DOI: doi.org/10.47363/JCET/ICPEI2026/2026(7)2

Defeating Resource Bottlenecks in Mass Screening: Empowering Global Pandemic Surveillance via Free Liaw Pooling Strategies

Chen-Kun Liaw

Department of Orthopedics, Taipei Medical University, Taiwan

Abstract

As the world faces an era of continuous pandemic threats, the primary challenge for global health systems remains the initial, rapid mobilization of mass population screening. When time and testing resources are severely limited, sample pooling serves as the only mathematically viable solution to identify infectious cohorts quickly.

This presentation introduces two breakthroughs in diagnostic optimization software: "Liaw Improved Hypercube Pooling" and "Liaw Multiple Pooling." Benchmarked as the most efficient pooling architectures currently available, these dual strategies drastically lower the number of test kits required to clear large populations without sacrificing diagnostic accuracy. Driven by a commitment to global health equity, these algorithms are being released entirely as freeware. We provide these accessible, high-efficiency tools to the international scientific community to ensure that no nation is left defenseless against emerging infectious diseases due to supply chain failures.