Abstract Submitted
for the DFD13 Meeting of
The American Physical Society

The role of erythrocyte size and shape in microchannel fluid dynamics[1] KATHRYN FINK, JACOBO PAREDES, DORIAN LIEPMANN, University of California, Berkeley — The unique properties of blood flow in microchannels have been studied for nearly a century; much of the observed blood-specific dynamics is attributed to the biconcave shape of red blood cells. However, for almost twice as long biologists have observed and characterized the differences in the size and shape of red blood cells among vertebrates. With a few exceptions, mammals share the denucleated biconcave shape of erythrocytes but vary in size; oviparous vertebrates have nucleated ovoid red blood cells with size variations of a full order of magnitude. We utilize micro-PIV to analyze blood flow of vertebrate species in microchannels, with a focus on understanding how erythrocyte size and shape alter the cell-free layer and velocity profile of whole blood. The results offer insight into the Fahraeus-Lindqvist effect and the selection of animal blood for the design and evaluation of biological microfluidic devices.

[1]This material is based upon work supported by the National Science Foundation Graduate Research Fellowship under Grant No. DGE 1106400

Kathryn Fink
University of California, Berkeley

Date submitted: 01 Aug 2013 Electronic form version 1.4