

Fast Algorithms for Particulate Flows

Presented By: Shравan Veerapaneni
University of Michigan



Simulating the low-Re hydrodynamics of particulate flows is an extremely challenging and important problem that arises in several disciplines. In this talk, I will present recent advances made by our group in overcoming several computational bottlenecks, especially those arising in the context of dense suspensions confined by complex geometries. In particular, a spectrally-accurate scheme to resolve the interactions of close-to-touching particles, a novel periodizing scheme for arbitrary geometries and a new boundary integral equation formulation for colloidal and active suspensions will be presented. Incorporating stable time-marching schemes, fast direct solvers based on low-rank factorizations and the fast multipole method, we were able to simulate the hydrodynamics of over 1000 deformable particles flowing through a periodic microfluidic-chip geometry in less than a minute per time-step on a laptop.

Thursday, January 21st, 2016 @ 4:00 PM
Technological Institute M416

For further information see <http://esam.northwestern.edu>

Engineering Sciences and Applied Mathematics
2145 Sheridan Road, M426, Evanston IL 60208 (847) 491-3345