

Short Curriculum Vitae of

Carlo Massimo Casciola

Carlo Massimo Casciola, born 1962 and Italian citizen, is presently full professor of Fluid Dynamics at the Mechanical and Aerospace Engineering Department of La Sapienza where he leads a research group working on the fluid dynamics of complex flows. The group consists of three permanent members between associate and assistant professors, and presently includes three postdocs and six PhD students. The modus operandi of the group is chiefly theoretical and numerical, oriented to fundamental and numerical modeling. This approach brought the group members to collaborate with scientists belonging to several neighboring disciplines, such as physics, material science, chemistry, and biology. The issuing multidisciplinary and multiscale expertise has already proved successful in dealing with such diverse problems as Combustion, Drag reduction, Particle Transport, Multiphase Flows, and Interfacial Phenomena like wetting and liquid slippage. Major achievements of the research group under his guidance concern the coupling of macroscopic flows with a micro-structure. In particular, the group has given contributions in wall bounded turbulence (DNS and LES), particle-laden turbulent flows, polymer-laden and multiphase flows. More recently the interest enlarged to the nanoscale, and concentrated on the study of fluid motion and protein translocation in nanopores through various kind of Molecular Dynamics (MD) simulations. Finally advanced MD simulation and free-energy methods have been applied to address the stability of vapor nuclei on rough, hydrophobic surfaces. The original results achieved in this field encouraged the group in extending this kind of approaches from the nano to the micro scale (thermodynamics and phase field methods).

The complete list of papers coauthored by Carlo Massimo Casciola can be found at the address <http://scholar.google.it/citations?user=iliWpyoAAAAJ&hl=it&oi=ao>

Major research topics and contributions in the last 5 years.

- Particle-laden turbulent flows (~20 papers among journals and conference proceedings; 2008-): Turbophoresis in wall flows (numerical, theoretical); Anomalous transport in cold jets (numerical, theoretical); Dynamics of inertial particles in reactive flows (numerical, experimental, theoretical); Clustering in homogeneous and inhomogeneous flows (numerical, theoretical)
- Combustion (~10 papers among journals and conference proceedings ; 2008-): Fractal behaviour of premixed flames (numerical, experimental, theoretical); Fractal-based LES modelling of premixed flames (numerical, theoretical); Counter-gradient diffusion in premixed flames (experimental, theoretical)
- Micro-Nanofluidics (~15 papers among journals and conferences; 2005-): Molecular Dynamics for fluid-flows through nano-pores (numerical, theoretical); Protein translocations through nano-pores (numerical, theoretical); Water slippage over hydrophobic surfaces (numerical, experimental, technological)
- Multiphase flows and phase change (~ 6 papers among journals and conferences; 2010-): Phase-field methods (theoretical, numerical); Atomistic simulations and free-energy methods of wetting processes (theoretical, numerical)

Carlo Massimo Casciola is presently the Director of the CECAM-IT-Sapienza Node, http://www.cecarn.org/node_sapienza.html, one of the three Italian nodes of CECAM, the prestigious European organization devoted to fostering basic advancements and applications

of atomistic and numerical simulation techniques. The Node involves the major departments interested in numerical simulations in Sapienza as well as the major Universities in Rome (Tor Vergata, Roma Tre) and several CNR Institutes (Complex Systems, Chemical and Physical Processes).

He coordinates the PhD Program in Theoretical and Applied Mechanics and the Master Program (Laurea Magistrale) in Nanotechnology Engineering.

He is member of the editorial board of Flow, Turbulence and Combustion; Acta Mechanica; Meccanica and of the Steering Committee of the European Turbulence Conference, a major EuroMech initiative in fluid mechanics.

During the years he tutored order of 20 PhD students, mainly in the field of numerical simulations of different fluid dynamics systems, several of which are presently recognized scientists in the field.

Recently (2013) he received substantial funding (2.5 MEuro) under the renowned ERC-Advanced-Grant for innovative research for the project BIC - Cavitation across scales: following Bubbles from Inception to Collapse.