Abstract Submitted
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***E. coli* in a wall bounded shear flow**[1] MEHDI MOLAEI, JIAN SHENG, Texas Tech University — Understanding bacteria motility over a wall in a shear flow is critical to determine those crucial biophysical processes involved in the biofilm formation and the shear erosion. Using digital holographic microscopy combined with microfluidics we capture three-dimensional swimming patterns of wild-type *E. coli* bacteria in a straight micro-channel subjecting to a carefully controlled flow shear. Three-dimensional locations and orientations of bacterial are extracted with a resolution of 0.185 μm in lateral directions and 0.5 μm in the wall normal direction. Robust statistics based on thousands of trajectories allow us to characterize bacteria swimming over a surface under flow shear. These characteristics, including swimming velocity, tumbling frequencies, cellular attachment, and suspension dispersion, will be used to elucidate the cell wall interactions in shear flows. Current analysis will focus on the hydrodynamic mechanisms other than near field interfacial forces on cell migration and orientation near a sheared surface. Preliminary data on bacteria over a chemically modified surface will also be presented.

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