Our Innovations are Plentiful like Acorns

科研・碩果累累

PolyU's internationally recognised research has produced an abundance of innovations, from world changing discoveries to business and industrial solutions and innovations for social good. The availability of state-of-the-art research centres and facilities have fostered ground-breaking multidisciplinary collaborations and research outcomes.

理大科研享譽國際，碩果累累，從改變世界的突破發明到工商業解難方案及造福社會的創新科研均一應俱全。大學具備先進的研究中心及設施，讓開天闢地的跨學科協作項目得以開花結果。

World Changing Discoveries
科研突破 改變世界

Camera Pointing System
相機指向機構系統

Deployed aboard the Chang'e-3 lunar lander in 2013, this compact, lightweight system developed by PolyU and the China Academy of Space Technology made possible clear images beamed back to Earth.

由理大與中國空間技術研究院合力研發的相機指向機構系統於 2013 年隨嫦娥三號登月，該系統精密而輕巧，有助將清晰的月球影像傳送到地球。

Cancer drug resistance inhibitor
逆轉抗癌藥的抗藥性

Apigenin Flavonoid Dimer, derived from a natural nutrient extractable from a wide range of fruit and vegetables, is 10 times better in preventing cancer cells from pumping drugs out. It is also three times safer than the best inhibitor in the market.

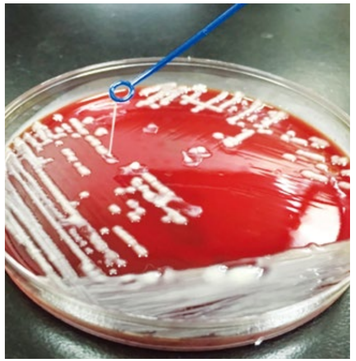
由不同種類的蔬果所含有之天然營養素提煉出的芹菜素黃酮類二聚體，可防止癌細胞把藥物排出。跟市面上最有效的抑制劑比較，這種新抑制劑的效力高出十倍，其安全性更高出三倍。

Novel anti-cancer biological drug
嶄新治癌藥物

Researchers have found that arginase kills drug-resistant cancers, and have developed a new drug known as BCT-100 that could provide a cure for liver and other cancers, leading to the first ever Investigational New Drug status granted by the US Food and Drug Administration to Hong Kong.

研究人員發現精氨酸酶能有效對付具抗藥性的癌症，並研發出新藥物 BCT-100，它對肝癌及多種癌症均產生療效，是首隻本港自主研發並通過美國食品藥品監督管理局批准臨床試驗申請的新藥。

Discovery of newly emerged superbug, hyper-resistant and hypervirulent Klebsiella pneumoniae
發現新發性、高抗藥性、高毒力超級細菌肺炎克雷伯菌



In collaboration with counterparts from the Second Affiliated Hospital of Zhejiang University, PolyU researchers discovered a new superbug – the hyper-resistant and hyper-virulent Klebsiella pneumoniae – which may cause untreatable and fatal infections in relatively healthy individuals with normal immunity.

理大夥拍浙江大學第二附屬醫院的科研人員，發現了一種新發性超級細菌—高抗藥性、高毒力的肺炎克雷伯菌，這種細菌有機會導致免疫力正常且相對健康的人士出現不可治癒和致命的感染。

Record-breaking optical communication speed for data centres
數據中心光纖通訊速度刷新紀錄

To overcome fibre-optic limitations, researchers developed a software approach to undo signal distortions and achieve optical communications for data centres at 240 gigabytes per second over two kilometres, about 24 times the speed available on the market.

研究人員研發軟件方案消除訊號失真，並成功突破光纖通訊的限制，令數據中心兩公里傳輸速率達每秒二千四百億位元，是現時市場上傳輸速率的二十四倍。

Ingenious Solutions to Problems

創新發明 解決問題

Structural Health Monitoring System for buildings

建築物結構診斷與預測系統

Installed in the headquarters of the Shenzhen Stock Exchange, Sutong Bridge and Canton Tower in the Chinese mainland, the PolyU-developed Structural Health Monitoring System performs health checks throughout buildings' lifespans.

