1147-60-190 **Don A Krasky*** (don@math.hawaii.edu) and **Daisuke Takagi** (dtakagi@math.hawaii.edu).

Diffusion of stochastic "gear changing" swimmers.

We introduce a model for dispersion of independent swimmers jumping randomly between multiple translational velocities in arbitrary dimensions. Stochastic differential equations are introduced and used to produce simulations for comparison with theory. The associated Fokker-Planck equations are derived from the Langevin dynamics, giving an analytical prediction for the effective diffusion constant. This prediction is shown to be in good agreement with simulations, and is in a relatively simple form, yielding a quick tool for experimentalists to obtain an accurate estimate of diffusion coefficient. A full analysis of the model is presented for the case with two velocities, and some extreme cases are discussed in the general model. We show adaptability of the model by fitting to three previous models of swimmers having two or three preferred velocities. These comparisons explore how stochastic vs. deterministic velocity changes and restricting certain velocity jumps result in different rates of dispersion. (Received January 08, 2019)