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Hydrodynamics of Peristaltic Propulsion ATHANASIOS ATHANASSIADIS, DOUGLAS HART, Massachusetts Inst of Tech-MIT — A curious class of animals called salps live in marine environments and self-propel by ejecting vortex rings much like jellyfish and squid. However, unlike other jetting creatures that siphon and eject water from one side of their body, salps produce vortex rings by pumping water through siphons on opposite ends of their hollow cylindrical bodies. In the simplest cases, it seems like some species of salp can successfully move by contracting just two siphons connected by an elastic body. When thought of as a chain of timed contractions, salp propulsion is reminiscent of peristaltic pumping applied to marine locomotion. Inspired by salps, we investigate the hydrodynamics of peristaltic propulsion, focusing on the scaling relationships that determine flow rate, thrust production, and energy usage in a model system. We discuss possible actuation methods for a model peristaltic vehicle, considering both the material and geometrical requirements for such a system.

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