



UNIVERSITÀ DEGLI STUDI DI GENOVA

**Dottorato in Fluidodinamica e Processi dell'Ingegneria Ambientale**

## **AVVISO DI SEMINARIO**

**“Turbulent Eddy Generation in hybrid  
RANS-LES calculations”**

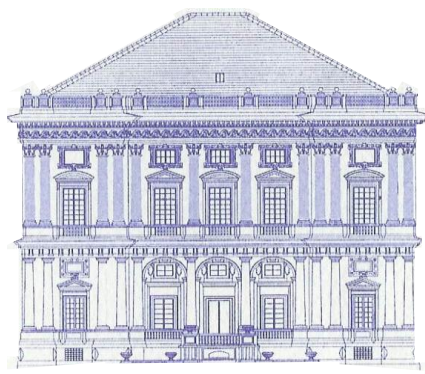
or

**“Wall-modelled large-eddy simulations:  
Present state and prospect”**

**Prof. Ugo Piomelli**

Queen's University  
Kingston, Ontario, CA

Mercoledì 16 Giugno, 2010 – ore 11.00  
Facoltà di Ingegneria,  
Aula A11  
Villa Giustiniani Cambiaso



Per informazioni contattare il  
Prof. Alessandro Bottaro, [bottaro@dicat.unige.it](mailto:bottaro@dicat.unige.it)



### **Turbulent Eddy Generation in hybrid RANS-LES calculations**

Hybrid RANS/LES methods combine the advantages of RANS models in terms of simulation costs, with the ability of LES to capture unsteady flow structures. A problem encountered in applications of this technique is the transmission of information between the RANS and LES zones: in the RANS region only mean-flow data is available, and the Reynolds shear stresses are entirely supported by the turbulence model; in the LES region, on the other hand, turbulent eddies must be present to support the turbulent momentum transport. The generation of these eddies is a critical ingredient in determining the effectiveness and accuracy of a hybrid method. In this seminar applications in which the RANS region is below the LES zone, and cases in which the flow advects from RANS to LES regions are discussed, and recent results from our research group are presented.

### **Wall-modelled large-eddy simulations: Present state and prospect**

The most common techniques used to perform large-eddy simulations of high-Reynolds number wall-bounded flows are reviewed. The main sources of error of this approach are discussed, and considerations on future directions for development are made.

### **Biographical sketch of Ugo Piomelli**

Professor Piomelli obtained a Laurea in Ingegneria Aeronautica from the Università di Napoli "Federico II" in 1979. He then earned a Master of Science Degree in Aerospace Engineering from the University of Notre Dame and a PhD in Mechanical Engineering from Stanford University in 1988. From 1987 to 2008 he was on the faculty of the Department of Mechanical Engineering at the University of Maryland, first as Assistant, then Associate and finally Full Professor. He also served as Associate Chair and Director of Graduate studies from 2002 to 2007. In August 2008 he joined the Department of Mechanical and Materials Engineering at Queen's University in Kingston, Ontario, where he is a Tier 1 Canada Research Chair in Computational Turbulence, and the HPCVL-Sun Microsystems Chair in Computational Science and Engineering.

Professor Piomelli has published over 50 refereed journal articles, in the fields of turbulence and transition modelling and simulations. His work has been cited over 3,000 times. He is Associate Editor of the ASME Journal of Fluids Engineering. He was elected Fellow of the American Physical Society in 2002, of the Institute of Physics (UK) in 2004 and of the American Society of Mechanical Engineers in 2009. He was also elected Associate Fellow of the American Institute of Aeronautics and Astronautics in 2004. His present research includes studies of the flow in rivers and lakes, turbulent boundary layers, and vascular systems.