Abstract Submitted
for the DFD17 Meeting of
The American Physical Society

Hemodynamics of a Patient-Specific Aneurysm Model with Proper Orthogonal Decomposition. SUYUE HAN, GARY HAN CHANG, YAHYA MODARRES-SADEGHI, Univ of Mass - Amherst — Wall shear stress (WSS) and oscillatory shear index (OSI) are two of the most-widely studied hemodynamic quantities in cardiovascular systems that have been shown to have the ability to elicit biological responses of the arterial wall, which could be used to predict the aneurysm development and rupture. In this study, a reduced-order model (ROM) of the hemodynamics of a patient-specific cerebral aneurysm is studied. The snapshot Proper Orthogonal Decomposition (POD) is utilized to construct the reduced-order bases of the flow using a CFD training set with known inflow parameters. It was shown that the area of low WSS and high OSI is correlated to higher POD modes. The resulting ROM can reproduce both WSS and OSI computationally for future parametric studies with significantly less computational cost. Agreement was observed between the WSS and OSI values obtained using direct CFD results and ROM results.

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Date submitted: 30 Jul 2017 Electronic form version 1.4