For Immediate Release

HKRITA showcases its achievements in the 48th International Exhibition of Inventions of Geneva

Driving the sustainable development of the textile and apparel industry and benefits for society

29 May 2023 — The Hong Kong Research Institute of Textiles and Apparel (HKRITA) has achieved a grand slam in the 48th International Exhibition of Inventions of Geneva with a total of 9 awards from all its entries this year. At today's media briefing, HKRITA demonstrated all the award-winning innovations, specifically including a "Gold Medal with Congratulations of the Jury". This outstanding success is attributed to the dedicated commitment of its local professional R&D teams in driving the sustainable development and future advancement of the textile and apparel industry with their core competencies and innovative use of technology, while addressing the evolving needs of the community in order to enhance the quality of life in our society.

Mr Edwin Keh, Chief Executive Officer of The Hong Kong Research Institute of Textiles and Apparel, said during his congratulatory message at the event today in The Hong Kong Science Park, "our performance at this International Exhibition of Inventions of Geneva is evidence of our success in facilitating the entire R&D lifecycle from ideation and concept development to technology transfer and commercialisation. Going forward, we are planning to have The Open Lab in operation in Hong Kong in 2024 to scale solutions and maximise impact, ensuring smooth transition from research to business opportunity."

In the 48th International Exhibition of Inventions of Geneva, HKRITA stood out from among many innovative submissions from around the globe and earned high praise, with its 9 winning entries, including a "Gold Medal with Congratulations of the Jury", along with 3 Gold Medals, 4 Silver Medals and 1 Bronze Medal. Among this year's entries, HKRITA has developed an exciting range of R&D technologies and smart solutions for a wide variety of applications in different sectors to address some longstanding industry challenges and societal needs. One of these is the project "**Compact Electro-adhesion Gripper for Fabric Handling**", which received a "Gold Medal with Congratulations of the Jury" in the category of machinery. This invention helps enhance the automation of material handling, driving the transformation of the textile industry as we head towards Industry 4.0.

The 48th International Exhibition of Inventions of Geneva (26-30 April 2023), one of the biggest and most important international annual events devoted exclusively and continuously to invention, welcomed inventors, researchers, manufacturers, commercial traders and financiers from around the globe to present and discover the latest research results and innovation achievements. HKRITA has participated in this event since 2010 and has received a total of 70 awards, including 31 Gold Medals.

About The Hong Kong Research Institute of Textiles and Apparel (HKRITA)

Established in 2006, HKRITA is funded by the Innovation and Technology Commission of the HKSAR Government and is hosted by The Hong Kong Polytechnic University. HKRITA contributes to the competitiveness of the textile and apparel industry by providing one-stop services in applied research, technology transfer and commercialisation. HKRITA also plays a vital and expanding role in driving sustainable improvements in the industry and thus bringing benefits to society as a whole.

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For media enquiries, please contact:

iPR Ogilvy
Shelley Li / Charlotte Mo
Tel: 3920 7673 / 3920 7617
Email: shelley.li@iprogilvy.com /
charlotte.mo@iprogilvy.com

The Hong Kong Research Institute of Textiles and Apparel
Ms SC Ku
Tel: 2627 8112
Email: scku@hkrita.com

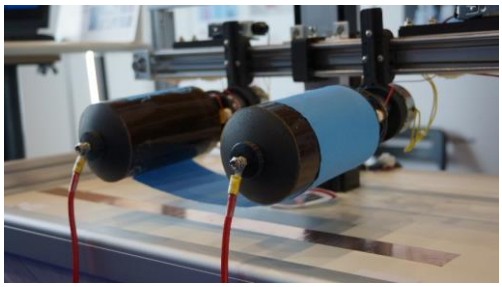
Photo:

Photo 1

Mr Edwin Keh, Chief Executive Officer of The Hong Kong Research Institute of Textiles and Apparel expresses that they are delighted to have achieved great success in the 48th International Exhibition of Inventions of Geneva with a total of 9 awards from all its entries this year.

Appendix: HKRITA Award-winning Projects

Gold Medal with Congratulations of the Jury:
Compact Electro-adhesion Gripper for Fabric Handling (Category: Machinery)



This project has developed a pair of robust electrostatic grippers controlled by robotic arms for handling large, soft and thin fabrics. The insulated roller surface of the grippers is embedded with a high density of conductive electrodes to yield an electro-adhesion force. Simply positioning the rollers at the two edges of the fabric and rolling up the fabric through 180° enables the rollers to firmly grip the fabrics piece by piece from a fabric stack by electro-adhesion force and shear force. This technology increases the level of automation, making the whole fabric manipulation process more flexible and efficient, and in turn driving the transformation of the textile industry towards Industry 4.0.

