**PolyU's winning projects
at the 47th International Exhibition of Inventions of Geneva**

(1) WiseEye: AI-based Textile Material Inspection System

Principal Investigator: Professor Calvin WONG Wai-keung, Institute of Textiles and Clothing
(Video: https://youtu.be/kbzUSBfIeRw)

Two Grand Awards (Prize of the Italian Delegation of the Exhibition, Prize of the Technical University of Cluj-Napoca of Romania), Gold Medal with the Congratulations of Jury, and Special Merit Award

Equipped with a high-resolution charge-coupled device camera, WiseEye employs Artificial Intelligence (AI)-based machine vision, big data and deep learning technologies to perform real-time automated inspection on fabrics in place of manual inspection during the manufacturing process. This intelligent system can be installed on any weaving machines, and can identify about 40 common fabric defects with exceptionally high accuracy resolution of up to 0.1 mm/pixel, reducing 90% of material loss and wastage in the fabric manufacturing process.

WiseEye can be applied to most types of fabric with different weaving structures and colours. It marks a significant milestone in quality control automation for the textile industry, and can be further applied to other areas, such as apparel manufacturing, leather goods manufacturing, laundry, etc.

(2) Palm-sized 3D Ultrasound Imaging System for Radiation-free Scoliosis Assessment

Principal Investigator: Ir Professor ZHENG Yongping, Department of Biomedical Engineering

Grand Award (Prize of the Legal Company "Gorodissky & Partners", Russia), Gold Medal with the Congratulations of Jury, and Special Merit Award

The portable 3D ultrasound imaging system provides radiation-free assessment for diagnosing scoliosis in the early stages anywhere. Apart from diagnosis, the system can also be used to give real-time feedback during treatment and to monitor treatment progress.

Hung Hom Kowloon Hong Kong
香港九龍紅磡
E paadmin@polyu.edu.hk **T** (852) 2766 5101 **F** (852) 2364 0246
www.polyu.edu.hk/cpa

Opening Minds • Shaping the Future • 啟迪思維 • 成就未來

(3) Mobile Exo-neuro-musculo-skeleton for Self-help Post-stroke Upper Limb Rehabilitation

Principal Investigator: Dr HU Xiaoling, Department of Biomedical Engineering
(Video: https://youtu.be/IICTvXjyscw)

Grand Award (Prize of the Polish of Patents Office), Gold Medal, and Special Merit Award

Combining neuro-muscular electrical stimulation, soft pneumatic artificial muscle and exoskeleton, the device can sense the electromyogram (EMG) signals of paretic muscles and provide voluntary motor intention control for users. It thus offers effective self-help and mobile upper limb rehabilitation for patients after stroke. Its soft and flexible design makes it lightweight, compact and comfortable to wear, enabling patients to use it for training anywhere, anytime.

(4) Flexible, Stable, High-energy Textile Lithium Batteries

Principal Investigator: Professor ZHENG Zijian, Institute of Textiles and Clothing

Gold Medal and Two Special Merit Awards

The wearable, rechargeable lithium batteries with excellent energy density, cycling life and foldability are developed with metallic fabrics. They can be used to power wearable electronics, smart apparels, health monitors, communications devices, etc.

(5) Indirect Evaporative Cooler for Efficient Energy Recovery

Principal Investigator: Professor YANG Hongxing, Department of Building Services Engineering

Gold Medal

By recovering the heat energy in the exhaust in a centralised air-conditioning system to cool and dehumidify the incoming fresh air, this innovative system significantly saves energy by around 17% to 35%. It is suitable for all climates, especially hot and humid ones.

(6) Curvature-adaptive Multi-jet Freeform Polishing System for Precision Manufacturing

Principal Investigator: Ir Professor Benny CHEUNG Chi-fai, Department of Industrial and Systems Engineering

Silver Medal and Two Special Merit Awards

The novel technology, which allows different number of jets for different work pieces, enables fast and precise polishing of freeform surfaces by controlling the fluid pressure of each jet according to the change of surface curvature. It can be used in the post-process finishing of freeform surfaces made of different materials in various fields, such as biomedical science, optics, aerospace and 3D printing.

(7) An Industrial IoT-based Smart Robotic Logistics Management System

Principal Investigator: Dr Carman LEE Ka-man, Department of Industrial and Systems Engineering
(Video: https://youtu.be/1-o6tBhEHOU)

Silver Medal

The smart system applies Industrial Internet of Things (IoT), cloud computing and robotics to redefine logistics operations and warehouse picking and replenishment processes. Using autonomous mobile robots and advanced intelligent robotic algorithms, it revolutionizes the conventional labour-intensive man-to-goods procedures by adopting goods-to-man automation operation. The system of high operational efficiency also helps enhance labour and space utilization in warehousing.

Hung Hom Kowloon Hong Kong
香港九龍紅磡
E paadmin@polyu.edu.hk **T** (852) 2766 5101 **F** (852) 2364 0246
www.polyu.edu.hk/cpa

Opening Minds • Shaping the Future • 啟迪思維 • 成就未來