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Low Reynolds Number Bacterial Robots GRANT GIESBRECHT, KATHA NI, ISAAC VOCK, BRUCE RODENBORN, Centre College — The dynamics of prokaryotic motility in a fluid is important in a wide range of fields. Our experiment models the locomotion of bacteria with a robotic swimmer made using a computer controlled DC motor that drives a helical flagellum formed from welding wire. Because of its small size, a bacterium swimming in water is like our robot swimming in corn syrup. We compensate for the size difference by placing the robot in highly viscous silicone oil. Previous research measured helical propulsion of a swimmer far from a boundary (Rodenborn et al., PNAS 2013). However proximity to a boundary strongly affects bacterial swimming. We have designed a system to precisely control the distance from the flagellum to the tank wall, and have made some of the first macroscopic measurements of boundary effects on helical propulsion.

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