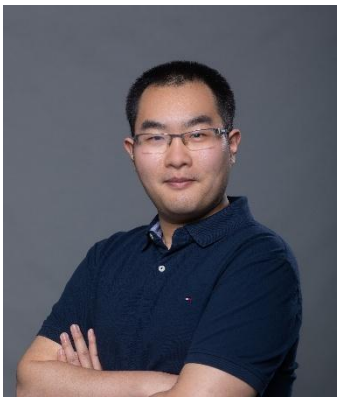
Department of Mechanical Engineering
THE UNIVERSITY OF HONG KONG

SEMINAR

Swimming Under Wave: My Humble Vision for Future Bio-inspired Underwater Robots



Date: 1 December, 2025 (Monday)
Time: 10:00 a.m.
Venue: Room 7-34 & 7-35, Haking Wong Building HKU

Speaker: Professor Dixia Fan
School of Engineering
Westlake University
China

Abstract:
Biomimetics leverages insights from biological systems to create innovative engineering solutions, a paradigm especially compelling in ocean science where life itself originated. Marine organisms have evolved extraordinary efficiency and agility in environments that challenge human-made vehicles, which typically suffer from high drag and limited maneuverability. This talk explores how inspiration from sea turtles, rainbow trout, and other species can inform next-generation underwater robotics. I will present recent advances using deep reinforcement learning to achieve efficient flapping propulsion and agile surface-skimming maneuvers, and highlight the successful 2000 m sea trials of the Sea Guru biomimetic submersible. Together, these results illustrate the progress of bio-inspired technologies in ocean engineering and point toward a future of more capable and adaptive marine robots.

Biography:
Prof. Fan Dixia is an Assistant Professor at Westlake University's School of Engineering, an Expert of Zhejiang Province's Kunpeng Action Plan, and an awardee of the National Youth Talent Program. He earned his B.Eng. from Shanghai Jiao Tong University (2013) and his M.S. and Ph.D. from MIT (2016, 2019). He later worked at the Woods Hole Oceanographic Institution, where he established the Intelligent Hydrodynamics Laboratory and developed the world's first intelligent towing tank, and served as Assistant Professor at Queen's University, Canada. At Westlake, he leads the Fluid Intelligence & Informatics Laboratory, focusing on AI in fluid mechanics, amphibious bio-inspired robotics, and metamaterials for large-deformation systems. His work appears in *Science Robotics*, *PNAS*, and *Journal of Fluid Mechanics*.

ALL INTERESTED ARE WELCOME

For further information, please contact Prof. X.F. Li (lixf@hku.hk).