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Monitoring biofilm deformation under laminar flow by a digital holography interferometry MARYAM JALALI-MOUSAVI, JIAN SHENG, Texas AM UniversityCorpus Christi — Bacteria can grow and form biofilm on biotic and abiotic environments. Extra cellular polymetric substance (EPS) facilitates the attachment of bacteria upon contact to the surface and formation of biofilm. Biofilm after formation is subjected to mechanical forces. One of the major changes in a bacterium's environment when attachment to substrate occurs is the alteration in the mechanical characteristics of the environment. In this work, we have developed a technique to perform in-situ measurement of forces exerted on the bacteria cells causing the deformation of biofilm under flow sheer. The experiments are performed utilizing a uniquely designed fluidic platform containing a flexible mirror. The bottom layer of the mirror consists of Polydimethylsiloxane (PDMS) and is coated with agar gel. The flexible mirror is fabricated by sputter deposition of 50 nm aluminum thin film on 0.5 mm of PDMS that performs as a pressure sensitive substrate. The selection of agar gel as the topcoat for pressure sensitive substrate facilitates biofilm formation. The distinctive property of the flexible mirror is the sensitivity to weak forces that can be sensed by a digital holographic interferometer (DHI) or an interference reflection microscopy (IRM). The experimental setup consists of a closed loop microfluidic platform with the flexible mirror as the bottom layer, a reservoir, two pumps and connecting tubing to form two recirculating loops. The initial experiments are being performed under non-flow conditions to examine any elastic deformation. Funded by ARO, ONR

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