理大研發的結構診斷與預測系統已裝置於中國內地的深圳證券交易所總部、蘇通大橋及廣州塔，可以為建築物進行全壽命期的健康監測。

Aviation Services Research Centre

航空服務研究中心

PolyU and the Boeing Company jointly established Hong Kong's first Aviation Services Research Centre, which develops technologies to enhance the efficiency and operation of the aircraft maintenance, repair and overhaul industry, improving performance for the global aviation industry.

理大與波音公司攜手成立香港首間航空服務研究中心，致力研發科技以促進飛機維修工程業的效率及運作，並提升全球航空業的表現。

Fibre optic sensing system for railway monitoring

光纖傳感鐵路監測系統

Optical fibre sensing technology has been developed at PolyU to monitor railway operation, allowing continuous surveillance and rapid maintenance. The system is currently installed in Hong Kong's MTR and Singapore's MRT, and will be deployed in the railway network of other places.

大學研發的光纖傳感監測技術可用於監測鐵路運作，並持續監控和提升維修效率。相關系統現安裝於香港的港鐵及新加坡地鐵網絡，並會陸續應用於世界其他鐵路網絡。

Surgical Robotic System

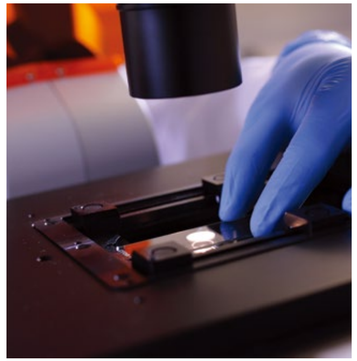
外科手術機械人系統

Developed by PolyU engineers and the University of Hong Kong surgeons, the internally motorised Novel Surgical Robotic System features a 3D camera and robotic arms that can be reassembled inside the human body for different surgical procedures.

由理大工程師與香港大學外科醫生合力研發的嶄新外科手術機械人系統，內置馬達並配備三維攝像機和機械臂，這些機械臂進入人體後可重新組裝，以配合不同手術程序的需要。

Novel nanobiosensor for rapid detection of influenza viruses

創新納米生物傳感器迅速檢測流感病毒



PolyU researchers have developed a breakthrough nanobiosensor that uses upconversion luminescence resonance energy transfer to reduce the time needed to detect influenza from 1-3 days to 2-3 hours. With this simple procedure, viruses can be detected by the naked eye while no expensive machinery or sophisticated operating skills are required.

科研人員採用上轉換發光共振能量轉移技術，研發出創新的納米生物傳感器，成功將檢測流感時間由一至三天縮短至兩至三小時。這項技術步驟簡單，可憑肉眼檢測病毒，無需昂貴儀器或複雜的操作技能。

Fluorescent probes for rapid detection of formaldehyde in food

熒光探針快速測試食品的甲醛含量

To enhance food safety, researchers have developed fluorescent probes that rapidly detect food-borne formaldehyde. Using the chemical coupling of amine-functionalised resins, formaldehyde and fluorescent dyes, the probes can test 10 samples per hour.

研究人員研發出一種熒光探針，可快速測試食品中的甲醛含量，提升食品安全。該技術善用含位阻大胺的樹脂聚合物、甲醛和熒光炔烴的化學耦合反應，可於一小時內檢測十個食物樣本。

Nu-Torque single ring yarn

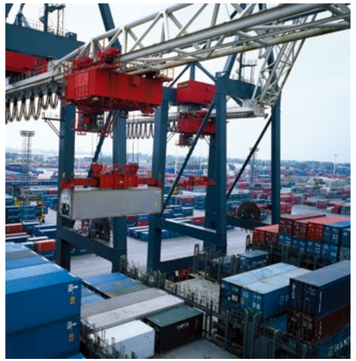
扭妥環錠紡紗

Nu-Torque single ring yarn improves textile quality, strength and softness while solving the problem of residual torque making seams curl — with no use of chemicals, this is a truly green technology.

