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Bacterial motility near crude oil and water interface[1] JOMAYRA E. SÁNCHEZ RODRÍGUEZ, University of Puerto Rich Mayaguez Campus, MEHDI MOLAEI, JIAN SHENG, Texas Tech University — Study of biodegradation of crude oil by microbes requires profound understanding of their movement near oil-water interface as well as in/out of phase movement. Bacterial motilities are known to be modified by the presence of an interface through hydrodynamic interactions in addition to the chemotactic behavior towards the oil phase. Using digital holographic microscopy and phase contrast microscopy, we study locomotion of *Pseudomonas* sp (P62), a well-known hydrocarbon degrader under various chemo- and mechano-environmental conditions. Baseline experiments have been performed at different nutrient levels and Ion levels to identify effects of chemical environment on cell motility. Utilizing novel microfluidics and surface functionalization, we have established a stable vertical oil-water interface between top and bottom surfaces of the microfluidics, which allow clear optical access to observe bacterial movement near the interface. Three-dimensional trajectories of bacteria, obtained by analyzing recorded by digital holography microscopy, enable us to characterize bacterial swimming and orientation near interfaces. Chemotaxis velocity and swimming induced dispersion are measured directly as well as cell concentration distributions with respect to the distance to the interface.

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