

Work experience

- 2023 – **Research fellow in Fluid Mechanics at Department of Mechanical and Aerospace Engineering, "Sapienza" University of Rome.** *The main research topics are: turbulent flows of dilute polymer solutions, polymer dynamics, particle-laden flows, and turbulent flows over superhydrophobic and liquid-infused surfaces.*

Teaching experience

- 2025 **Course in Thermodynamics, Biomedical Engineering,** University of Arkansas, Rome Center.
- 2025 **Course in Mechanics of Fluids, Biomedical Engineering,** University of Arkansas, Rome Center.
- 2023 - 2024 **Tutoring course in Fluid Dynamics, Mechanical Engineering,** "Sapienza" University of Rome.
- 2022 **Tutoring course in Geometry, Management Engineering,** "Sapienza" University of Rome.
- 2021 - 2022 **Tutoring course in Geometry, Mechanical Engineering,** "Sapienza" University of Rome.

Education

- 2020 - 2023 **PhD in Theoretical and Applied Mechanics, "Sapienza" University of Rome,** Thesis title: Drag reduction in turbulent wall-bounded flows of dilute polymer solutions.
- 2018 - 2020 **Master in Aeronautical Engineering, "Sapienza" University of Rome,** Graduation date: 26/10/20, Final result: 110/110 cum laude, Thesis title: Turbulent flows of dilute polymer solutions.
- 2015 - 2018 **Bachelor in Aerospace Engineering, "Sapienza" University of Rome,** Graduation date: 07/11/20, Final result: 110/110 cum laude, Thesis title: Optimization of the front wing for an open-wheel car.
- 2010 - 2015 **Secondary School Diploma, Liceo Scientifico "Louis Pasteur",** Rome, Final result: 100/100.

Languages

Native Italian
Proficient English

Level C1. CAE: Certificate in Advanced English (2014)

Competitive HPC Resource Grant

- 2025 **IS CRA-B, HP10BQ3ZG0,** Awarded a competitive grant of 1700000 core-hours on the High-Performance Computing (HPC) system 'Leonardo' at CINECA to conduct Direct Numerical Simulations of polymeric turbulent flows at Maximum Drag Reduction.

Publications

- [1] F. Serafini, F. Battista, P. Gualtieri, and C.M. Casciola. Drag reduction in turbulent wall-bounded flows of realistic polymer solutions. *Physical Review Letters*, 129(10):104502, 2022.
- [2] F. Serafini, F. Battista, P. Gualtieri, and C.M. Casciola. Polymers in turbulence: any better than dumbbells? *Journal of Fluid Mechanics*, 987:R1, 2024.
- [3] F. Serafini, F. Battista, P. Gualtieri, and C.M. Casciola. The role of polymer parameters and configurations in drag-reduced turbulent wall-bounded flows: Comparison between fene and fene-p. *International Journal of Multiphase Flow*, 165:104471, 2023.
- [4] F Serafini, F Battista, P Gualtieri, and CM Casciola. The role of polymer molecular weight distribution in drag-reducing turbulent flows. *Journal of Fluid Mechanics*, 1007:A10, 2025.
- [5] F Serafini, F Villani, M Gallo, P Gualtieri, and F Battista. High reynolds number bulk effects induced by superhydrophobic surfaces. *Physics of Fluids*, 37(2), 2025.
- [6] F. Serafini, F. Battista, P. Gualtieri, and C.M. Casciola. Drag reduction in polymer-laden turbulent pipe flow. *Fluids*, 7(11):355, 2022.
- [7] F. Serafini, F. Battista, P. Gualtieri, and C.M. Casciola. Kinetic energy budget in turbulent flows of dilute polymer solutions. *Flow, Turbulence and Combustion*, 2023.
- [8] Francesco Serafini, Francesco Battista, Paolo Gualtieri, and Carlo Massimo Casciola. Universal mean velocity profile in polymeric flows at maximum drag reduction. *arXiv preprint arXiv:2503.13168*, 2025.

Conferences and Workshops

- 08/2025 **Drag reduction by polymer additives: the Maximum Drag Reduction asymptote**, *Oral presentation at the 2nd European Fluid Dynamics Conference*, Dublin, 26-29 August 2025
- 07/2025 **Supramolecular polymers for turbulent drag reduction**, *Oral presentation at the EuroMech Colloquium "Non-spherical particle in turbulence"*, Udine, 16-18 July 2025
- 05/2025 **Hybrid Eulerian-Lagrangian model to simulate the dynamics of polymer solutions**, *Oral presentation at the 12th International Conference on Multiphase Flows*, Toulouse, 12-16 May 2025
- 09/2024 **Drag reduction by polymers in turbulent pipe flows: comparison between DNS and experiments**, *Oral presentation at the 1st European Fluid Dynamics Conference*, Aachen, 16-20 September 2024
- 04/2024 **Turbulent Flows of Dilute Polymer Solutions: Comparing DNS with Experiments**, *Oral presentation at the 14th Direct and Large Eddy Simulations Workshop*, Erlangen, 10-12 April 2024
- 09/2023 **Turbulent pipe flows of dilute polymer solutions**, *Oral presentation at the 10th International Symposium on Turbulence, Heat and Mass Transfer THMT23*, Rome, 13-15 September 2023
- 09/2023 **Drag reduction by polymers. The issue of comparing DNS with experiments**, *Oral presentation at the European Turbulence Conference ETC18*, Valencia, 04-06 September 2023

- 10/2022 **Drag reduction in turbulent wall-bounded flows of realistic polymer solutions**, *Oral presentation at the 13th Direct and Large Eddy Simulations Workshop*, Udine, 26-29 October 2022
- 09/2022 **Drag reduction in turbulent pipe flows of realistic polymer solutions**, *Oral presentation at the 14th European Fluid Mechanics Conference*, Athens, 13-16 September 2022
- 10/2021 **Hybrid Eulerian-Lagrangian simulations of drag reducing polymers at high Weissenberg**, *Presented at poster Session at Multiscale simulations of complex materials*, CECAM, 27/10/2022