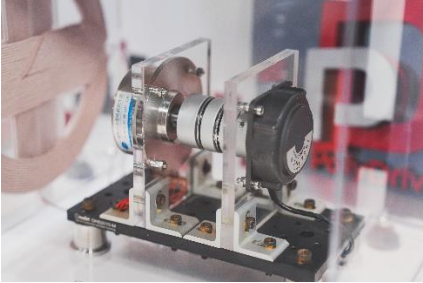



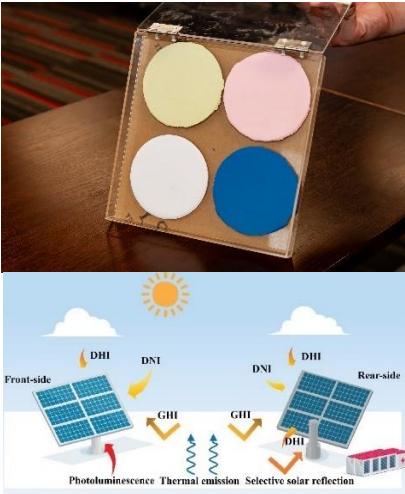


PolyU's winning innovations at 4th Asia Exhibition of Innovations and Inventions Hong Kong

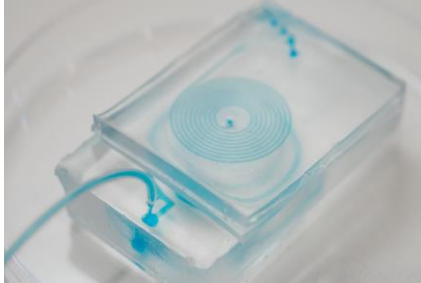

For high-resolution photos, please visit: <https://polyu.me/3VqAKpo>

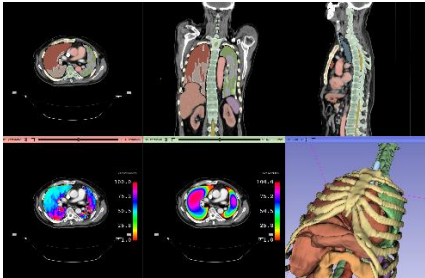
Project Description	Principal Investigator(s)	Image(s)	Award(s)
<p>Highly integrated wireless ultrasonic motor system for fully enclosed environments</p> <p>The wireless ultrasonic motor system designed by the team features a single integrated magnetic coupler connected to the motor, which can control motor systems in fully enclosed environments without power cables, batteries and controllers. The system is adaptable to various applications, facilitating seamless integration. Its streamlines are designed by operating without additional controllers or sensors, which is ideal for environments where traditional cabling is impractical, such as in robotic arms, enhancing mobility and flexibility. In enclosed environments like underground pipelines or underwater propellers, it avoids complications from perforated installation cables, preventing gas or liquid leaks. This innovation brings new solutions for advanced applications in robotics and industrial automation.</p>	<p>Prof. CHAU Kwok-tong Chair Professor, Department of Electrical and Electronic Engineering</p>		<p>Grand Prize Gold Medal</p>
<p>Eye-On-a-Chip technology</p> <p>Eye-On-a-Chip Technology aims to provide eye-mimicking environment for testing eye products such as contact lens materials, multipurpose solutions, eye drops, and pharmaceuticals, etc. This product utilizes microfluidics technology to simulate tear flow, enables real-time imaging and employs a patented automatic image analysis algorithm. Its design allows for easy and safe installation while minimizing material usage. As a result, it</p>	<p>Dr Liping ZHOU Co-Principal Investigator, CEVR; Research Assistant Professor, School of Optometry and the Department of Applied Biology and Chemical Technology, PolyU</p>		<p>CAI Award Invention and Innovation – China Association of Inventions Gold Medal</p>



