

Curriculum Vitae

Chiara Calascibetta

Born November 14, 1997, in Rome (Italy)

Nationality: Italian

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PROFESSIONAL EXPERIENCE

July 2024 - present

Research Fellowship funded by MUR under the program **PRIN 2022** (Dept. of Physics University of Rome Tor Vergata).

EDUCATION

Nov. 2021 - Dec. 2024

Ph.D. in Physics - University of Rome “Tor Vergata”.

Thesis Advisors: Prof. Luca Biferale and Dr. Massimo Cencini

Thesis title: *Active control of Lagrangian particle transport in complex and turbulent flows*
(**Cum Laude**)

Sept. 2019 - May 2021

Master’s degree in Theoretical Physics (*Statistical Mechanics*) - University of Rome “Tor Vergata”.

Official duration: one academic year 2019/20

Thesis title: *Reinforcement Learning algorithms to control the dynamics of some agents in chaotic flows*

Thesis supervisors: Proff. Luca Biferale & Roberto Benzi / Dr. Massimo Cencini

Final degree mark: **110/110 cum laude**

Weighted Average: 30/30

Number of honors: 8

Sept. 2016 - Sept. 2019

Bachelor’s degree in Physics - University of Rome “Tor Vergata”

Thesis title: *The Zermelo’s Navigation Problem following Optimal Control*

Thesis supervisors: Prof. Luca Biferale / Dr. Michele Buzzicotti

Final degree mark: **110/110 cum laude**

Weighted Average: 29,40/30

Number of honors: 10

July 2016

High school leaving qualification in scientific studies

Final mark: 100/100

RESEARCH INTEREST

I am specializing in the field of Statistical Mechanics with interest in **turbulent** and **complex systems**. My main research activity is focused on the study of control problems using both data-driven (**Reinforcement Learning**) and equation-informed (**Optimal Control**) approaches. In particular, I am studying systems of Lagrangian active particles navigating in complex fluids, optimizing their navigation in order to achieve specific goals. Recently, I also started to work on the **passive scalar turbulence**. Thus, from the computational point of view, I study numerical methods for simulating the time evolution of the Navier-Stokes equations on high performance computing facilities. In particular, I am working with **parallel computing** codes on CPUs and GPUs.

Main collaborations: Dr. Jérémie Bec (Centre Inria d’Université Côte d’Azur and CNRS), Dr. Laetitia Giraldi (INRIA, Sophia-Antipolis), Dr. Antonio Celani (ICTP, Trieste) and Prof. Alexei Mailybaev (IMPA, Rio De Janeiro).

AWARDS & SCHOLARSHIPS

Sept. 2023	Euromech Young Scientist Prize at the 18th European Turbulence Conference (ETC18) Motivation: for the best oral presentation given by an attendee under the age of 35 years
July 2022	National Award Milla Baldo Ceolin 2021 "Women in Theoretical Physics" award given by INFN. Motivation: to the best Master Theses in Theoretical Physics in 2021
Apr. 2021	Scholarship "Enrico Persico" 2021 - Accademia Nazionale dei Lincei 1st classified Motivation: among the best undergraduate students in physics in Rome
2017/2020	Deserving Student Award, a.y. 2017/18, 2018/19, 2019/20. 1st classified among all students enrolled in the bachelor/master's degree in Physics at the University of Rome Tor Vergata.
2018/19	Winner of the Degree Award - Lazio DiSCo
2017/18	Winner of the Award student of particular merit, a.y. 2017/18. Reserved for the 5% most talented students at the University of Rome Tor Vergata enrolled in the 2016/17 a.y.
2017/18/19/20	Winner of the Right to Education - Lazio DiSCo

PUBLICATIONS

- **Calascibetta, C.**, Giraldi, L., El Khiyati, Z. And Bec, J. Effects of collective patterns, confinement, and fluid flow on active particle transport. *Phys. Rev. E* **110**, 064601 (2024).
- **Calascibetta, C.**, Biferale, L., Borra, F., Celani, A. and Cencini, M. Optimal tracking strategies in a turbulent flow. *Commun Phys* **6**, 256 (2023).
- **Calascibetta, C.**, Biferale, L., Borra, F., Celani, A. and Cencini, M. Taming Lagrangian chaos with multi-objective reinforcement learning. *Eur. Phys. J. E* **46**, 9 (2023).
- Biferale, B., Bonaccorso, F., Buzzicotti M. and **Calascibetta, C.** TURB-Lagr. A database of 3d Lagrangian trajectories in homogeneous and isotropic turbulence. arXiv preprint *arXiv:2303.08662* (2023).

REVIEWING ACTIVITIES

Referee for: Physical Review Letters (**PRL**), Physical Review E (**PRE**), Physical Review Research (**PRR**), European Physical Journal E (**EPJE**).

