Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

Mass transfer effect of the stalk contraction-relaxation cycle of *Vorticella convallaria*[1] JIAZHONG ZHOU, DAVID ADMIRAAL, SANGJIN RYU, University of Nebraska-Lincoln — *Vorticella convallaria* is a genus of protozoa living in freshwater. Its stalk contracts and coil pulling the cell body towards the substrate at a remarkable speed, and then relaxes to its extended state much more slowly than the contraction. However, the reason for *Vorticella*'s stalk contraction is still unknown. It is presumed that water flow induced by the stalk contraction-relaxation cycle may augment mass transfer near the substrate. We investigated this hypothesis using an experimental model with particle tracking velocimetry and a computational fluid dynamics model. In both approaches, *Vorticella* was modeled as a solid sphere translating perpendicular to a solid surface in water. After having been validated by the experimental model and verified by grid convergence index test, the computational model simulated water flow during the cycle based on the measured time course of stalk length changes of *Vorticella*. Based on the simulated flow field, we calculated trajectories of particles near the model *Vorticella*, and then evaluated the mass transfer effect of *Vorticella*'s stalk contraction based on the particles' motion.

[1]We acknowlege support from Laymann Seed Grant of the University of Nebraska-Lincoln

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Date submitted: 01 Aug 2014 Electronic form version 1.4