## Real-time LES for indoor and outdoor environments

***Abstract:*** *A novel lattice Boltzmann method (LBM)-based 3D computational fluid dynamics (CFD) technique has been implemented on the graphics processing unit (GPU) for the purpose of simulating turbulent flows in real-time. We study the time evolution of the turbulent airflow and temperature inside a test chamber and around wall-mounted obstacles. The predicted results from LBM are compared with traditional CFD-based large eddy simulations (LES). Good agreement between LBM results and LES method are observed with significantly faster computational times. Efficient use of visualisation techniques allows the results of the simulation to be seen concurrently in real-time. The developed solver is validated against mechanically and thermally driven 3D cavities and flow around obstacles.*

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