

Abstract Submitted
for the DFD17 Meeting of
The American Physical Society

Non-Newtonian fluid structure interaction in flexible biomimetic microchannels M KIRAN, SUNANDO DASGUPTA, SUMAN CHAKRABORTY, Indian Institute of Tehchnology Kharagpur — To investigate the complex fluid structure interactions in a physiologically relevant microchannel with deformable wall and non-Newtonian fluid that flows within it, we fabricated cylindrical microchannels of various softness out of PDMS. Experiments to measure the transient pressure drop across the channel were carried out with high sampling frequencies to capture the intricate flow physics. In particular, we showed that the waveforms varies greatly for each of the non-Newtonian and Newtonian cases for both non-deformable and deformable microchannels in terms of the peak amplitude, r.m.s amplitude and the crest factor. In addition, we carried out frequency sweep experiments to evaluate the frequency response of the system. We believe that these results will aid in the design of polymer based microfluidic phantoms for arterial FSI studies, and in particular for studying blood analog fluids in cylindrical microchannels as well as developing frequency specific Lab-on-chip systems for medical diagnostics.

M Kiran
Indian Institute of Tehchnology Kharagpur

Date submitted: 05 Sep 2017

Electronic form version 1.4