Department of Mathematics

University of Houston

## Scientific Computing Seminar

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## Deformation of a single red blood cell in bounded Poiseuille flows

Thursday, Dec. 6, 2012 3:00 PM- 3:25 PM Room 646 PGH

## Abstract:

Deformation of a red blood cell (RBC) in bounded Poiseuille flows is studied by using an immersed boundary method (IBM). An elastic spring model is applied to simulate the skeleton structure of RBC membrane. As a benchmarking test, the dynamical behavior of a single RBC under simple shear flow is presented. Then we focus on investigating the motion and the deformation of a single RBC in Poiseuille flows by varying the swelling ratio, the initial angle between the longest axis of the cell and the horizontal line, the maximum velocity of fluid flow  $u_{max}$ , and the membrane bending stiffness of RBC. Two motions of oscillation and swing (vacillating-breathing motion) of RBC are observed in a narrow channel considered here. In particularly, both parachute shape and bullet-like shape, depending on the initial angle, coexist for the elliptic shape cell with lower  $u_{max}$  in a narrow channel.

This seminar is easily accessible to persons with disabilities. For more information or for assistance, please contact the Mathematics Department at 743-3500.