扭妥環錠紡紗改善紡織物的質素，提升其強度和柔軟度，同時解決殘餘扭矩所引致摺縫捲曲的問題。這技術無須使用化學添加物，是一項綠色科技。

Hierarchical Positioning System enhances logistics terminal management

分層定位系統改善碼頭物流管理



The Hierarchical Positioning System uses wireless Zigbee-based sensor network technology and differential global positioning to determine the locations of containers and monitor truck queues, truck locations and load statuses in real-time at low cost for shipping terminal operators.

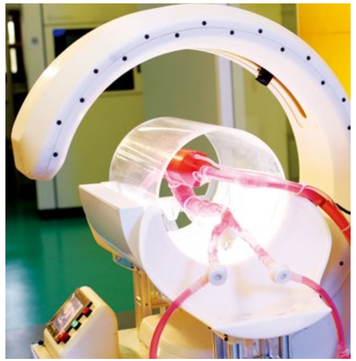
這分層定位系統採用 Zigbee 無線感測網絡技術及差分全球定位系統，讓碼頭物流營運商以低成本實時追蹤集裝箱位置、卡車排隊狀態、卡車位置及起重機活動。

Innovations for Social Good

嶄新方案 造福社會

Transcatheter Aortic Valve Implantation Simulation Model

導管主動脈瓣植入術模擬系統

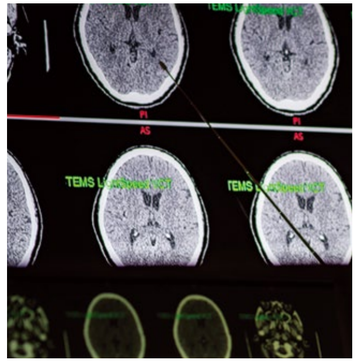


PolyU researchers have jointly developed a Transcatheter Aortic Valve Implantation Simulation Model in collaboration with Queen Elizabeth Hospital that accommodates patient specific 3D printed blood vessels and aortic valves for surgeons to simulate aortic valve repair.

理大科研人員與伊利沙伯醫院合作研發出一個導管主動脈瓣植入術模擬系統，可讓外科醫生採用為病人度身訂造的三維打印血管及主動脈瓣，模擬修補主動脈瓣的程序。

Intelligent system for speedy diagnosis of strokes

智能系統快速診斷中風



Combining artificial intelligence, pathology and a sophisticated algorithm, the computer intelligence system for acute stroke detection can diagnose strokes in three minutes via multiple X-ray images, allowing physicians to quickly detect dangerous but subtle changes in the brain.

這套電腦輔助系統結合人工智能、病理學和精密運算技術，透過分析多張 X 光影像，可於三分鐘內就急性中風進行診斷，協助醫生迅速偵測腦部危急但微細的變化。

Scolioscan for radiation-free spine screening
無輻射脊柱側彎測量系統

Scolioscan is a radiation-free measurement system for accurately screening and monitoring scoliosis of the spine. Developed using 3D ultrasound imaging techniques, its measurement results are comparable to those of conventional X-ray assessments.

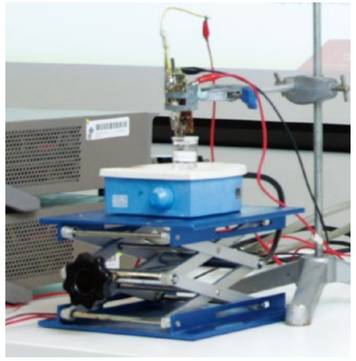
Scolioscan 是一套沒有輻射風險的測量系統，可精確地檢驗及監測脊柱側彎程度。這系統採用三維超聲成像技術，其測量結果與傳統 X 光評估相若。

DISC lens to slow myopia progression
光學離焦隱形鏡片延緩近視加深

The Defocus Incorporated Soft Contact (DISC) Lens allows an image to be produced on the retina and then another to generate a defocus that balances out the negative effects of extensive close-up work. DISC Lens helps to stop excessive growth of eyeball length that causes myopia.

