

Abstract Submitted
for the DFD15 Meeting of
The American Physical Society

Measurements of flow structure interaction in a plaqued artificial artery using an index matched flow facility AKASH JAIN, LARRY BROCK, JIAN SHENG, Texas Tech Univ. — The aim of the experiment is to study the flow structure interaction in an arterial model with a simulated plaque inside a closed loop index matched pulsatile flow facility. The test section is 24.5 inches long 6 inches wide. The experimental models are compliant polymer (PDMS) tubes having an outer diameter of 9 mm and a wall thickness of 1 mm. The plaque on the models are simulated by means of a radially asymmetric bump. Both flow and polymeric structures are doped with different particles and imaged with Particle Image Velocimetry (PIV) method. To minimize the optical distortion near liquid solid interface, the facility is fully index matched with NaI at 40% by weight. A suite of analysis procedures quantifying complex interactions including solid-fluid phase separation, near wall flow analysis, and wall shear stress approximation as well as wall deformation quantification, have been developed and applied to study the healthy and plaqued artificial arteries in steady and pulsatile flow conditions. 3D ensemble velocity fields, wall shear stress distributions and corresponding strain deformations will be presented.

Akash Jain
Texas Tech Univ.

Date submitted: 01 Aug 2015

Electronic form version 1.4