

Simulation-assisted Dense Granular Flow Modeling

Fu-Ling Yang

Department of Mechanical Engineering, National Taiwan University

Dense granular flows appear in many natural hazards and industrial application processes and a feasible model and efficient solution for flow prediction and control has long been sought. The discrete nature of the constituent solid particles allows different interaction mechanisms with the neighbor particles and the flow boundary, leading to transport mechanisms and flow behaviors not seen in the motion of a single-phase continuum. This talk presents how we performed particle-resolved simulation (discrete element simulation) to identify the possible transport mechanisms at both the microscopic and the mesoscopic level. We also integrate the findings with the experimental data to advance the dynamic model. How the new findings bridge to the existing theories to give a better flow prediction will also be discussed.

Keyword: Discrete element simulation, dense granular flow model, boundary condition, transport mechanism