LORENZO CAMPANA

PERSONAL INFORMATION

Address	Inria (G24), Sophia Antipolis, France
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"What we observe is not nature itself, but nature exposed to our method of questioning."

— Werner Heisenberg

RESERCH INTERESTS

My research interests are oriented on the fundamental aspects of modelling the physics of turbulence. Particularly, how physical models can be useful to explain partially or even fully some phenomena hidden behind the natural events that can be measured only experimentally. Furthermore, during my Phd I get passionate on the mathematical aspects of develop models and how these are constrained to the physical description. In addition, also the numerical aspects arouse my curiosity coming from the fact that these problems turn up as a real hardship on understanding process of the phenomena. Personally, I am strongly motivated and passionate in a professional career and I like sharing opinions and knowledge, and cooperating to enriched my capabilities in team working and improved my skills.

EDUCATION

Dec. 2017- Present — Université Côte d'Azur - INRIA

Phd Thesis

Thesis: *Stochastic modelling of non-spherical particles in turbulence*
Advisor: DR Mireille Bossy

Oct. 2014-Mar. 2017 — University of Rome, "Sapienza"

Master in Mechanical Engineering

· Department: Mechanical and Aerospace Engineering
Thesis: *Turbulent Drag Reduction by Superhydrophobic Surfaces*
Advisors: Prof. Carlo Massimo Casciola & Ph.D. Francesco Battista

Nov. 2010-Mar. 2014 — University of Rome, "Sapienza"

Bachelor in Mechanical Engineering

· Department: Mechanical and Aerospace Engineering
Thesis: *Low Mach Number Asymptotic of the Navier-Stokes Equations*
Advisor: Prof. Paolo Gualtieri

Set. 2005-Giu. 2010 — Liceo Scientifico Statale, "A. Righi"

Secondary School

· Diploma Statale Liceo Scientifico

SKILLS

Programming	</> Fortran, Python, C, C++
Softwares	Mathematica, Pycharm, Tecplot360, Matlab, LaTeX, Ansys
Operating Systems	Linux, MacOsx, Microsoft Windows
Languages	Italian · Mothertongue
	English · Intermediate (B2)

French · Intermediate (B1/B2)

PUBLICATIONS

2019

A Lagrangian stochastic model for rod orientation in turbulent flows.
Authors: Lorenzo Campana, Mireille Bossy & Jean Pierre Minier.
ICMF 2019, Conference book.

2017

Turbulent Drag Reduction by SHSs.
Authors: Lorenzo Campana & *Advisor*: Prof. Carlo Massimo Casciola & *Co-Advisor*: Ph.D. Francesco Battista & *Ph.D. Student*: Roberta Costanitini.
University of Rome, "Sapienza".

Abstract: The superhydrophobic surfaces (SHSs) were initially inspired by the unique water-repellent properties of the lotus leaf and can be employed to produce drag reduction in turbulent flows. The effects of a SHS consist on micro-grooves which can entrap gas pockets when sub-merged in the water, i.e. at the groove an interface liquid-gas with a no zero velocity is present. In this work, direct numerical simulations (DNS) are used to investigate the drag-reducing performance of SHS in a turbulent pipe flow. The configuration of SHS influences the drag reduction within the pipe. The drag appears reduced in the SHS cases with respect to the smooth classical case. This effect strongly depends on the geometrical features of the surfaces. The increase of drag reduction is remarkable in the cases with a large groove width. To understand the phenomena linked to this mechanism, the turbulent vortical structures are studied. These structures are significantly modified compared to the smooth case. The result obtained in this work underlines that the contribution of the Reynolds stress within the pipe rises with the width of groove, providing a negative contribution to the drag reduction. This effect is exceeded by the contribution of the slip velocity at the wall. SHS technology represents an emergent application in many fields of research and in a broad spectrum of industrial and everyday life applications.

TALKS

Conferences

3-6 September 2019 · ETC 2019 - "17th European Turbulence conference", Turin, Italy. Title: *Numerical scheme for a Lagrangian stochastic model describing rods orientation.*

19-24 May 2019 · ICMF 2019 - "10th International conference of multiphase flow", Rio de Janeiro, Brazil. Title: *A Lagrangian stochastic model for rod orientation in turbulent flow.*

17-19 September 2018 · DTPF 2018 - "Dispersed two phase flow", Toulouse, France. Title: *Modelling rod orientation in turbulent flow: Lagrangian stochastic approach.*

16-18 October 2018 · GDR 2018 - "Phénoménologié de la turbulence", Nice, France. Title: *Modelling rod orientation in turbulent flow through Lagrangian stochastic approach.*

Seminars attended

9-10 November 2020 · Réunion dynamique des fibres, Zoom.

May 2019 · Physique des écoulement turbulent, Nice, France.

30 April 2019 · Journeé numeric, Nice, France.

17 April 2018 · Rencontre de mécanique de fluid, Nice, France.

Schools attended

1-5 July 2019 · CISM Advanced school, Udine, Italy. Title: *Anisotropic particles in viscous and turbulent flow.*

7-12 April 2019 · Les Houches School of Physics, Les Houches , France. Title: *New challenges in turbulence research* V.

OTHER INFORMATION

References

DR Mireille Bossy

Team Calisto, Galois building, Office G31

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Personal Interests

Travels · Photography · Tennis · Music · Art

January 5, 2022