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Mathematical models of hydrodynamically triggered zooplankton swimming: drivers and consequences.

The swimming of zooplankton is a complex phenomenon with a considerable number of mathematical models available in the published literature. After a brief review of these, I will present in detail a model of shear-triggered swimming that is objective in the sense of continuum mechanics, and that leads to zooplankton patchiness in the vertical. This patchiness occurs at depths that are determined, at least in part, by the hydrodynamics, as opposed to pure light preference levels. I will subsequently discuss the differences between shear triggered and acceleration triggered behaviour, in the context of a simple set up that is analogous to materials characterization in rheology. I will conclude with some speculation on future directions. (Received June 28, 2018)