Project Description	Principal Investigator(s)	Image(s)	Award(s)
<p>saves researchers and pharmaceutical companies both money and time, simplifies the research process, and generates more accurate and reliable clinically relevant data.</p>	<p>Dr Chau-minh PHAN Principal Investigator, CEVR</p>		
<p>“ProRuka” - novel prosthetic hand controlled by wireless sonomyography</p> <p>ProRuka is a novel 3D-printed powered prosthetic hand that can move its fingers independently. It is controlled by stump muscle signals collected by wireless wearable ultrasound imaging known as sonomyography. These signals are analysed by AI algorithms in real time to decode the natural control mechanism of a human hand motion. The AI model can also classify a specific hand gesture and the degree of action based on the activation pattern of all muscles combined in the scanning area. ProRuka allows more intuitive control of the prosthetic hand and can predict more complex hand gestures with higher accuracy. The mechanical design is based on the natural dimensions and proportions of a human hand and is lightweight and cost-effective. ProRuka aims to improve the comfort and acceptance of a prosthetic hand, and help them regain quality of life, independence, and confidence.</p>	<p>Prof. ZHENG Yongping Henry G. Leong Professor in Biomedical Engineering; Chair Professor of Biomedical Engineering, Department of Biomedical Engineering, PolyU; Co-founder and Director, Sonoconnect Technology Limited (a PolyU academic-led start-up)</p> <p>Mr Vaheh NAZARI Hardware Engineer, Sonoconnect Technology Limited (a PolyU academic-led start-up)</p>		<p>Gold Medal</p>
<p>Last-centimetre drone delivery in urban environments</p> <p>Drone flight in urban areas is challenging due to the unreliable and inaccurate Global Navigation Satellite System (GNSS) service. The innovation developed by the team provides a package of hardware and algorithms, enabling a drone to fly into balconies of apartments using a LiDAR, which does not require manpower for the final-segment parcel delivery. It employs an advanced</p>	<p>Dr HUANG Hailong Assistant Professor, Department of Aeronautical and Aviation Engineering</p>		<p>Gold Medal</p>



Project Description	Principal Investigator(s)	Image(s)	Award(s)
<p>perception algorithm to enable precise localisation for both drone and balcony, significantly enhancing landing accuracy, and making it versatile and adaptable to various scenarios. The robust control algorithm also enables the drone to navigate through various disturbances like wind with precision and deliver parcels seamlessly in complex urban environments safely.</p>			
<p>Synergistic integration of terrestrial radiative cooling and bifacial solar photovoltaics for low-carbon buildings</p> <p>The team has developed an environmentally friendly solar-driven adaptive radiative cooling coating that can adjust cooling capacity based on solar irradiance, thus cooling building roofs and walls without consuming any energy. The invention can integrate bifacial photovoltaic (biPV) modules, enabling simultaneous solar power generation and radiative cooling, thereby transforming buildings from energy consumers into energy harvesters. The coating can also convert solar energy into visible light to prevent buildings from absorbing excessive heat, as well as improve the efficiency of biPV systems and enhance their cooling capabilities. This enables buildings to generate more power while passively radiating excess heat into space, helping to realise energy-efficient and net-zero energy building designs.</p>	<p>Prof. LU Lin Vivien Professor, Department of Building Environment and Energy Engineering, PolyU</p> <p>Dr GONG Quan Postdoctoral Fellow, Department of Building Environment and Energy Engineering, PolyU</p>		<p>Gold Medal</p>


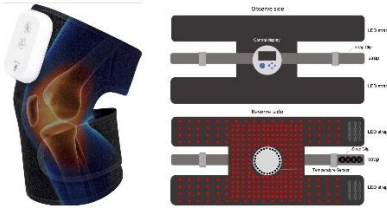
Project Description	Principal Investigator(s)	Image(s)	Award(s)
<p>“AkkMore™” - natural fat substitute</p> <p>The global fat substitutes market is enormous, but there is a lack of healthy, standardised natural alternatives. The AkkMore™ mushroom extract developed by the team has been proven to be an effective substitute for fat in ice cream and other high-fat products. AkkMore™ also has health benefits such as preventing obesity, diabetes and fatty liver, regulating intestinal flora, stabilising blood sugar levels and inhibiting neuroinflammation. AkkMore™ mushroom extract formula has been successfully applied to a variety of products such as cookies, moon cakes, and ice cream. Using AkkMore™ instead of animal cream can reduce greenhouse gases produced by raising dairy cows, extend the shelf life of cream products, and reduce food waste by implementing cold chain transportation.</p>	<p>Dr CHANG Jinhui Research Assistant Professor, Department of Food Science and Nutrition, PolyU; Co-founder, Bo InnoHealth Biotechnology Company Limited (a PolyU academic-led start-up)</p>		<p>Gold Medal</p>
<p>Artificial reef for oyster reef restoration in topological approach</p> <p>The artificial oyster reefs use specially designed structures to mimic the function of natural oyster reefs, providing habitats for marine life. The aim is to enhance oyster growth rates and contributes to improving the marine environment and biodiversity, as well as helping filter harmful substances from the water to further improve the marine environment. The reefs are made of recyclable materials and produced by 3D printing to achieve cost-effective and efficient ecological restoration. The reef structures are also equipped with water quality monitoring systems that can track various indicators in real-time, such as water temperature, salinity, and pH levels. The data are relayed to a control panel, providing continuous support for ecological environment data. The team plans to conduct trials in marine areas to verify the effects of water quality</p>	<p>Mr Dean CHAN PolyU School of Design alumnus; Engineer, Team Orz (a PolyU start-up)</p>		<p>Gold Medal</p>

