Abstract Submitted
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Shortfin Mako Skin: A Possible Passive Flow Control Mechanism for Drag Reduction[1] JENNIFER WHEELUS, AMY LANG, MICHAEL BRADSHAW, The University of Alabama, PHILLIP MOTTA, MARIA HABEGGER, University of South Florida — The shortfin mako is one of the fastest and most agile ocean predators creating the need to minimize its pressure drag by controlling flow separation. One proposed method for flow control is the activation of small teeth-like denticles, on the order of 0.2 mm, that cover the skin of the shark. Biological studies of the shortfin mako skin have shown the passive bristling angle of their denticles to exceed 50 degrees in areas on the flank corresponding to the locations likely to experience separation first. It is proposed that reversing flow, as occurs at the onset of separation in a turbulent boundary layer, would activate denticle bristling and hinder local separation from leading to global separation over the shark. It has been shown on a biomimetic model that bristled denticles create cavities that support the formation of vortices that interact with the boundary layer. This interaction is thought to support momentum exchange and allow the flow to stay attached longer. This experiment focuses on the mechanism that triggers bristling of the real shark skin denticles and further explores the interaction those denticles foster with the boundary layer on a 3D biomimetic model using Digital Particle Image Velocimetry (DPIV).

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