

Abstract Submitted  
for the DFD17 Meeting of  
The American Physical Society

**A framework for simulating particle-particle particle-wall interactions in suspensions with irregular particles**<sup>1</sup> MOHSEN DAGHOOGHI, IMAN BORAZJANI, State Univ of NY - Buffalo — An efficient direct numerical simulation method is developed to study the sedimentation of non-spherical particles in an incompressible Newtonian fluid. A new strategy is presented to model wall-particle collision based on 3D dynamics of a rigid particle, which complements the particle-particle collision model developed for low Stokes number flows. For non-spherical particles, contrary to spherical particles, upon the collision of a particle with a wall, particle's orientation needs to be determined. In the presented method, kinematics of an arbitrary-shaped particle is solved considering particle's inertia and hydrodynamic forces. This model is used to simulate sedimentation of many particles in a vertical channel as well as suspensions of non-spherical particles under simple shear flow.

<sup>1</sup>This work was supported by (ACS) Petroleum Research Fund Grant 53099-DNI9 and (NSF) CAREER grant CBET 1453982. The computational resources were partly provided by the Center for Computational Research at the University at Buffalo.

Mohsen Daghooghi  
State Univ of NY - Buffalo

Date submitted: 28 Jul 2017

Electronic form version 1.4