Motility and attachment/detachment dynamics of bacteria in complex microfluidic geometries M. Raatz, Bachelorarbeit, Universität Potsdam (2012).

Biofilms are aggregations of bacteria embedded in a polymer matrix, which form on solid-liquid and liquid-air interfaces. We used microfluidic channels with obstacles to study the swimming motility and biofilm formation of *Pseudomonas putida*. We focused on the early stages of surface colonization. By applying high resolution imaging and tracking procedures, motility data was recorded for several obstacle arrangements and compared to experiments in linear channels without obstacles. We found that obstacles have an effect on the swimming motility when no external flow is applied. It could be shown that in the presence of obstacles, the average run length of a bacterium and the turning angle distribution changes. Regarding the swimming velocity a bimodal distribution was proposed, possibly resulting from the characteristic run-and-turn motility. Furthermore experiments at various flow conditions were conducted. Here we observed an irreversible attachment pattern and a correlation between the number of swimmers in the channel and the number of attachments.