

distinguished speakers series

The Department of Mechanical and Materials Engineering presents:

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A Generalized Phase-Averaged Representation of the Quasi-Periodic Turbulent Wake behind a Normal Thin Flat Plate

A refinement of Hussein & Reynolds triple decomposition for fluctuating turbulent fields is developed based on an empirical Low Order Model (LOM). The LOM is constructed using the most energetic modes from a POD analysis of experimental data. The Generalized Phase Average (GPA) draws on elements of Stuart's Mean-Field Theory, formalizing the relationship between the slow-varying base flow and the fundamental harmonic pair. The benefit of the GPA over traditional approaches is the ability to represent cycle-to-cycle variations in terms of dynamically consistent coherent contributions. As a heuristic case, the wake of a normal thin flat plate will be examined. It will be shown that variations in the shedding cycle results in significant changes in the shed vortex topology and strength. The implications of this representation are considered in terms of the different contributions to the global and local turbulent kinetic energy balances and the interpretation of the incoherent Reynolds Stress field.



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TUESDAY, FEBRUARY 9th - 11:00 a.m. McLAUGHLIN HALL ROOM 312