Project Description	Principal Investigator(s)	Image(s)	Award(s)
improvement and use this as a basis to promote larger-scale applications.			
<p>The microfluidic platform for rapid efficient separation and detection of micro/nanoplastics</p> <p>Plastaway is an innovative microfluidics-based lab-on-a-chip designed for rapid, cost-effective detection of micro/nano-plastics (MNPs) pollution. Addressing the limitations of traditional MNP detection methods, which are often costly, time-consuming and requiring specialised expertise, Plastaway enriches, isolates and labels MNPs efficiently within one hour. This platform utilises microfluidic technology integrated with fluorescent microscopy, ensuring high sensitivity, precision and ease of use. The invention is suitable for a wide range of applications, including environmental monitoring, food and beverage testing, and cosmetic safety assessments. With pilot trials on polluted seawater, the lab-on-a-chip has demonstrated robust reliability, positioning Plastaway as a leader in MNP detection technology. The invention aims to empower industries, research institutions, and environmental non-governmental organisations for more informed decision-making and sustainable practices.</p>	<p>Dr CHUA Song Lin Assistant Professor, Department of Applied Biology and Chemical Technology, PolyU; Technical Advisor, Plastaway Limited (a PolyU academic-led start-up)</p> <p>Dr CHEN Chun Kwan Postdoctoral Fellow, Department of Applied Biology and Chemical Technology, PolyU; CEO, Plastaway Limited (a PolyU academic-led start-up)</p>		Silver Medal
<p>High-efficiency GaN converter module for wireless power transfer facilities</p> <p>The team has integrated gallium nitride (GaN) chips into the design of high-performance power converters with low gate driver stray inductance and low switching loss. An insulated metal substrate printed circuit board design is utilised to lower the thermal resistance while ensuring electrical isolation. The gate drive has small ringing and voltage overshoot, which ensures the realisation of smooth</p>	<p>Dr LIU Wei, Lucian Assistant Professor, Department of Electrical and Electronic Engineering, PolyU</p>		Silver Medal

Project Description	Principal Investigator(s)	Image(s)	Award(s)
<p>switching characteristics of the GaN switches. Compared with other converters, the new GaN high-electron-mobility transistor (HEMT) converter has higher efficiency, power density and switching frequency. Compared with GaN converters at the same power level, this new converter has better drive performance and incurs lower costs to promote commercialisation. It can be applied in various wireless power transfer facilities, including wireless charging for electric vehicles among others.</p>			
<p>“LungRT Pro” - advanced radiotherapy support system</p> <p>This project aims to enhance lung radiotherapy by automating the analysis of patient CT images and simplifying clinical procedures. With a few clicks, it identifies organs and generates lung ventilation and perfusion maps, providing a comprehensive visual representation of lung function. This streamlined process aids clinicians in making informed treatment decisions, improving patient outcomes. The system employs cutting-edge image processing algorithms and AI techniques to ensure high accuracy and consistency. It features a user-friendly interface, a powerful backend, and 3D visualisation capabilities. The system is designed to be compatible with major operating systems, reducing environmental impact with broad accessibility, making it a valuable tool in lung radiotherapy. The automation of manual tasks also reduces workload and minimises human error.</p>	<p>Prof. CAI Jing Associate Dean, Faculty of Health and Social Sciences; Professor, Department of Health Technology and Informatics, PolyU; Technical advisor, InsightRT Ltd (a PolyU academic-led start-up)</p>		<p>Silver Medal</p>

Project Description	Principal Investigator(s)	Image(s)	Award(s)
<p>“Vcare” - Vision training VR device</p> <p>Vcare offers personalised vision correction training for myopia, amblyopia, and strabismus. It combines hardware and software to provide engaging Virtual Reality (VR) games and exercises for active participation. Unlike traditional methods, this non-invasive solution minimises side effects and complications. Vcare is featured with a patented multi-folded lens module with a vari-focal mechanism in the VR headset. It automatically adjusts the focal length during the VR experience, providing optimal visual clarity without requiring manual adjustments. Notably, clinical trials have shown significant improvements in amplitude of accommodation and accommodative facility after training, highlighting its efficacy. The team have prioritised rigorous research and clinical trials to ensure effectiveness and safety by collaborating with eyecare professionals to provide a safe and convenient alternative for vision correction training.</p>	<p>Dr TANG Yuk Ming Senior Lecturer, Department of Industrial and Systems Engineering; Co-founder, Vcare Vision Technology Limited (a PolyU academic-led start-up)</p>		<p>Silver Medal</p>
<p>Real-time traffic noise identity extraction</p> <p>With the increasing adoption of electric vehicles, tyre and road noise has become the principal source of traffic noise pollution. This innovation aims to improve the quantification capabilities of the widely employed Close Proximity method for measuring tyre and road noise on urban roads. It facilitates real-time measurement of the sound power level of tyre and road noise, providing a definitive metric for noise sources that is less affected by the varying measurement conditions in typical urban settings, such as in Hong Kong. This technology stands out globally for its exceptional robustness, accuracy, and repeatability in real-time assessments. As urban traffic noise becomes increasingly severe, this absolute noise</p>	<p>Dr LEUNG Chi Kin, Randolph Associate Professor, Department of Mechanical Engineering, PolyU</p>		<p>Silver Medal</p>

