Department of
Mechanical Engineering
The University of Hong Kong

SEMINAR

FLUID TURBULENCE: A GRAND CHALLENGE PROBLEM IN SCIENCE AND COMPUTING

Date: May 25, 2023 (Thursday)
Time: 2:30 p.m.
Venue: Theatre C, Chow Yei Ching Building, HKU

Speaker: Prof. P.K. Yeung
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Abstract:
Turbulent fluid flows characterized by disorderly fluctuations spanning a wide range of scales in time and three-dimensional space arise in numerous applications important to society, including extreme weather phenomena, aircraft propulsion, disease transmission in air and water, etc. Basic questions include, say, how large the fluctuations can be, at what degree of likelihood, how long an episode can last, or over how large a spatial region can the effects be felt. Clearly, advances in the modeling of important quantities will require a certain level of fundamental understanding, which can in turn require a massive undertaking involving experiments, theory, and computation. The importance and challenges of turbulence have also motivated much work on direct numerical simulations of the exact governing equations of motion, which have benefited from tremendous advances in supercomputing power especially in the 21st Century. In this talk I will provide a general overview of turbulence, with emphasis on aspects of turbulence theory where high-resolution direct numerical simulations are of unique value. I will also discuss recent achievements in algorithmic development enabling simulations at a new world record resolution of 35 trillion grid points, on the world's first Exascale computer, called Frontier, at the Oak Ridge National Laboratory of the United States Department of Energy.

ALL INTERESTED ARE WELCOME

For further information, please contact Prof. D.Y.C. Leung at 3917 7911.