1077-76-1470 **Hoa V Nguyen*** (hoa.nguyen@tulane.edu). *Hydrodynamic effects of spines: A different spin.*

When placed in a simple linear gradient of velocity, elongate objects, including many phytoplankton, spend the most time with their longest axis aligned with the flow vectors, but they tumble with a frequency that depends on their ratio of length to width. This tumbling is important because it causes relative motion of phytoplankton cells and nearby fluid, thinning chemical boundary layers and thereby speeding diffusive supply of nutrients to the cells, and it also influences phytoplankton encounter rates with grazers. For both oblate and prolate spheroids, shapes resembling a smoothed discus and football, respectively, tumbling frequency can be predicted accurately from simple theory. Many planktonic organisms, however, have complex shapes produced by spines that extend in varying numbers, at varying angles, and to varying distances from the body or cell. We used numerical models to examine how rigid, spiny phytoplankton cells tumble in a simple linear gradient of velocity. We found that their tumbling was in general well approximated by that of the smallest oblate or prolate spheroid that could contain both the cell and its spines. Investigations that examine the tumbling of cells with flexible spines remain to be done. (Received September 19, 2011)