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*Modeling Fluid Flow Induced by C. elegans Swimming at Low Reynolds Number.*

*C. elegans* have been extensively researched regarding locomotion. However, most mathematical studies have focused on body dynamics rather than the fluid. As the nematodes undulate in a sinusoidal fashion, they cause fluid movement that has been studied experimentally but not modeled computationally on this scale. Utilizing the Navier-Stokes equation, regularized stokeslets, and the method of images, we computed the dynamics of the surrounding fluid. Our results strikingly matched experimental outcomes in various ways, including the distance particles travelled in one period of undulation, as well as qualitatively and quantitatively matching velocity fields. We then implemented this method using video data of swimming *C. elegans* and successfully reproduced the fluid dynamics. This is a novel application of the method of regularized stokeslets that combines theory and experiment. We expect this approach to provide insight in generating hypotheses and informing experimental design. (Received July 25, 2014)