

Abstract Submitted  
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**Roll and Yaw of Paramecium swimming in a viscous fluid** SUNGH-  
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Engineering, Virginia Tech — Many free-swimming microorganisms like ciliates,  
flagellates, and invertebrates exhibit helical trajectories. In particular, the Parame-  
cium spirally swims along its anterior direction by the beating of cilia. Due to the  
oblique beating stroke of cilia, the Paramecium rotates along its long axis as it  
swims forward. Simultaneously, this long axis turns toward the oral groove side.  
Combined roll and yaw motions of Paramecium result in swimming along a spiral  
course. Using Particle Image Velocimetry, we measure and quantify the flow field  
and fluid stress around Paramecium. We will discuss how the non-uniform stress  
distribution around the body induces this yaw motion.

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