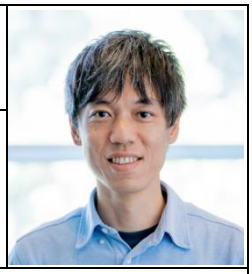
Name:	**Hirofumi Wada**	
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Mechanics of flagella-driven drilling motion in symbiotic bacteria

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Flagella-mediated motility in microbes is important in a range of biological processes such as pathologies and symbiosis. Recently, a new “flagellum wrapping” mode has been reported in several types of polar pathogenic and symbiotic bacteria. For example, a bean bug symbiont, *Burkholderia*, moves like a corkscrew with its flagellum wrapped around its cell body through a mucus-filled narrow constricted region to the gut symbiotic organ of a host insect, establishing the selective host-microbe symbiotic relationship. The reversal of a motor rotation triggers an elastohydrodynamic instability of a helical flagellar filament, leading to the characteristic wrapping configuration around the cylindrical cell body. We study this process by combining numerical simulation based on the geometrically exact Kirchhoff elastic rod theory and a macroscale physical experiment. We show that how the successful flagellum wrapping, and the resulting drilling motility, are realized by the coordination between the flagellar helical shape, hook flexibility, motor torque, and the frictional forces acting on the cell body from the surrounding medium.