



Michele Buzzicotti

Curriculum Vitae

Personal details

Given and family name **Michele Buzzicotti.**
Date and place of Birth **21 July 1987, Terni.**
E-mail **michele.buzzicotti@roma2.infn.it.**

Professional experience

13/12/2018- Present **RTDa**, University of Rome "Tor Vergata", Dept. of Physics.
01/03/2017- 12/12/2018 **PostDoc**, University of Rome "Tor Vergata", Dept. of Physics.
Funded by ERC Advanced Grant "Newturb". **PI Prof. Luca Biferale**

Education

From October 2013 to January 2017 **Ph.D. degree in Physics**, *University of Rome, "Tor Vergata"*, cum laudem.
Title Effects of Fourier mode reduction on small-scales turbulent fluctuations; Robustness and modelling
Thesis Advisor Prof. Luca Biferale, Department of Physics and INFN, University of Rome "Tor Vergata"
May 2013 **Master degree in Physics**, *University of Rome, "Tor Vergata"*, 110/110 cum laudem.
Title Analysis and Diagnostic of the Calibration Techniques of water vapour measurements from two LIDAR Raman belonging to the international network NDACC
Thesis Advisor Prof. G.L. Liberti, CNR ISAC, Roma Tor Vergata and Prof. Philippe Keckhut, CNRS-LATMOS Paris
May 2010 **Bachelor degree in Physics of the Atmosphere**, *University of Rome, "Tor Vergata"*.

Research interest

My main research activity is the study of **turbulent flows** using numerical simulations. Working from both **Eulerian** and **Lagrangian** points of view, I am interested in the development of non-linear, out of equilibrium models, such as Large-Eddy-Simulation closures for the small-scale dynamics of **high Reynolds** or **magnetohydrodynamic** flows. I am responsible for the development of **High-Performance Computing** (HPC) codes for state-of-the-art Direct Numerical Simulation (DNS), which are typically run in different

supercomputing centers and can scale up to tens of thousands of processing cores. I am also interested in the application and development of **Artificial Intelligence (AI)** tools to fluid flow problems such as: **deep learning** for the data analysis of turbulent flows and **reinforcement learning/policy gradient methods** for the development of smart swimmers, able to solve optimal navigation tasks in complex environments.

Memberships

2013-present **INFN**, *Istituto Nazionale di Fisica Nucleare*.

2013-present **EUROMECH**, *European Mechanics Society*.

2016-present **APS**, *American Physical Society*.

Publications

- 13) Biferale, L., **Buzzicotti, M.** & Toschi, F. Dynamical control of the small-scales turbulent fluctuations. (Work in preparation).
- 12) Biferale, L., Bonaccorso, F., **Buzzicotti, M.**, Iyer, K. P. (2019). Optimal sub-grid model for accurate determination of intermittent inertial range properties of turbulent flows. arXiv preprint arXiv:1901.08310.
- 11) Offermans, J., Linkmann, M., **Buzzicotti, M.** & Biferale, L. (2018) *A-priori* study of the subgrid energy transfers for small-scale dynamo in kinematic and saturation regimes. arXiv preprint arXiv:1807.00759 (in print *Physics of Plasmas*).
- 10) **Buzzicotti, M.**, Clark Di Leoni, P., & Biferale, L. (2018). On the inverse energy transfer in rotating turbulence. arXiv preprint arXiv:1804.07687 (Submitted to *European Physical Journal E*).
- 9) Linkmann, M., **Buzzicotti, M.**, & Biferale, L. (2018). Multi-scale properties of large eddy simulations: correlations between resolved-scale velocity-field increments and subgrid-scale quantities. *Journal of Turbulence*, 1-35.
- 8) **Buzzicotti, M.**, Aluie, H., Biferale, L., & Linkmann, M. (2018). Energy transfer in turbulence under rotation. *Physical Review Fluids*, 3(3), 034802.
- 7) Linkmann, M., **Buzzicotti, M.**, & Biferale, L. (2018). Nonuniversal behaviour of helical two-dimensional three-component turbulence. *The European Physical Journal E*, 41(1), 4.
- 6) **Buzzicotti, M.**, Linkmann M., Aluie H., Biferale L., Basseur J. & Meneveau C. (2018). "Effect of filter type on the statistics of energy transfer between resolved and subfilter scales from a-priori analysis of direct numerical simulations of isotropic turbulence." *Journal of Turbulence* 19.2: 167-197.
- 5) Biferale, L., **Buzzicotti, M.** & Linkmann, M. (2017). From two-dimensional to three-dimensional turbulence throughout two-dimensional three-component structures. *Physics of Fluids* 29, 111101.
- 4) **Buzzicotti, M.**, Bhatnagar, A., Biferale, L., Lanotte, A.S. & Ray S.S. (2016). Lagrangian Statistics for Navier-Stokes Turbulence under Fourier-mode reduction: Fractal and Homogeneous Decimations. *New Journal of Physics*, 18(11), 113047.
- 3) **Buzzicotti, M.**, Biferale, L., Frisch, U., & Ray, S. S. (2016). Intermittency in fractal Fourier hydrodynamics: Lessons from the Burgers equation. *Physical Review E*, 93(3), 033109.
- 2) **Buzzicotti, M.**, Murray, B. P., Biferale, L., & Bustamante, M. D. (2016). Phase and precession evolution in the Burgers equation. *The European Physical Journal E*, 39(3), 1-9.
- 1) Liberti, G. L., Tranterici, C. & **Buzzicotti, M.** (2012). Validation of TMI derived total precipitable water vapour with operational soundings. *Microwave Radiometry and Remote Sensing of the Environment (MicroRad)*, 2012 12th Specialist Meeting on. IEEE.

