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Airborne Transmission of Respiratory Infections in a Connected Network of Poorly Diluted and Crowded Indoor Spaces

Professor Dr. Yuguo Li

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Date: 7th July 2026 Time: 15:00-16:00 Location: EM302

Abstract: Respiratory infections such as COVID-19 and influenza spread mainly via airborne aerosols. Poor dilution, high crowding, and strong connectivity interact to amplify both short-range and long-range transmission in indoor spaces, driving heterogeneous city-wide epidemics. This presentation proposes a practical unitary zone approach for infection control, suitable for early epidemic phases where multiple index cases per building are unlikely. Two key metrics are introduced: Effective clean air flow rate, integrating ventilation, filtration, interzonal inflow, and spaciousness (extending ASHRAE 241-2023 ECAi); and Close-time equivalent, normalizing exposure risk across different close contact durations and scenarios. Stochastic modeling accounts for quanta and occupancy heterogeneity and urban mobility. Preliminary recommendations for dilution control for H1N1 and SARS-CoV-2 are illustrated with Hong Kong as a case study.

About Speaker: Yuguo Li is a Chair Professor of Building Environment at The University of Hong Kong. His research interests include city climate, environmental transmission of infection, and urban sustainability engineering. His team investigates ventilation requirements for mitigating SARS-CoV-2 transmission and exploring resilient city design technologies. He is the founding Editor-in-Chief of Indoor Environments, the official journal of the International Society of Indoor Air Quality and Climate (ISIAQ). He is a Fellow of the Hong Kong Academy of Engineering, currently serving as its Honorary Secretary, and has received numerous awards for his work, including the Pettenkofer Award, the Guanghua Engineering Science and Technology Prize, the Medal of Honour from the HKSAR Government, and an honorary doctorate from Aalborg University.

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