中央研究院生物多樣性研究中心
Biodiversity Research Center, Academia Sinica
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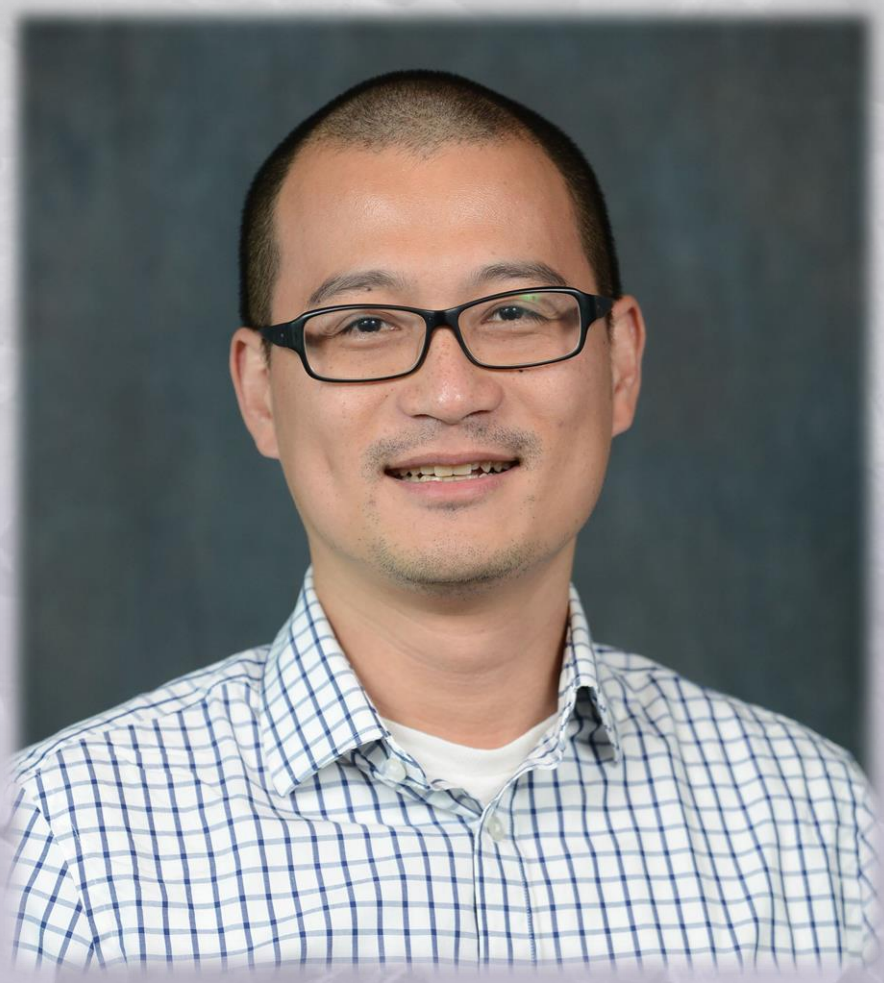
02-2789-9621

Microbial Diversity and Bioinformatics

Carbon Nanotube Array for Rapid Virus Enrichment and Sample Preparation



Dr. Yin-Ting Yeh

Assistant Research Professor
Department of Physics, Pennsylvania State University

Time: 2023. 02. 03 Fri. 15:00
Venue: Auditorium, 1st Floor,
Interdisciplinary Research Building
跨領域科技研究大樓1樓演講廳
Host: Dr. Sen-Lin Tang 湯森林研究員

~Attendee must wear mask~
~與會者請配戴口罩~

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Abstract

Viruses evolve rapidly and unpredictably, challenging the effectiveness of disease diagnostics. To help control outbreaks and understand their origins, the first step is often isolating viruses from infected samples for characterization. We demonstrate that multiple virus strains can be simultaneously enriched and optically detected in only a few minutes without using any labels. We grow carbon nanotube forests on various substrates to capture different viruses based on their physical sizes. A portable platform that captures viruses by their size, coupled to Raman spectroscopy, resulted in successful virus identification with 90% accuracy in real time directly from clinical samples. Furthermore, this viable enrichment process enables culturing of the captured virus, and characterization by electron microscopy and deep sequencing. This hand-held platform is an effective system for virus surveillance by enabling real-time virus identification and can be modified for virus detection from different sample types.