Abstract Submitted
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Remoras pick where they stick on blue whales.[1] BROOKE FLAMMANG, New Jersey Institute of Technology/Rutgers University, SIMONE MARRAS, New Jersey Institute of Technology, O LEHMKUHL, Barcelona Supercomputing Center, ERIK ANDERSON, Woods Hole Oceanographic Institution, ABHISHEK MUKHERJEE, New Jersey Institute of Technology, DAVID CADE, Stanford University, MICHAEL BECKERT, JASON NADLER, Georgia Tech Research Institute, GUILLAUME HOUZEAUX, MARIANO VZQUEZ , Barcelona Supercomputing Center, HALEY AMPLO, New Jersey Institute of Technology/Rutgers University, JOHN CALAMBOKIDIS, Cascadia Research Collective, ARI FRIEDLAENDER, University of Santa Cruz, JEREMY GOLDBOGEN, Stanford University — Animal-borne video recordings from blue whales in the open ocean show that remoras preferentially adhere to specific regions of the surface of the whale. Using empirical and computational fluid dynamics analyses, we show that remora attachment was specific to regions of separating flow and wakes caused by surface features on the whale. Adhesion at these locations offers remoras drag reduction up to 71-84% compared to the freestream. Remoras were observed to move freely along the surface of the whale using skimming and sliding behaviors. Skimming provided drag reduction as high as $50 - 72\%$ at some locations for some fish sizes, but little to none was available in regions where few to no remoras were observed. Experimental work suggests that the Venturi effect may help remoras stay near the whale while skimming. Understanding the flow environment around a swimming blue whale will inform the placement of biosensor tags to increase attachment time for extended ecological monitoring.

[1]Remoras pick where they stick on blue whales

Brooke Flammang
New Jersey Institute of Technology/Rutgers University

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