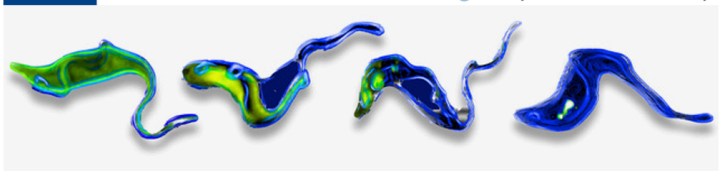

Contribution ID: **27** Type: **Poster**

Anomalous bacterial transport in confined geometries

Motile bacteria are known to interact with flows exhibiting in the bulk active Betherton-Jeffery trajectories or rheotactic drift due to the helical flagella shapes. In the vicinity of bound- ing surfaces, one also observes specific trajectories including persistent upstream swimming, an effect enhanced by the presence of edges. Statistically, the combination of hydrodynamic interactions and flow-induced orientation, leads to a strong density increase in the surface vicinity, inducing a boundary layer of around 10⊠ in extension. In disordered and complex environments, the presence of surface and flow make large-scale dispersion properties of active bacteria a challenging issue.
Based on the previous study, here we developed experimental model systems suited to observe individual trajectories and to assess the emerging dispersion processes in funnel-shape microfluidic device(figure(a)) varying the flow velocity using motile bacteria. We found: (1) a sharp density increases downstream close to surfaces at the same shear rate as in previous work(figure(a)); (2) the concentration difference indicator (⊠1) increase with time and then reach a steady state. This work will help to understand the role of flow on the transport of motile bacteria, in the presence of geometrically complex surfaces and surface.

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