Project Description	Principal Investigator(s)	Image(s)	Award(s)
<p>measurement technology aids in the predicting and managing urban traffic noise disturbances.</p>			
<p>“allcareAI” - smart anti-infection mobile dry toilet Unlike conventional commode chairs, the allcareAI smart anti-infection mobile dry toilet helps caretakers alleviate the daily hygiene and workload burden by eliminating the need to manually disinfect the toilet seat and empty the waste before and after each use. Leveraging its patented all-in-one toilet seat wrapping and bowl sealing automation technology, both the toilet seat and bowl are automatically wrapped and sealed by a disposable toilet seat bag using environmentally friendly material, ensuring hygiene and dignity to both caretakers and care recipients. The waterless and installation-free design enables it to be deployed at any time, in any community household or facility. Integrated with a variety of sensors and touchscreens, it digitises and visualises user and device status for easy health and Internet of Things (IoT) management.</p>	<p>Mr Phil WOO Outstanding Alumni Awardee in Entrepreneurial Achievement of PolyU Faculty of Humanities; Co-founder, PREN Limited (a PolyU start-up)</p>		<p>Silver Medal</p>
<p>Flower shaped intelligent medicine box based on artificial intelligence algorithm analysis The intelligent medication management solution developed by the team enhances medication safety and educational outreach in the community and patient medication adherence through the IoT intelligent medicine boxes and accompanying data-driven systems. It could help drug research and development companies complete new drug trials more efficiently at a lower cost, while also targeting the issues of patients forgetting or repeating to take medication and taking the wrong medication. This holistic solution provides more precise health management to patients and reduce drug waste. The system is also able</p>	<p>Dr ZENG Jingqiang PolyU Department of Applied Social Sciences alumnus; Founder and CEO, People Strong High-tech Company Limited (a PolyU start-up)</p>	 <p>Medicine data collection, medicine behavior analysis, health management assistance</p> <p>Take medicine in time, remember to take medicine, take the right medicine</p>	<p>Silver Medal</p>

Project Description	Principal Investigator(s)	Image(s)	Award(s)
<p>to automatically detect, manage, and operate without geographical or time limitations. It leverages technology and community education to engage deeply with the community, so enabling remote monitoring and data empowerment.</p>			
<p>The method of preparing rPVC composites from PVC waste</p> <p>Processing PVC (Polyvinyl Chloride - Plastic No. 3) may release toxic dioxins and hydrogen chloride. This invention addresses the recycling challenges in Hong Kong by introducing a comprehensive solution. Using a low-temperature, high-pressure process with patented additives, PVC waste is transformed into valuable products such as boxes, rPVC flooring and even phone cases. Throughout the manufacturing process, carbon emissions are meticulously calculated, and carbon dioxide is captured. By-products are reused, further enhancing sustainability. This upcycling approach conserves landfill space and valuable materials, generating carbon credits that contribute to both the environment and economy.</p>	<p>Mr WONG Chi San PolyU Department of Biomedical Engineering alumnus; Executive Director, EBP Biotech Company Limited (a PolyU start-up)</p>		<p>Silver Medal</p>
<p>Wearable smart device for knee osteoarthritis</p> <p>Knee osteoarthritis (Knee OA) affects a large portion of the aging and sporting population, yet effective, accessible long-term treatments are limited. This wearable LED device is equipped with temperature sensors to assess knee joint temperature changes, enabling differentiation Knee OA phenotypes for targeted treatments. Animal studies have showed that each wavelength targets specific knee tissues, such as synovitis, tendons, or cartilage. Its three-chip LED enables independent activation of each wavelength, customising treatment based on tissue</p>	<p>Prof. FU Siu Ngor Associate Head and Peter Hung Professor in Pain Management, Department of Rehabilitation Sciences; Associate Director, Research Institute for Sports Science and Technology</p>		<p>Bronze Medal</p>

Project Description	Principal Investigator(s)	Image(s)	Award(s)
involvement and Knee OA phenotype. The AI-driven system also adjusts LED settings dynamically, based on patient-specific data from studies, to optimise outcomes. Patients can scan a QR code for customised rehabilitation advice and virtual consultations.			