Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

Experimental Study of Fluid Flow in an Aneurysm for Varying Shape Indices[1] PAULO YU, CYRUS CHOI, VIBHAV DURGESH, Cal State Univ - Northridge — An aneurysm is an abnormal bulging of a blood vessel wall. A ruptured aneurysm can be severely debilitating or fatal. There is a lack of understanding of fluid flow parameters leading to aneurysm growth and rupture. Clinical studies have shown that certain aneurysm shape indices are strongly correlated to rupture. The overall goal of this study is to comprehensively characterize fluid dynamics parameters inside an aneurysm sac, for varying shape indices. As part of this work, two different idealized aneurysm glass models are used, and an in-house flow loop system has been developed to simulate constant and physiological pressure gradients. Index of refraction matching techniques have been used for accurate estimation of fluid flow parameters. Laser Doppler Velocimetry measurements are conducted for Reynolds number values from 10-200 to understand impact of inflow conditions on flow structures and parameters inside aneurysm sac. Particle Image Velocimetry measurements are performed on several horizontal and vertical planes inside aneurysm sac and show the presence of secondary fluid structures inside the sac, not observed in mid-plane measurements from earlier studies. The results show dependence of flow parameters/structures on aneurysm shape and inflow conditions.

[1]This work is supported through the California State University Northridge Research Fellowship Program 2013-14

Vibhav Durgesh
Cal State Univ - Northridge

Date submitted: 01 Aug 2014 Electronic form version 1.4