Talks - Conferences

- Jan., 2019 **Seminar at the University of Marburg; (Germany)**, Title: '*Energy transfer in turbulence under rotation*'.
- Nov., 2018 **APS Division of Fluid Dynamics; Atlanta (GA, USA)**, Title: '*Optimal sub-grid model for inertial range turbulence*'.
- Sep., 2018 **12th European Fluid Mechanics Conference (EFMC12); Vienna (Austria)**, Title: '*Energy transfer in turbulence under rotation*'.

- Jul., 2018 **HPC-LEAP Conference; Cambridge (England)**, Title: '*On the inverse energy transfer in rotating turbulence*'.
- Nov., 2017 **APS Division of Fluid Dynamics; Denver (CO, USA)**, Title: '*From to 2D to 3D turbulence through 2D3C configurations*'.
- Aug., 2017 **16th European Turbulence Conference; Stockholm (Sweden)**, Title: '*Eulerian and Lagrangian turbulence on reduced Fourier sets*'.
- May, 2017 **Fluids and Structures: Interaction and Modeling; Naples (Italy)**, Title: '*Transition from 3D to 2D turbulence by Fourier space decimation*'.
- Nov., 2016 **APS Division of Fluid Dynamics; Portland (OR, USA)**, Title: '*On the statistics of backscatter from sub-grid fluctuations at high Reynolds numbers*'.
- Nov., 2016 **Seminar at the Department of Mechanical Engineering of Rochester University; Rochester (NY, USA)**, Title: '*Eulerian and Lagrangian statistics in Fourier-reduced Navier Stokes equations*'.
- Oct., 2016 **HPC Applications to Turbulence and Complex Flows; Rome (Italy)**, Title: '*Coherent structures and phases synchronization in non linear Burgers equation*'.
- Sep., 2016 **11th European Fluid Mechanics Conference (EFMC11); Sevilla (Spain)**, Title: '*Eulerian and Lagrangian turbulence on fractal Fourier set*'.
- Sep., 2016 **iTi conference on Turbulence 2016 ; Bertinoro (Italy)**, Title: '*Extreme events and phases synchronization in Navier-Stokes equations and in non-linear models*'.
- Jun., 2016 **7th Summer school; Complex Motion in Fluids; Twente (Netherlands)**, Title: '*Coherent structures and phases synchronization in non linear Burgers equation*'.
- Mar., 2016 **COST Lagrangian transport: from complex flows to complex fluids; Lecce (Italy)**, "*Invited speaker*", title: '*Eulerian and Lagrangian turbulence on fractal Fourier set*'.
- Jan., 2016 **COST Flowing Matter; Porto (Portugal)**, Title: '*Intermittency in the Fractal Fourier Burgers Equation*'.
- Nov., 2014 **APS Division of Fluid Dynamics; San Francisco (CA, USA)**, Title: '*Burgers Turbulence on a Fractal Fourier set*'.
- Oct., 2014 **Seminar at the ICTS; Bangalore (India)**, Title: '*Burgers equation and Fourier Fractal Decimation*'.
- Jun., 2014 **Seminar at the observatoire de Nice; Nice (France)**, Title: '*Burgers equation and Fourier Fractal Decimation*'.
- May, 2014 **"New Frontiers in Theoretical Physics"; Cortona (Italy)**, Title: '*Burgers' equation, a model for turbulence*'.

DATA
24/03/2019

FIRMA
Michele Bucciotti