Abstract Submitted
for the DFD10 Meeting of
The American Physical Society

Particle transport near arterial stenosis SAHAR HENDABADI, SHAWN SHADDEN, Illinois Institute of Technology — We will present work towards understanding particle transport near arterial stenoses. Prior studies have shown increased platelet aggregation downstream of stenosis, or analogous geometrical models that induce flow separation and recirculation via abrupt expansion. Stenosis leads to changes in fluid mechanical quantities such as shear stress, flow separation, recirculation and reattachment and there exists several hypotheses on how these conditions influence platelet activation and aggregation. In particular, it is thought that high shear at the stenotic throat "activates" platelets that subsequently aggregate in the low shear separation zone perpetuating thrombotic events. We aim to understand particle (e.g. platelet) transport downstream of a stenosis in close detail. Towards this objective, we have developed numerical models of pulsatile flow near arterial stenoses and methods for particle tracking, including quantification of mechanical stimuli thought to initiate platelet activation. We will discuss results of this effort, comparison with previous studies, and plans for continued numerical and experimental work.

Shawn Shadden
Illinois Institute of Technology

Date submitted: 06 Aug 2010 Electronic form version 1.4