Gold Medal:
Development of Bacterial Cellulose Fibres from Sustainable Source (Category: Textile)

Cotton growing uses a substantial amount of pesticides and water, while the production of wood-based regenerated cellulose fibres involves a kraft process which uses harmful chemicals. This project has developed a novel solvent system and spinning method to produce regenerated cellulose fibres out of sustainable bacterial cellulose (BC) fermented from kombucha (a fermented sweetened black tea). Kombucha bacterial cellulose (KBC) as a byproduct from fermented tea has high degrees of purity and polymerisation, and can be utilised as an alternative source for sustainable cellulose fibre production with improved energy efficiency. The regenerated cellulose fibres produced have passed the laboratory tests of fibre strength and elongation, providing a viable and eco-friendly source for the manufacture of textile materials. Comparing with cotton and wood-based fibres, the BC fibres have a faster growth rate and less water consumption, without the use of pesticides and toxic chemicals during the production process.

Gold Medal:
Mordant-free Natural Dyeing of Cotton Fabric (Category: Textile)

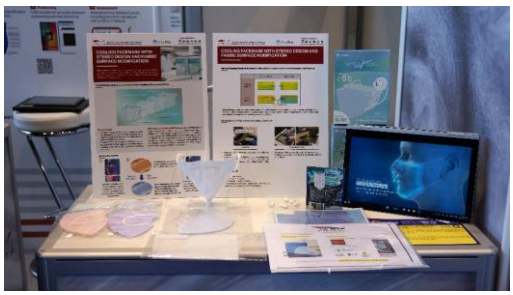
Synthetic dyes are widely used in textile dyeing but their production and the related waste treatment processes create severe environmental hazards. Use of natural dyes seems to be a sustainable and biodegradable solution, but their poor affinities with textiles lead to the use of harmful heavy metal mordants or binding agents that cause water pollution. This project has developed a mordant-free natural dyeing method, which is able to dye cotton fabric effectively. With the use of surface functionalisation of fabrics by metal-organic framework (MOF), this method offers at least a 50% higher dye

uptake than the conventional natural dyeing method. Fabric dyed by this mordant-free dyeing method has excellent antibacterial properties, good biodegradability and causes no skin irritation. It also works for polycotton and wool, presenting an efficient, sustainable and biodegradable solution for textile dyeing.

Gold Medal:
Smart Garment Sorting System for Recycling (Category: Textile)

This smart, automated sorting system provides an effective and efficient solution to sort reusable and resalable post-consumer garments by using artificial intelligence and image analysis. The integrated system comprises four highly customisable AI-backed modules connected by a conveyor path with robotic arms to identify garment type, fabric structure, material composition and colour. The four modules can be operated as stand-alone units or arranged in different order to carry out specific sorting tasks and business operations. In terms of performance, the fabric structure module operates at 95% accuracy while other modules operate at over 90% accuracy. This system is able to sort bulk garments effectively and generates a full set of results in eight seconds, eliminating most manpower requirements and minimising hygiene concerns. The value of the recycled garment materials can be maintained, extending the garment lifecycle while contributing to the sustainability and eco-friendliness of the industry.

Silver Medal:
Cooling Facemask with Stereo Design and Fabric Surface Modification (Category: Health)

