

Abstract Submitted
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On the Vertical Impact of a Highly-Flexible Cantilevered Plate on a Free Surface¹ CHRISTINE M. GILBERT, M. JAVAD JAVAHERIAN, Virginia Tech — Taking inspiration from nature and biology, the structural response and reconfiguration of a flexible structure in a flow can decrease drag if the structure becomes streamlined with the flow direction. Much research on passive reconfiguration of structures such as seagrasses or leaves on trees have been conducted in a single fluid, either in air or water. The current project is on both passive and active control of flexible plates interacting with a free surface interface between air and water. This talk is on a subset of the larger project and is on passive reconfiguration of a highly-flexible set of cantilevered plates, forming a V-shape, vertically impacting a free surface. Impact loading occurs as the plate passes through the free surface. While a seemingly simply problem, the large deformations of the plate are nonlinear and cause significant changes in the free surface elevation and pressure loads on the flexible body. In this talk, preliminary experimental measurements will be discussed and interpreted in light of theory.

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