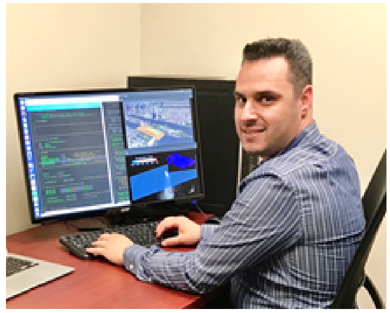
The Department of Mechanical Engineering
College of Engineering and Applied Sciences
Stony Brook University

Mechanical Engineering Seminar



Dionysios Angelidis, Ph.D.

Department of Civil Engineering, Stony Brook University

Friday, March 30, 2018 at 11:00 AM, Room 173 Light Engineering Building

Lecture: High-fidelity two-phase flow large-eddy simulations for tackling turbulent fluid flows in nature.

Abstract

Numerical simulation of natural flow regimes across a range of Reynolds numbers requires adoption of advanced strategies which can resolve the prevailing large disparity in spatial and temporal scales. Despite the recent advances in computational methods and the exponential computing processing growth, numerical simulation of turbulent flows over arbitrarily complex terrains and geometries remains a challenging issue. In this talk I will demonstrate the potential of coupling high-performance computing (HPC) with adaptive mesh refinement (AMR) methods, for performing two-phase flow large-eddy simulations (LES) of turbulent flows. Such an approach allows multi-resolution massively parallel calculations and enables the performance of high-fidelity real-life turbulent flow calculations. To this end, a number of three-dimensional flow simulations of increasing complexity will illustrate the ability of the method to handle flows across a range of Reynolds numbers and flow regimes. This talk will emphasize on realistic turbulent cases including: hydrokinetic turbine calculations, bio-inspired aquatic flows and water impact problems. The ability of the proposed framework will be demonstrated by simulating the flow of New York City's East River, where an array of thirty MHK turbines is to be deployed as part of the Roosevelt Island Tidal Energy (RITE) Project. Also, the powerful computational codes are used to perform two-phase flow, fluid-structured-interaction (FSI) calculations to investigate the hydrodynamics and aerodynamics of a jumping archer fish. This study, performed in collaboration with the Center of Ocean Engineering of the Massachusetts Institute of Technology (MIT), ultimately enables assessment of the role of jumping as a competitive foraging strategy.

Biography

Dr. Dionysios Angelidis is a Research Scientist with the Research Foundation for the State University of New York (SUNY); affiliated with the Department of Civil Engineering of Stony Brook University. Dr. Angelidis received his diploma in Mechanical Engineering (MEng) from the National Technical University of Athens (NTUA) - Greece in 2005 and in 2010 received his Ph.D. in Computational Fluid Dynamics (CFD) from the same department. He continued his postdoctoral studies in CFD at the Saint Anthony Falls Laboratory (SAFL) of the University of Minnesota. His research is primarily focused on the development of novel CFD methods and codes which enable high fidelity calculations of turbulent flows; taking advantage of high-performance computing (HPC). Since 2010 he has published research papers in peer reviewed journals, which are emphasizing on robust mass conservative adaptive mesh refinement (AMR) finite volume (FV) and finite difference (FD) numerical methods for multi-resolution calculations of incompressible flows. He is specialized in calculations of real-life problems including, wind / hydro - kinetic energy, two-phase flows, aquatic swimmers and environmental flows.

Directions: Please refer to website: http://www.sunysb.edu or call 631-632-8310 for more information.
Check http://me.eng.sunysb.edu for any changes to location or time.

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