

The Department of Mechanical Engineering presents:

Dr. Haris J. Catrakis

*Associate Fellow of the American Institute of
Aeronautics and Astronautics*

Associate Professor

*Department of Mechanical and Aerospace Engineering
University of California, Irvine*

**Friday, April 23rd
11:10AM-12:00PM
Bourns Hall A265**

Turbulence: Multiscale Dynamics, Predictability, and Optimization

Abstract: We consider fundamental theoretical ideas of multiscale dynamics, predictability, and optimization in turbulence including testing by computations and experiments. For multiscale aspects, we focus on level crossings which correspond to the occurrences in the flow where a physical quantity of interest such as velocity, vorticity, or concentration crosses a particular threshold level at instances in time and/or locations in space. Theoretical connections between level crossings, fractal dimensions, and spectra are also explored. For predictability, we consider the evolution and rate of growth of the flow region affected by initial flow differences. For optimization, we consider the effects of forcing on the multiscale dynamics and the mechanisms by which the forcing affects the flow dynamics. We explore the theoretical aspects with experimental and computational testing in selected fundamental turbulent flows.

Bio: Dr. Haris J. Catrakis earned his Ph.D., M.Sc., and B.Sc. degrees from Caltech. He joined the UC Irvine faculty in 1998. He has received several awards including the National Science Foundation Career Award, the Fitzpatrick Prize in Physics, the Ruttly Prize in Mathematics, the Esso Award in Science, the Buhler Award in Aeronautics, the Mager Prize in Engineering, and the Henry Ford Scholar Award. He is an Associate Fellow of the American Institute of Aeronautics and Astronautics.

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