

Abstract Submitted
for the DFD13 Meeting of
The American Physical Society

Simultaneous measurement of flow over and transmigration through a cultured endothelial cell layer LORI LAMBERT, University of Nebraska - Lincoln, IRAKLIS PIPINOS, TIMOTHY BAXTER, JASON MACTAGGART, University of Nebraska Medical Center, GEORGE KARNIADAKIS, Brown University, DEREK MOORMEIER, KENNETH BAYLES, University of Nebraska Medical Center, TIMOTHY WEI, University of Nebraska - Lincoln — This talk focuses on the methodologies associated with the integration of temporally and spatially resolved μ PIV measurements of flow over live endothelial cells with measurements of chemical transport through and across the cells. The ultimate goal of the study is to examine and model the transport and transmigration of key agents responsible for the formation of atherosclerotic plaques. Flow over endothelial cells cultured in a microchannel was measured using μ PIV. By making measurements in a number of planes parallel to the wall, key dynamic quantities such as shear and pressure distributions, along with surface topography could be computed from the flow measurements. Experiments were conducted in a $65\ \mu\text{m} \times 65\ \mu\text{m}$ cross section microchannel at shear rates up to $20\ \text{dynes/cm}^2$. Changes in cell conformation as a function of time after flow was started were examined. The deposition and transmigration of LDL was also examined using fluorescent-tagged LDL molecules.

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Date submitted: 31 Jul 2013

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