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Numerical Study of the Particles Dispersion Expelled during Breathing, Coughing, and Sneezing in Public Indoor Environments JHON QUINONES, ALI DOOSTTALAB, Purdue University, VICTOR CASTANO, Universidad Nacional Autnoma de Mxico, LUCIANO CASTILLO, Purdue University — Transmission of most respiratory diseases is mainly attributed to the airborne dispersion of viruses through the droplets that are produced in the respiratory system of infected individuals. Understanding how these droplets disperse in indoor environments is key for the detection and cleaning processes of living spaces and would be the input to identify which areas have the highest concentration of contaminated particles. This work aims to numerically study the saliva droplet dispersion and transport in public indoor environments by using Computational Fluid Dynamics (CFD). Unsteady RANS simulations with the Euler-Lagrange approach were implemented for three different time-dependent velocity profiles that represent real human breathing, coughing, and sneezing. The Lagrange approach was used to track the saliva droplets through the flow field. The results show a considerable impact of human body heat flux on the exhaled droplets dynamics and the local velocity field close to the human body. The heat plumes appeared to prevent small saliva droplets from depositing human body surfaces. Besides, the strength of air conditioning velocity may have a significant effect on the saliva droplets trajectories.

Jhon Quinones
Purdue University

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