Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

How does *Vorticella* utilize its stalk contraction-relaxation cycle?[1] JIAZHONG ZHOU, DAVID ADMIRAAL, SANGJIN RYU, University of Nebraska-Lincoln — *Vorticella* is a sessile ciliate living in water, and it coils its slender stalk to pull the cell body (zooid) towards the substrate at a maximum speed of $\sim$ 1 cm/s. After stalk contraction is completed, the stalk slowly relaxes to its extended state. Although this ultrafast stalk contraction has been studied in terms of cell motility, it is poorly understood how *Vorticella* utilizes its stalk contraction. Here we propose a hypothesis that *Vorticella* can augment transport of particles near the substrate relying on water flow induced by the stalk contraction-relaxation cycle. We investigated our hypothesis using a computational fluid dynamics (CFD) model which models *Vorticella* as a solid sphere moving normal to a solid surface in water. Having simulated water flow caused by *Vorticella*, we calculated motions of particles near *Vorticella*, and then quantified the transport effect of *Vorticella*'s stalk contraction using microfluidic mixing indices.

[1]Supported by Laymann Seed grant from UNL

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Date submitted: 14 Nov 2014 Electronic form version 1.4