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More efficient swimming by spreading your fingers WILLEM VAN DE WATER, JOSJE VAN HOUWELINGEN, DENNIS WILLEMSSEN, Applied Physics, Eindhoven University of Technology, WIM PAUL BREUGEM, JERRY WESTERWEEL, RENE DELFOS, ERNST JAN GRIFT, Laboratory for Aero and Hydrodynamics, Delft University of Technology — A tantalizing question in free-style swimming is whether the stroke efficiency during the pull phase depends on spreading the fingers. It is a subtle effect—not more than a few percent—but it could make a big difference in a race. We measure the drag of arm models with increasing finger spreading in a wind tunnel and compare forces and moments to the results of immersed boundary simulations. Virtual arms were used in the simulations and their 3D-printed real versions in the experiment. We find an optimal finger spreading, accompanied by a marked increase of coherent vortex shedding. A simple actuator disk model explains this optimum.

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