Johns Hopkins University

Center for Environmental & Applied Fluid Mechanics

3:00 PM, Tuesday, September 16, 2025
Gilman Hall 17
Zoom: https://wse.zoom.us/j/93762992307
Link for Fall 2025 recordings

Prof. Christine Gilbert
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"Passive and Active Reconfigurations of Engineering Systems Inspired by Manta Ray Oscillatory Swimming Motions Near a Free Surface"

Abstract: Animals such as fish and manta rays actively control the shape of their fins to swim. Taking inspiration from these biological movements, we can study passive and active reconfiguration of flexible structures near a free surface. In this talk, results will be presented on the passive reconfiguration of flexible plates vertically flapping near a free surface calm water. A discussion of fluidic flexible matrix composites (F2MC) will be presented to provide active reconfiguration of the plates, and these results will be compared to those of the passive reconfiguration experiments looking at the influence of stiffness, depth, and flapping frequency. Going back to the inspiration of the manta ray, results of a scaled, rigid manta ray at different distances from the free surface, angles of attack, and flow speed will be shown and interpreted. Future measurements include the measurement of the wake generated by the manta ray and the influence of fluid-structure interactions near the free surface will be discussed. The work presented in this talk was funded by the National Science Foundation.

Bio: Dr. Christine Gilbert (née Ikeda) is an associate professor in the Kevin T. Crofton Department of Aerospace and Ocean Engineering at Virginia Polytechnic Institute and State University. Dr. Gilbert received her PhD from the University of Maryland in Mechanical Engineering in 2012. She holds an MS and BS in Mechanical Engineering also from the University of Maryland. Dr. Gilbert has held academic appointments at both the US Naval Academy and the University of New Orleans before coming to Virginia Tech in 2016. Dr Gilbert has received both the ONR Young Investigator Award (YIP, 2015) and the NSF CAREER award (2020). Her research interests include experimental fluid-structure interaction near a free surface. She is an active member in the American Physical Society (APS) Division of Fluid Dynamics and the American Naval Engineers Society.

For more details, visit: https://www.aoe.vt.edu/people/faculty/gilbert.html

Hosted by: Prof. Rajat Mittal (MechE)