TUAT Fluid Dynamics Seminar

Beyond Six Feet: Respiratory flows and airborne disease transmission

Speaker: John W. M Bush

Professor of Applied Mathematics Department of Mathematics, MIT, USA

Date: Wednesday, March 23rd, 2022

Time: 08:30 a.m. - 09:30 a.m.

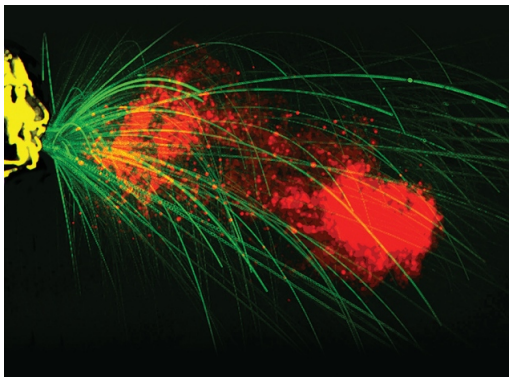
Venue: Online *Your presence and punctuality will be highly appreciated

https://tuat-jp.zoom.us/j/81592188092?pwd=bXlUdDNibXQ5bkNmM1kyMVFGNi93QT09

Meeting ID: 815 9218 8092

Pass code: 964857

Abstract



We first describe respiratory flows associated with breathing, coughing and sneezing, giving particular attention to both the liquid and gas phases. We demonstrate that the widely implemented 6-foot-rule safety guideline for COVID-19 was based on a physical picture in which the gas-phase was neglected. Consideration of the gas-phase flows makes clear that the range of droplet-borne pathogen may greatly exceed 6 feet, and introduces the possibility of long-range airborne transmission. Evidence is presented that airborne transmission was the dominant mode of transmission of COVID-19. We develop a guideline for mitigating airborne disease transmission that provides a limit for the time spent in indoor spaces with infected individuals. We further demonstrate that carbon-dioxide may serve as a proxy for concentration of airborne pathogen; thus, carbon-dioxide monitoring allows for a real-time assessment of the risk of COVID-19 in indoor settings.

Organized by: Prof. Y. Tagawa (tagawayo@cc.tuat.ac.jp)