Stokesian Jellyfish ARTHUR EVANS, SAVERIO SPAGNOLIE, ERIC
LAUGA, University of California, San Diego — Most studies into the swimming
of microscopic organisms are directed at flagellated cells, ciliated bodies, or other
biologically relevant models. However, biological systems need not be emulated in
order to produce locomotion. We present here a proof-of-principle model for a closed
bilayer vesicle swimming at low Reynolds number due to a prescribed physically-
actuated shape change of the surface. By modulating the volume and membrane
composition of the vesicle via osmotic or colloidal effects, the vesicle shapes change
continuously in thermal equilibrium, leading to non-reciprocal deformation, and
therefore swimming, if the proper conditions are satisfied.

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