MEMBERSHIPS

2021 - present	INFN (National Institute for Nuclear Physics)
2022 - present	APS (American Physical Society)

INVITED TALKS/SEMINARS

10 Oct. 2024	Young Seminars SIFS (Italian Society of Statistical Physics). Title: " <i>Optimal strategies to catch a passive drifting target in turbulence</i> ".
26 Feb. 2024	Geophysical and Environmental Processes seminar series @DAMTP (University of Cambridge, United Kingdom). Title: " <i>Data-driven and equation-informed optimal control of Lagrangian pairs in turbulent flows</i> ".
5 Dec. 2023	Team Seminar @INRIA (Université Côte D'Azur, France) . Title: " <i>Data-driven and equation-informed optimal control of Lagrangian pairs in turbulent flows</i> ".
4 Dec. 2023	PhD seminars - Scientific presentation @INRIA (Université Côte D'Azur, France) . Title: " <i>An Introduction to Control Theory: From Markov Decision Processes to Reinforcement Learning</i> ".
21 Oct. 2022	National Award Milla Baldo Ceolin 2021 "Women in Theoretical Physics" - @INFN (GGI, Firenze, Italy) . Talk's Title: " <i>Optimal Control tools to minimize dispersion in turbulent flows</i> ".

CONTRIBUTED TALKS

24 Nov. 2024	77th Annual Meeting of the APS Division of Fluid Dynamics (24-26 Nov. 2024, Salt Lake City, Utah)
18 Sept. 2024	1st European Fluid Dynamics Conference (16-20 Sept. 2024, Aachen, Germany)
21 Nov. 2023	76th Annual Meeting of the APS Division of Fluid Dynamics (20-22 Nov. 2023, Washington DC)
5 Sept. 2023	18th European Turbulence Conference (4-6 Sept. 2023, Valencia, Spain)
3 July 2023	Summer school 100 years of turbulent cascades (26 June - 7 July 2023, Nice, France)
30 May 2023	Math 2 Product (M2P) Conference (30 May - 2 June 2023, Taormina, Italy)

20 Nov. 2022	75th Annual Meeting of the APS Division of Fluid Dynamics (20-22 Nov. 2022, Indianapolis, Indiana)
14 Sept. 2022	14th European Fluid Mechanics Conference (13-16 Sept. 2022, Athens, Greece)
29 Aug. 2022	10th summer school Complex Motion in Fluids - University of Twente (28 Aug. - 2 Sept. 2022, Bad Boekelo, Enschede, Netherlands)
7 July 2022	Workshop Challenges and Benchmarks for quantitative AI in Complex Fluids and Complex Flows (6-8 July 2022, CREF)
27 June 2022	INFN FieldTurb Meeting (27-28 June 2022, University of Rome La Sapienza)
11 May 2022	70 years INFN (division Roma Tor Vergata, Villa Mondragone)

CONTRIBUTED POSTERS

26 March 2024	Complex Systems, Statistical Mechanics and Machine Learning Crossover (in Memory of Giovanni Paladin) - (25-29 March 2024, Les Houches, France)
9-11 Jan. 2023	Dynamics Days US 2023 (Online) hosted by the Mathematic Department of Trinity College

ORGANISING COMMITTEES

27 Feb. - 2 March 2023	First Bilateral Workshop Smart-TURB/Smart-HEART, Farnetta, Italy 2023
12 - 16 May 2024	Second Bilateral Workshop Smart-TURB/Smart-HEART, Città di Castello, Italy 2024

SCHOOLS

15-25 Aug. 2023	Summer school Frontier of Mixing (IESC , Corsica, organized within the Marie-Curie Skłodowska ITN CoPerMix)
26 June - 7 July 2023	Summer school 100 years of turbulent cascades (Université Côte D'Azur , Nice, France)
28 Aug. - 2 Sept. 2022	10th summer school Complex Motion in Fluids - University of Twente (Twente, Netherlands)
7-9 Mar. 2022	Introduction to Parallel Computing with MPI and OpenMP - CINECA
7-11 Feb. 2022	Hands on Machine Learning for Fluid Dynamics - VKI for Fluid Dynamics
31 Jan. - 4 Feb. 2022	HPC in Data Science: Introduction to Parallel Programming - SCtrain
13-17 Dec. 2022	Virtual School on Numerical Methods for Parallel CFD - CINECA
22-26 Nov. 2021	Data Science and Deep Learning with Python - CINECA
Sept. 2020	Online PhD School on Machine and Reinforcement Learning, Rare Events and Tensor Networks - (University of Rome Tor Vergata)
June 2019	School on Scientific Data Analytics and Deep Learning - CINECA (Rome)
Mar. 2016	International Masterclass IPPOG - INFN (National Institute of Nuclear Physics)

RESEARCH DISSEMINATION

2023	Presentation about “Deterministic Chaos” during the activities of SHARPER European Researcher’s Night: Title “ <i>Improbable Research</i> ” (Istituto d’Istruzione Superiore “A. D’Aosta” - L’Aquila, Italy)
2022	Presentation during the activities of Moff’Art-Surgente: Title “ <i>Panta rhei (but how ?)</i> ”
2022	Participation in the PLS Dept. of Physics Tor Vergata promotional video , showcasing the research activities of the Statistical Theoretical Physics and Complex Systems group.

Date

13/12/2024

Signature

Chiara Calascibetta



I give consent to the processing of my personal data according to D.lgs. 196 of 30 June 2003.