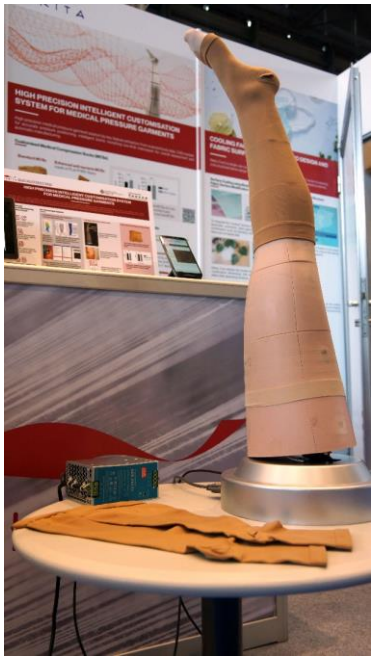


This single-use non-woven facemask features a subtle structural design and a fabric surface coating with hygroscopic cooling agents to relieve the moist feeling and heat stress when in use. Among its four layers, the “Cool Hygroscopic Layer” is a non-woven fabric coated with hygroscopic sugar alcohols, which can serve as non-irritating and non-sensitising cooling agents to absorb warm exhaled moisture, thus lowering the immediately surrounding temperature and maintaining a temperature differential of up to 5°C lower on the inner surface of the mask, compared to that of a standard facemask even when worn over a period of time. In addition, its stereo design creates an optimised 3D breathing zone and minimises unnecessary contact area between the facemask surface and the wearer’s facial regions to prevent heat accumulation through direct thermal conduction, giving wearers a feeling of coolness with extra comfort. This project was developed in the partnership of HKRITA, The Hong Kong Polytechnic University and SkyPro.

Silver Medal:
Eco-friendly Yarn and Fabric for Sporty Fashion (Category: Textile)

Sporty fashion, integrating functional materials and design, is a mainstream of the fashion industry nowadays. This project has designed eco-friendly yarns and fabrics for the production of sporty fashion with multi-functions. Bio-based materials such as cellulose, protein and natural synthetic polymer (*i.e.* Lyocell, wool, silk, PLA and PHBV) are used to develop yarns with special fibre distribution and functional fabrics with specific structural design. The developed fabrics have multiple functions including one-way moisture transport and UV blocking, and benefits such as antimicrobial properties, durability and easy care. The production method, developed based on the selected fibres' features such as morphology, dimension, hydrophobicity and hygroscopicity, is sustainable without using any harmful chemicals and can be applied in existing production processes, serving as a green alternative source of materials for sporty fashion.

Silver Medal:
High Precision Intelligent Customisation System for Medical Pressure Garments (Category: Health)



Varicose veins are a common chronic venous disease affecting over 30% of the population in Western countries. Wearing medical compression stockings (MCSs) is an effective way to relieve varicose veins. To address the stringent demands of quality medical pressure garment manufacturing, this project has developed an intelligent customisation system for the production of MCSs by using Computer Aided Design (CAD) and Computer Integrated Manufacturing (CIM) technology. Featuring a morphing bionic leg mannequin that can be adjusted circumferentially and longitudinally with a total of 22 embedded pressure sensors, the system can collect data and identify lower limb dimensions and potential pressurised locations through real-time measurement. This facilitates customisation of MCSs based on specific needs of patients and enhances accuracy in medical compression garment manufacturing. It decreases the back-and-forth communication time and cost during stocking samples production and increases the willingness of patients to put on the custom-fit compression stockings. This project was developed in the partnership of HKRITA and The Hong Kong Polytechnic University.

Silver Medal:

Smart Composite Material with Energy Absorption for Protection (Category: Textile)

This project has invented a smart composite material in which anisotropic particles are used to introduce a controllable shear sensitivity. This new smart composite material is produced by using biocompatible and non-toxic inorganic oxide particle, anisotropic cellulose and hydrocarbon compounds in a simple process at room temperature in 10 minutes and at a low cost. Using the conventional textile finishing process "pad-dry-cure", this smart composite material can be coated on textiles such as woven, knitted and other fabric types. The finished fabric, in dry form, provides a toughening effect from low to high shear rates, depending on the production formula. To adjust the production formula, a variable shear rate sensitivity can be achieved for providing different protection functions such as acoustic protection, stab-resistance and protection against falls, slips and trips. The smart composite materials have great potential for different applications and are easy to scale up.

Bronze Medal:

Microplastic Degradation Using Microbial Consortium (Category: Environment)

The textile industry is believed to be one of the major sectors generating and releasing microplastics affecting oceans, land and the human food chain. This project has developed a biological method to degrade microplastics by using a naturally occurring microbial consortium. The method can digest common synthetic fibres, such as polyester, acrylic and nylon, over a period of 48-53 weeks. This sustainable approach has great potential to be applied in textile mills, landfills and even daily environments where plastic waste occurs, providing an eco-friendly, effective and economic solution to handle microplastics.

View the awarded projects in detail:
https://www.hkrita.com/en/our-innovation-tech/achievement/awards?year=2023&event=5

Download photos: https://bit.ly/43ugV1H