


## PERSONAL INFORMATION

## Francesco Mambretti

 Istituto Italiano di Tecnologia, via Melen 83, Genova (16152), Italy

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 [francescomambretti.github.io](https://github.com/francescomambretti)

Gender Male | Date of birth 27/08/1993

Nationality Italian



## MAIN SKILLS

Molecular Dynamics; Monte Carlo; DNA simulation; C++; Python; data analysis; machine learning; High Performance Computing; theory and simulation of soft and condensed matter.

## PRESENT JOB

December 2022 – present

## Postdoctoral researcher in Physics

Istituto Italiano di Tecnologia, via Melen 83, Genova (16152), Italy

**Postdoctoral Researcher** at the Atomistic Simulations research line, PI: prof. Michele Parrinello.

Topics: Molecular Dynamics, *ab-initio* and Machine Learning-aided simulations of **catalytic processes**.

Other research interests: simulations of DNA oligomers, coarse-grained modeling of nanostructured metallic films for neuromorphic computing applications, simulation of emergent phenomena in soft matter, coarse-graining of biophysical systems.

## WORK EXPERIENCES

February 2021 – November 2022

## Postdoctoral researcher in Physics

Università degli Studi di Padova, Dipartimento di Fisica e Astronomia, Laboratory of Interdisciplinary Physics, Padova, Italy

**Postdoctoral Researcher** at the (<https://www.liphlab.com/>) at the University of Padova, Italy. Supervisor: prof. Samir Suweis.

Topics: Molecular Dynamics simulation of DNA oligomers (with OxDNA); data analysis; machine learning; genetic algorithms; Bayesian statistics.

Co-supervisor of 4 Bachelor theses.

September 2017-March 2021

## PhD student in Physics

**PhD student (XXXIII cycle)** at the University of Milan, Italy. Tutor: prof. Davide E. Galli. Thesis title: **Emergent phenomena in condensed matter, soft matter and complex systems** (<https://air.unimi.it/handle/2434/820780>).

Topics: crystal growth in supercooled argon-krypton liquids; emergent properties of 1D and 2D soft matter; Stochastic Resistor Networks; soft patchy particles binary mixtures.

Co-supervisor of 7 Bachelor theses and 5 Master theses.

November 2017 - present

## University teaching assistant

## Courses:

- Measurement of nanoscale interactions in biological systems and data analysis - Python module (From 2020/21, 12 h/year)
- Laboratory for Numerical Treatment of Experimental Data (2018/19-2021/22 and 2022/23, 36 h/year)
- Numerical Simulation Laboratory (2019/20-2020/21, 36 h/year)
- Mathematics (2017/18, 40 h/year)
- Total: 292 h in the last 5 years.

May 2015 - present **tutor c/o Camplus College - Fondazione CEUR**

tutor of Mathematical Analysis, Linear Algebra and Physics at the Camplus CEUR Colleges in Milano (Città Studi, Humanitas, Lambrate, Turro).

## EDUCATION AND TRAINING

April 2017 - September 2017 and  
May 2021 - present

**Graduate goer**

at the Physics Department of the Università degli Studi di Milano, Italy, co-working with the research group of prof. D. E. Galli.

January 2015 - April 2017

**Master degree in Physics**

Università degli Studi di Milano, Milano - Italy.

Thesis: **Microscopic study of the structural phase transition in supercooled argon-krypton liquid mixtures**, 110 cum laude/110. Supervisor: prof. D. E. Galli.

September 2011 - December 2014

**Bachelor degree in Physics**

Università degli Studi di Milano, Milano - Italy.

Thesis title: **Microscopic characterisation of undercooled argon-krypton liquid mixtures via Molecular Dynamics simulations**, 107/110. Supervisor: prof. D. E. Galli.

September 2006 - June 2011

**Classical high school diploma**

Liceo "B.Zucchi", Monza (MB) - Italy. Final mark 94/100.

