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Optimal stroke patterns for a model jellyfish swimmer with thin, flexible body JIFENG PENG, JOHN DABIRI, California Institute of Technology — In this study, a numerical model is built to simulate swimming of oblate jellyfish (e.g. *Aurelia aurita*). The model swimmer is a thin, axisymmetric circular plate which is flexible and is able to deform, mimicking contraction and relaxation of a jellyfish. Using body deformation, the swimmer is able to swim by shedding vortices into fluid wake. A prescribed body motion extracted from a free-swimming *Aurelia aurita* is applied to the swimmer. The induced vortex wake is solved by a vortex sheet method and is compared with the wake of the free-swimming *Aurelia aurita* measured by PIV. The stoke pattern of the swimmer is optimized for minimal cost of locomotion. The body kinematics are parameterized and cost of locomotion is calculated from simulation using the vortex sheet method. A surrogate management framework is used as the optimization scheme. The vortex wake induced by the optimal stroke pattern is investigated to identify the characteristics of the wake which enhance swimming performance.

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