Abstract Submitted
for the DFD09 Meeting of
The American Physical Society

Strain Variants in Swimming Characteristics of a Predatory Algae Species[1] JIAN SHENG, University of Minnesota, JOSEPH KATZ, Johns Hopkins University, J. ADOLF, ALLEN PLACE — Digital holographic microscopic cinematography is used for measuring the 3D, time resolved, swimming behavior of toxic and non-toxic strains of the marine dinoflagellates *Karlodinium veneficum*. The experiments are performed in a 3×3 mm square cuvette at densities of ∼150,000 cells/ml, and holograms are recorded at 120fps and 20X magnification for 12-20s. In each case, we simultaneously track 200-500 cells in the 3mm deep sample, at a spatial resolution of 0.4×0.4×2 μm. Results show that all strains prefer vertical migration during phototrophic growth and localized foraging in response to prey. Strains capable of swimming in both left and right hand helices show stronger tendency towards vertical motion than right handed strains. Swimming-induced dispersion computed from Lagrangian trajectories corroborates the observed migration trends, and suggests a mechanism for predation-induced cell aggregation into dense bloom. Velocity spectra and conditional sampling of swimming modes will also be presented to elucidate locomotion of dinoflagellates.

[1]Sponsored by NSF.

Joseph Katz
Johns Hopkins University

Date submitted: 11 Aug 2009 Electronic form version 1.4