

Abstract Submitted
for the DFD20 Meeting of
The American Physical Society

Incorporating recirculation effects into metrics of feeding performance for zooplankton KIARASH SAMSAMI, LUDIVINE SANCHEZ ARIAS, HENRY C FU, University of Utah — The feeding performance of zooplankton influences their evolution and can explain their behavior. A commonly-used metric for feeding performance is the volume of fluid that can be scanned for food, as measured by the fluid flow through a filtering or capturing surface. However, this measure does not take into account whether the flow contains fresh nutrient particles or already-filtered fluid. Here we show that such a metric may give incorrect results for organisms that produce recirculatory flows, and describe how to construct a metric which correctly accounts for recirculation based on the velocity field of the feeding current. We demonstrate our metric using two example zooplankton, *Salpingoeca rosetta* and *Vorticella*. We use the method of regularized Stokeslets to compute the velocity field around these two microorganisms, based upon organism kinematics obtained from the literature and our experimental observations. We determine the part of the flow that contains fresh nutrient particles by examining the pathlines of Lagrangian particles that pass through the defined surfaces that we are interested in, and compare with flow rates computed from the velocity fields.

Kiarash Samsami
University of Utah

Date submitted: 03 Aug 2020

Electronic form version 1.4