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Application of micro-PIV to the study of staphylococci bacteria bio-film dynamics ERICA SHERMAN, University of Nebraska - Lincoln, KENNETH BAYLES, DEREK MOORMEIER, University of Nebraska - Medical Center, TIMOTHY WEI, University of Nebraska - Lincoln — Staphylococci bacteria are recognized as the most frequent cause of biofilm-associated infections. Although humans are regularly exposed to staphylococcus bacteria without consequence, a localized staph infection has the potential to enter the bloodstream and lead to serious infections such as endocarditis, pneumonia, or toxic shock syndrome. The mechanics of staphylococci biofilm formation and dispersion through the bloodstream are not well known. It has recently been observed that under certain flow conditions, bacteria grow in stable bio-films. Under other conditions, they organize in tower-like structures which break and are transported downstream by the flow. The fundamental questions addressed in this study are i) whether or not fluid mechanics plays a role in differentiating between film or tower formation and ii) whether or not the faulty towers are a bio-film propagation mechanism. This talk focuses on the application of micro-PIV to study this problem. Bacteria were cultured in a glass microchannel and subjected to a range of steady shear rates. Micro-PIV measurements were made to map the flow over and around different types of bio-film structures. Measurements and control volume analysis will be presented quantifying forces acting on these structures.

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