一間客房。



The platform designed for the second stage of the study.
研究的第二階段中所設立的平台。

酒店及旅遊業管理學院近日進行一項研究，以確定在顧客心目中，甚　是酒店客房中最佳的品牌組合，但大前題定要保持酒店本身品牌的獨特個性。

該研究在Second Life的三維虛擬世界進行，讓參與者進入栩栩如生的酒店環境及客房，並在所提供不同的品牌中揀選自己心中所愛。

研究開始時，參與者須填寫一份有關他們喜歡在酒店客房中有甚　品牌的問卷。然後，學院在Second Life三維虛擬世界中複製其即將面世、樓高二十五層、設有二百六十二間客房的的教學及研究酒店，作為進行該研究的地點。在這虛擬酒店內，來自三十九個國家的四百位參與者會檢閱酒店的各項設施，並揀選自己喜愛的品牌。初步結果顯示，參與者最希望酒店提供特別品牌的咖啡、電視機、牙膏、洗髮水及沐浴露。這些資料將用於第二階段的研究。

第二階段會採用聯合分析法以識別參與者怎樣評價提供多個品牌組合的酒店客房。酒店客房會有三個不同的價目，以及提供二十二種不同設計意念及不同品牌組合供參與者評級，參與者要將最喜歡至最不喜歡的客房逐一評級，學院會利用收集到的數據，為不同社會背景及有不同旅遊習慣的人士制訂最佳的酒店設施與品牌組合。

聯合分析法有助識別顧客在作出交易決定時的取捨考慮，並可用作製定酒店價格策略。此項研究將用作設計酒店客房品牌組合的根據，並從而打造酒店品牌。