Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

Hydrodynamic interactions for complex-shaped nanocarriers in targeted drug delivery YAOHONG WANG, DAVID ECKMANN, RAVI RADHAKRISHNAN, PORTONOVO AYYASWAMY, University of Pennsylvania — Nanocarrier motion in a blood vessel involves hydrodynamic and Brownian interactions, which collectively dictate the efficacy in targeted drug delivery. The shape of nanocarriers plays a crucial role in drug delivery. In order to quantify the flow and association properties of elliptical nanoparticles, we have developed an arbitrary Lagrangian-Eulerian framework with capabilities to simulate the hydrodynamic motion of nanoparticles of arbitrary shapes. We introduce the quaternions for rotational motion, and two collision models, namely, (a) an impulse-based model for wall–particle collision, and (b) the short-range repulsive Gay-Berne potential for particle-particle collision. We also study the red blood cell and nanocarrier (such as ellipsoid) interactions. We compare our results with those obtained for a hard sphere model for both RBCs and nanocarriers. Supported by NIH through grant U01-EB016027.

Portonovo Ayyaswamy
University of Pennsylvania

Date submitted: 01 Aug 2014 Electronic form version 1.4