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HKUST and APEL establish joint laboratory to develop novel health and environmental innovations

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Hong Kong University of Science and Technology (HKUST) has jointly established a laboratory with Absolute Pure EnviroSci Limited (APEL) to develop and translate novel discoveries into groundbreaking health and environmental innovations. These include highly effective and long-lasting pest repellent against bedbugs that can also inactivate up to 99.9% of highly-infectious viruses, bacteria and hard-to-kill spores, as well as artificial organoids that could help quantify pollutionâ??s risks on human health and provide essential data for establishing a health monitoring system in Hong Kong and Greater Bay Area (GBA).

Prof. YEUNG King-Lun from the Department of Chemical and Biological Engineering and Division of Environment and Sustainability at HKUST and Dr. Pat YEUNG, Director of APEL, signed the memorandum today on the establishment of HKUST-AP EnviroSci Ltd Joint Laboratory (the Joint Lab).

With an initial funding of HK$20 million from APEL, an affiliated subsidiary of the listed company Yee Hop, the Joint Lab will contribute sustainable solutions to support water resources management, reduce and revalorize food waste and support decarbonization by enhancing energy efficiency from conditioning to power plant.

The advanced formula, derived from the anti-pathogenic Multilevel Antimicrobial Polymer (MAP-1) â?? one of the earliest disinfectants to provide long-lasting protection against SARS-CoV-2 during the global COVID-19 pandemic â?? has been certified by two labs in Mainland China and Switzerland of having 100% repellency against bedbugs. This eco-friendly anti-pest spray is set to be adopted by Hong Kong athletes during the Paris 2024 Olympic Games, in response to a growing bedbug issue in Europe.

The formula can also be incorporated into fabrics such as cotton and linen without altering their texture, providing long-lasting anti-pathogenic protection to clothing and accessories, especially those worn or used by patients, elderly or infants.

HKUST Vice-President for Research and Development Prof. Tim Cheng said, â??These units provide a platform for collaboration between academia and industry, allowing us to leverage our strengths and expertise to tackle complex problems and develop innovative solutions. They also provide students with unique opportunities to gain practical experience and exposure to industry-relevant projects, preparing them for successful careers in their chosen fields".

APEL Chairman Dr. David Chung said, â??The four main areas we will be focusing on are: environmental hygiene and sanitation, air and water purification, net-zero, circular resource utilization, and energy-saving decarbonization processes."

Researchers led by Prof. Yeung have also built 3D-printed cellular scaffoldings of human skin, lung, kidney, and heart cells to create artificial organoids* for monitoring air and water pollutions to directly measure their potential harm to human health. The cellular viability, functional changes, and biological expressions data from these artificial organoids will provide important health index to inform policy-makers locally and across the GBA on pollutions and pave the way to improving citizenâ??s health and well-being.

Other innovative solutions being developing by the Joint Lab included Algi-Gel, an award-winning hydrogel that controls and prevents the rapid proliferation of algae in fresh and seawater. It is currently being tested in partnership with the Water Supplies Department. The Joint Lab has also embarked on developing a sustainable washable air filter for better indoor air quality and an enhanced cooling surface to improve air conditioning and cooling systems.

* An organoid is a miniaturized and simplified version of an organ produced in vitro in three dimensions that mimics the key functional, structural, and biological complexity of that organ. Scientists use organoids to study development and disease in the laboratory.