Abstract Submitted
for the DFD09 Meeting of
The American Physical Society

Swimming of helically-undulating rings in a Stokes fluid LISA FAUCI, HOA NGUYEN, RICARDO ORTIZ, RICARDO CORTEZ, Tulane University — Dinoflagellates swim due to the action of two eucaryotic flagella - a trailing, longitundinal flagellum that propagates planar waves, and a transverse flagellum that propagates helical waves. The transverse flagellum wraps around the cell in a plane perpendicular to the trailing flagellum, and is thought to provide both forward thrust along with rotational torque. Motivated by the intriguing function of this transverse flagellum, we study the fundamental fluid dynamics of a helically-undulating ring in a Stokes fluid. We use slender-body theory to compute the steady-state transverse and rotational swimming velocities of the ring in free- space, due to an imposed helical traveling wave. In addition, we study the dynamics of an undulating, elastic ring moving in both free-space and near a plane wall using the method of regularized Stokeslets.

Lisa Fauci
Tulane University

Date submitted: 19 Jul 2009 Electronic form version 1.4