



Fall 2021 Mechanical Engineering Distinguished Speaker Series

Dr. Haibo Dong
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Date and time: September 23, 2021 @ 3:30 PM Venue: In Person 310 Kelly Hall
<https://virginiatech.zoom.us/j/83237597114?pwd=Zi9tdGIEazZ1UE1lY2lRbTBxVlQvQT09>

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Bio-inspired Underwater Propulsion for Fast, Efficient Swimming: A Computational Approach

In this talk, an image-guided computational approach will be introduced for studying unsteady flow physics of fish swimming. High-speed, multi-camera system and a virtual-scene kinematics reconstruction technique are used together to measure the kinematics of fish (including tuna and trout) body and appendages with extraordinary details. A 3D Cartesian-grid-based immersed boundary flow solver together with adaptive mesh refinement (AMR) is then used to simulate corresponding unsteady flows in all their complexity. Analysis of vortex dynamics due to body-appendage interactions and associated hydro-performance of solitary swimming and schooling will be discussed. The discoveries of various performance enhancement mechanisms from this work will bring new insights on the design of highly efficient bio-inspired underwater robotic systems.

Speaker Biography



Dr. Haibo Dong is currently a Professor of Mechanical and Aerospace Engineering and the director of Aerospace Engineering program of the University of Virginia (UVA). Prior to his position at UVA, Dr. Dong held positions at Wright State University and the George Washington University, respectively. He obtained his Ph.D. degree in Aerospace Engineering from UCLA. His current research involves computational fluid dynamics, fluid-structure interaction, low speed aero/hydrodynamics, bio-inspired flows in nature, and bio-medical flows. He is currently an AIAA associate fellow, the CFD technique committee chair of the ASME Fluid Engineering Division, the editor-in-chief of the International Journal of Micro Air Vehicles, and associate editor of the AIAA Journal. He also was the recipient of a number of national and society awards including the NSF CAREER award, the AIAA Foundation Abe Zarem Educator award, the ASME Fluids Engineering Division Lewis F. Moody Award, and the APS/DFD Gallery of Fluid Motion best video award etc.

Host: Danesh Tafti (dtafti@vt.edu)