

Abstract Submitted  
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**Traveling waves in a continuum model of 1D schools** ANAND OZA,  
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SHELLEY, Courant Institute and Flatiron Institute — We construct and analyze  
a continuum model of a 1D school of flapping swimmers. Our starting point is a  
delay differential equation that models the interaction between a swimmer and its  
upstream neighbors wakes, which is motivated by recent experiments in the Applied  
Math Lab at NYU. We coarse-grain the evolution equations and derive PDEs for the  
swimmer density and variables describing the upstream wake. We study the equa-  
tions both analytically and numerically, and find that a uniform density of swimmers  
destabilizes into a traveling wave. Our model makes a number of predictions about  
the properties of such traveling waves, and sheds light on the role of hydrodynamics  
in mediating the structure of swimming schools.

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