戴上光學離焦軟性隱形鏡片，視網膜上會首先產生一個影像，繼而出現另一離焦影像，以平衡因長時間定神專注對眼睛的負面影響。這種鏡片有助延緩眼球過度增長而導致近視。

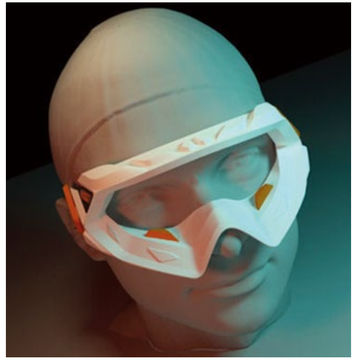
Highly sensitive biosensor measures glucose level in saliva
高靈敏度生物傳感器量度唾液葡萄糖水平



Glucose levels in saliva can now be measured more conveniently, safely and inexpensively, thanks to an ultra-sensitive transistor-based biosensor developed at PolyU that is nearly a thousand times more sensitive than a traditional device.

大學研發出高靈敏度的電晶體生物傳感器，可以更方便、安全、便宜地檢測唾液中的葡萄糖水平，其靈敏度比傳統驗血糖儀器高出近千倍。

Asian ergonomics design helps create Asian-fit products
亞洲人體工學設計助製亞洲人合身產品



The Asian Ergonomics Design Lab has developed a digital database of Asian head and face sizes for use in the design, engineering and fashion industries, allowing the development of better-fit products for the huge Asian market.

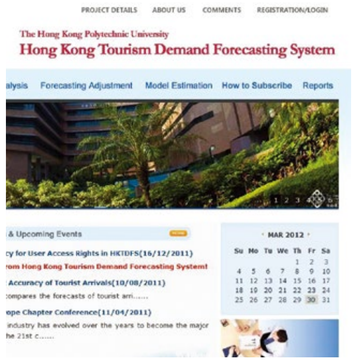
亞洲人體工學設計研究室建立了亞洲人頭及面部尺碼的數碼數據庫，供設計、工程及時裝界廣泛使用，為龐大的亞洲市場開發更符合亞洲人體型尺碼的產品。

Training to alleviate reading difficulties
減緩閱讀障礙的培訓

Based on a psycholinguistic theory of dyslexia, the Accelerating Reading Ability intervention programme makes extensive use of games as around 160 new words are gradually introduced and previously learnt words revised in each training session.

「促進閱讀能力」課程根據讀寫障礙的心理語言學理論而研發。課程加入大量遊戲，讓兒童於每節訓練課中逐步學習達一百六十個新詞彙，並重溫已學詞彙。

Tourism Demand Forecasting System facilitates effective planning
旅遊業需求預測系統促進有效規劃



The web-based Tourism Demand Forecasting System generates forecasts of tourism-related demand from target markets, providing figures to facilitate planning by tourism-related businesses, tourism investment and the formulation of sustainable tourism policies.

這個網上系統可預測旅遊業的相關需求，提供數據予旅遊相關業務和旅遊業投資作規劃用途，以及用作制定可持續發展旅遊政策。

Research Centres and Facilities

研究中心與設施

PolyU maintains its place on the cutting edge of socially and globally relevant research by investing in and actively supporting a wide variety of dedicated research centres and facilities. These units draw together leading experts from discrete fields into multidisciplinary teams, developing synergies in areas from aviation support to disaster management and beyond. For instance, PolyU recently opened a facility in 3D printing that allows rapid prototyping and builds on entrepreneurial efforts within the University. In addition, the University has in place centres in rail transit electrification, ultra-precision machining, food safety and technology, and natural anti-cancer drug development, among others.

理大積極投放資源，設立各種專門的研究中心和設施，使各項和社會及全球議題相關的研究均居於領導地位。這些研究單位雲集由不同領域頂尖專家組成的跨學科團隊，由航空服務支援以至災難管理及其他多個範疇，充分發揮協同效應。例如，理大最近設立的三維打印技術中心實驗室，可支援快速製作實體模型，有助實踐創業構思。此外，理大還設有軌道交通電氣化、超精密加工技術、食物安全與科技，以及開發天然抗癌藥物等的研究中心。