

Abstract Submitted  
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**Active mixing of swimming bacteria in a hyperbolic ow**<sup>1</sup> TOM SOLOMON, JOHN BUGGELN, Bucknell University, SIMON BERMAN, KEVIN MITCHELL, UC-Merced — We present experiments on the motion of smooth-swimming and tumbling bacillus subtilis bacteria in laminar ows. For most of the experiments the ow is a hyperbolic ow in a PDMS, microuidic cross channel cell. Since the bacteria are self-propelled, they are able to swim across passive invariant manifolds that block the motion of passive tracers (including sessile bacteria). Theoretically, the motion of these active tracers is inuenced by *swimming invariant manifolds* (SwIMs) that act as one-way barriers. We compare the motion of the trajectories to the SwIMs and their associated swimming xed points, as predicted by the theory. We also discuss the eectiveness of the theory in explaining the behavior of tumbling bacteria. Time permitting, we will also present preliminary results for the motion of bacteria in a double-gyre (vortex) ow.

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