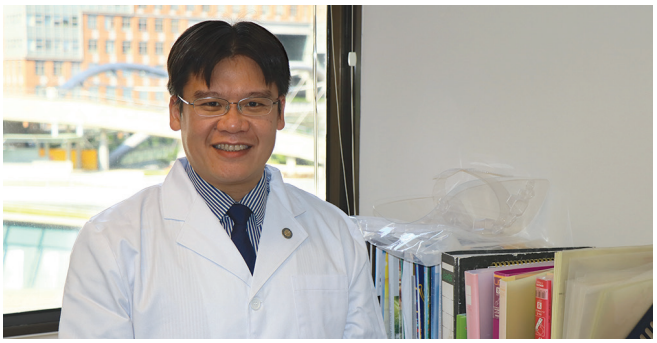
An Antimicrobial and Self-Cleaning Gown to Protect Those Most at Risk

– Interview with **Dr Ka-fu YUNG, Joseph**
Associate Professor & Associate Head, Department of Applied Biology and Chemical Technology

As the COVID-19 pandemic continues to claim lives and wreak havoc on healthcare systems across the globe, it is essential to uphold public hygiene at every level, from the household to the workplace. Stringent cleaning and disinfection measures can help to reduce the risk of spreading the virus and protect people until an effective vaccine is found.

With this in mind, **Dr Ka-fu YUNG, Joseph**, of the Department of Applied Biology and Chemical Technology and his team set out to fill a critical gap in COVID-19 research. We know that the COVID-19 can survive on fabrics for up to 24 hours, creating a high risk of infection. However, whilst liquid disinfectants such as bleach are widely used on hard and non-absorbing surfaces, porous surfaces like textiles require a different approach. “The instant and simple disinfection of clothes, uniforms, curtains, etc.,” says Dr Yung, “is needed to provide stronger protection for the public.”



Laboratory coats carry a particular risk for students, teachers and technicians. Washing them after each use is costly and time-consuming, and may even lead to cross-contamination. In teaching laboratories, close contact between students and demonstrators further increases the infection risk. To help safeguard students, Dr Yung and his team will capitalise on the unique properties of textiles to develop and test a laboratory gown with antibacterial, anti-stain and self-cleaning functions.

This will build on important work already done by the researchers, who recently used zinc oxide based nanomaterials to develop a robust antimicrobial treatment for cotton-based fabric. This treatment not only works against various bacteria, but also shows substantial antiviral activity towards H1N1, which is similar to the virus that causes COVID-19. Even better, the nanomaterials serve as a photocatalyst that accelerates the breakdown of organic compounds by absorbing UV radiation. Therefore, explains Dr Yung, “an anti-stain and self-cleaning process will be automatically performed when the laboratory gown is exposed to in-house light”.

Dr Yung and his team will produce and trial 1,000 proposed gowns, with the assistance of Prince Philip Dental Hospital. The data they collect will allow them to take another step on the path towards substantially enhancing the safety of all clinical students receiving hands-on laboratory training in the COVID-19 era.

抗菌自潔實驗袍 提供更佳抗疫保障

— **容家富博士**專訪
應用生物及化學科技學系副教授兼副系主任

2019冠狀病毒的疫症大流行繼續肆虐全球，造成人命損失並衝擊醫療系統，我們實在有必要從家居至工作上的每一個層面謹守公眾衛生。在有效疫苗面世前，嚴格的清潔和消毒措施有助減低病毒傳播風險，保障人類安全。

有見及此，應用生物及化學科技學系**容家富博士**及其團隊隨即展開工作，務求填補有關2019冠狀病毒防護的關鍵缺口。據研究顯示，2019冠狀病毒可於布料上存活長達24小時，這將大大提高其社區感染風險。雖然漂白水等液體消毒劑一般可有效而快速地消毒不吸水的硬表面，但紡織物等透水表面卻需要另一種處理方法。容博士表示：「我們需要一種能為衣物、制服、窗簾等紡織物進行簡單且即時的消毒方法，才可為公眾提供更強的防疫保護。」

實驗袍對學生、老師和技術員來說有一定的風險，因為每次使用後都進行水洗不但花錢耗時，也可能引至交叉感染。學生和研究人員在教學實驗室的密切接觸也會進一步增加感染風險。為守護同學，容博士和他的團隊將利用織物獨有的特質，研發出一款具有抗菌、防污漬和自潔功能的實驗袍，並為其進行測試。

研究團隊最近研發出以鋅氧化物為基礎的納米物料於綿質布料上進行的強效抗菌處理。這種處理不但可以對抗各種細菌，同時對與2019冠狀病毒相似的H1N1，具備高度的抗病毒活性。當中的納米物料更可同時用作光催化劑，透過吸收紫外光而加快分解有機化合物。容博士解釋指：「當實驗袍曝露於室內光線時，防污自潔的程序便會自動進行。」

在菲臘牙科醫院的協助下，容博士和團隊將生產及試用1,000套新研發的實驗袍。試用時將收集數據支持下一步的研究，持續提升學生在疫情下於實驗室的安全。