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**Micro-PIV Measurements of Pulsatile Flow Over Endothelial Cells.** CHIAMIN LEONG, Rensselaer Polytechnic Institute, GARY NACKMAN, RWJ Medical School, TIMOTHY WEI, Rensselaer Polytechnic Institute — In both humans and mammals, endothelial cells remodel themselves according to mechanical loading by changing shape and orientation. Subsequently, these mechanical forces are transduced into chemical signals, mechanotransduction, involving changes in gene and protein expression. Alterations in mechanotransduction by endothelial cells to underlying smooth muscle cells is a key factor in human arterial disease. The goal of this study is to determine the importance of spatially and temporally varying mechanical loading and examine biological response under different flow conditions. In-vitro micro-PIV measurements are made in pulsatile flow over cultured endothelial cells flush mounted in a small rectangular channel. Cells are subjected to peak shear stress of  $20 \text{ dynes/cm}^2$  corresponding to peak Re of 1000 and Womersley number of 1.4. Using multiple measurement planes, local surface height, surface pressure, and wall shear stress are extracted from the measurements. Simultaneous Raman spectroscopy is also being explored to investigate the bio-chemical response of live cultured human and bovine cells.

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