



TUAT Fluid Dynamics Seminar

Hydroelasticity of High-Speed Planing Craft Subjected to Slamming Events by Vertical Water Entry Experiments



Lecturer:

Dr. Christine M. Gilbert

Date: Thursday, 7th September, 2023

Time: 10:30 - 11:30

Place: Building 6 - Room201

Biography

Dr. Christine Gilbert 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 BS, MS, and PhD from the University of Maryland in Mechanical Engineering. Prior to her appointment at Virginia Tech, Dr. Gilbert has worked at the U.S. Naval Academy (assistant research professor, 2012 to 2014) and the University of New Orleans (tenure track assistant professor, 2014 to 2016). Dr Gilbert has received both the ONR Young Investigator Award (YIP, 2015) and the NSF CAREER award (2020). She is a member of the American Physical Society (APS) Division of Fluid Dynamics and AIAA.

Abstract

Small high-speed craft endure repeated slams into waves in the ocean. To better design these craft, it is important to understand this fluid-structure interaction when materials such as composites are used in their construction. In this talk, the slamming of composite high-speed craft is experimentally investigated by early free-falling water entry experiments. These are conducted on a wedge with flexible bottom panels. Kinematics, hydrodynamics, structural deformation, and spray-root propagation on the bottom of the wedge are measured and analyzed. It was found that for a composite panel, small outward (toward the water) deflections are observed at very early times in the impact event and decaying vibrations are observed after chinewetting. Soon, we will begin planning of non-traditional towing-tank tests that will be conducted at the VT Advanced Towing Tank Facility. These future VT experiments will use controlled motion experiments to replicate single slamming events of a planing hull boat on calm water. The motions will be controlled in surge, heave, and pitch and fixed in all other degrees of freedom.