## SCIENTIFIC ACTIVITY

## Ongoing collaborations

prof. T. Bellini, University of Milan; prof. D. E. Galli, University of Milan; dr. R. Grisenti, Goethe Universität, Frankfurt; prof. P. Milani, University of Milan; dr. D. Pini, University of Milan; dr. E. Locatelli, University of Padova; prof. S. Suweis, University of Padova; dr. I. Stoev, MPI-CBG, Dresden

## Publications

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arXiv.org: francesco.mambretti

Author of **5** publications on international peer-reviewed journals (Nature Materials, Physical Review E, Entropy, Scientific Reports) and of 1 manuscript in preparation to be submitted to PNAS.

- <https://doi.org/10.1038/s41598-022-15996-9> (2022)
- <https://doi.org/10.3390/e24040458> (2022)
- <https://link.aps.org/doi/10.1103/PhysRevE.104.044602> (2021)
- <https://link.aps.org/doi/10.1103/PhysRevE.102.042134> (2021)
- <https://doi.org/10.1038/s41563-020-0613-z> (2020)

**Talks & posters** I have given 10 talks and presented 5 posters in national and international workshops, schools and conferences.

**Grant** I have won 2 CINECA ISCRA C grants (equivalent total value  $\approx$  4400 euro).

**Reviewer** I currently serve as a reviewer for Physical Review B, E and Materials; I have also reviewed contributions for Conference on Complex Systems 2022.

**Society membership** Since 2021, I am a member of the Organizing Committee and of the External Relations committee of the CSS/Italy <https://italy.csssociety.org/>

**Participation into school, conferences and workshops** Since 2014 participated into >15 national and international workshops, schools and conferences.

**Computer skills**

- OS: MacOS, Linux e Windows
- programming languages, high level: C++, Python, MPI, C, CUDA, bash, LaTeX, Gnuplot. Basic level: OpenMP, Fortran, Mathematica, awk.
- Molecular Dynamics (LAMMPS, OxDNA, GROMACS) and Molecular Visualization/Analysis (VMD, Ovito, JMOL, OxView) software. Basic PLUMED usage.
- development of custom Monte Carlo, Parallel Tempering, Simulated Annealing and Genetic Algorithm codes. GitHub maintenance of such packages.
- PBS and SLURM schedulers

Since 2015, I regularly collaborate to ISCRA projects on CINECA supercomputing facilities. Moreover, I was involved in a LISA 2016 project, PI: prof. D. E. Galli.

**Laboratory experiences** At university and during PhD I took part in many experiments, in particular at the DESY and EU-Xfel facilities in Hamburg.

**FOREIGN LANGUAGES** ■

**Mother tongue** Italian

Other languages	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	C2	C2	C2	C2	C2

Levels: A1/A2: Basic user - B1/B2: Independent user - C1/C2: Proficient user  
[Common European Framework of Reference \(CEF\) level](#)

**November 2015** CPE certificate (British Council, European level C2, mark: A – 221/230, november 2015).

**OTHER INFORMATION** ■

- Charity and volunteering**
- 2014 - 2021: guide to the scientific/technological exhibition organised in Rimini for the Meeting for Friendship amongst Peoples by Fondazione CEUR and Associazione Euresis. Curators of the exhibitions in the editions 2015-2018, 2020 and 2021.
  - March - July 2020: Temporary Volunteer of Italian Red Cross, in Monza.
  - since 2016 I am a member of AVIS (italian association of blood donors)
  - 2010 - 2020: volunteering at the retirement home "Don Angelo Cambiaghi" in Monza.
  - 2009 - 2016: volunteering at the "Cooperativa sociale ONLUS Iride", Monza.

- Relational and artistic skills**
- 2015 - 2019: member of the "Capitano Grandi" choir (Milano)
  - individual lessons of classic, acoustic and electric guitar
  - responsible in Catholic associations of groups of younger students

- Certificates**
- October 2019 – November 2019: First Aid basics, Italian Red Cross, Monza (16 hours).
  - March 2019 and October 2019: UPEX safety training for EU-Xfel.
  - June 2017 - August 2017: e-learning course for volunteers and workers, hosted by Fondazione Meeting Rimini and certified by E.BI.GEN. - UGL/CONFIMEA (8 h).

- Other scientific/didactic activities** Chairman/speaker for about 20 meetings/conferences for scientific dissemination.

- Driving license** B

*Curriculum updated on 02/02/2023*

*I authorize the treatment of my personal data according to DL 30/06/2003 n. 196.*