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Individual nectophore kinematics during multi-jet swimming by the siphonophore Nanomia bijuga[1] KELLY SUTHERLAND, University of Oregon, BRAD GEMMELL, University of South Florida, SEAN COLIN, JOHN COSTELLO, Marine Biological Laboratory — The siphonophore N. bijuga is a colonial marine organism comprised of multiple swimming units that coordinate forward and reverse swimming as well as maneuvering. Though colonies can be cms long, individual swimming units (nectophores) are mms in length. To better understand swimming kinematics and jet-wake properties at the scale of individual nectophores, we collected high speed microvideography and micro particle image velocimetry at the nectophore scale. Nectophores exhibited high pulse frequencies (3 Hz) and a rapid refill time that was roughly equal to the jet time. Forward and reverse swimming were achieved using a maneuverable velum with a triangular opening (jet nozzle) that directed flow forward or backward. Detailed velum kinematics can be applied to the design of multijet underwater vehicles with varying nozzle geometries and cross sectional areas for control of exit flow properties.

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