Vittorio **Erba**

Ph.D. candidate in Statistical Mechanics

📧 vittorio.erba@unimi.it | 🏠 vittorio.erba@posteo.net | 🖥 vittorioerba.github.io | ☎ (+39) 345 2360130

Last updated on February 29, 2020

Education

Present 10/2018	**Ph.D. Student in Statistical Mechanics** *Università degli Studi di Milano* ○ Topics: Euclidean random combinatorial optimization, Theoretical data science ○ Supervisor: Sergio Caracciolo	Milano (IT)
10/2018 10/2016	**M.Sc. Student in Theoretical Physics** *Università degli Studi di Milano* ○ Final grade: 110/110 cum laude ○ Thesis topic: Euclidean random combinatorial optimization ○ Supervisor: Sergio Caracciolo	Milano (IT)
07/2016 10/2013	**B.Sc. Student in Physics** *Università degli Studi di Milano* ○ Final grade: 110/110 cum laude ○ Thesis topic: Fractional quantum Hall effect ○ Supervisor: Luca Molinari	Milano (IT)

Publications

28/02/2020	**Random geometric graphs in high dimension** Erba, Ariosto, Gherardi, Rotondo Arxiv preprint, 2002.12272
14/01/2020	**The Dyck bound in the concave 1-dimensional random assignment model** Caracciolo, D'Achille, Erba* & Sportiello Journal of Physics A (2020), doi:10.1088/1751-8121/ab4a34
18/06/2019	**Intrinsic dimension estimation for locally undersampled data** Erba, Gherardi & Rotondo Scientific Reports (2019), doi:10.1038/s41598-019-53549-9
19/05/2017	**Unified Fock space representation of fractional quantum Hall states** Di Gioacchino, Molinari, Erba & Rotondo Physical Review B (2017), doi:10.1103/PhysRevB.95.245123

*: in these publications, authors are listed in alphabetical order. I had a major role in preforming the research, the numerical simulations and the writing involved in all of those manuscripts.

International schools & Internships

10/2019	**Mathematical and Computational Aspects of Machine Learning** *Ennio De Giorgi center* ○ Lectures on optimal transport, mean field Bayesian inference, numerical methods in machine learning and approximation theory	Pisa (IT)
02/2019	**Lectures on Statistical Field Theories** *Galileo Galilei Institute* ○ Lectures on tensors networks, Floquet physics, Luttinger liquids and transport phenomena in 1d	Firenze (IT)
09/2015	**Internship in Electronic Structure** *European Syncrotron Radiation Facility* ○ Lectures on X-ray and neutron physics and imaging techniques ○ Experimental project with the "Electronic structure" group on Eu3+ Fluorescence	Grenoble (FR)

02/2012	**Valerio Filippini Internship**	
	European Joint Research Centre	Ispra (IT)

Supervising experience

Fall 2019	**Co-supervisor for M.Sc. Theses**	
	Università degli Studi di Milano	Milano (IT)
	◦ Sebastiano Ariosto, "Random geometric graphs in high dimension"	
	◦ Mirko Rossini	

Teaching experience

Fall 2019	**Tutoring for the "Introductory Mathematics" course**	
	Università degli Studi di Milano (IT), Natural Sciences dept.	Milano (IT)
	◦ High school level mathematics for students starting university with gaps in their knowledge	
Spring 2020 & 2019	**Tutoring for the "Mathematical methods in Physics" course**	
	Università degli Studi di Milano (IT), Physics dept.	Milano (IT)
	◦ Complex and functional analysis for second year B.Sc. course	
06/2017 10/2016	**Substitute physics teacher for a secondary public school**	
	Istituto Professionale "L. Einaudi"	Varese (IT)
06/2018 11/2013	**Private lectures**	
		Varese (IT)
	◦ Math and Physics from middle school level to bachelor level	
	◦ Chemistry, Computer Science, Latin, English at high school level	

Talks & Posters

12/11/2019	**Intrinsic dimension estimation for locally undersampled data**	
	Michele Parrinello's group, Università della Svizzera Italiana	Lugano (CH)
	◦ 30min invited talk	
31/10/2019	**Intrinsic dimension estimation for locally undersampled data**	
	Complex System Meeting, Università degli Studi di Milano	Milano (IT)
	◦ 15min contributed talk	
24/06/2019	**Intrinsic dimension estimation for locally undersampled data**	
	XXIV Statistical Physics Meeting, Unversity of Parma	Parma (IT)
	◦ Poster	
14/08/2016	**Slater decomposition of fractional quantum Hall states**	
	International Conference of Physics Students 2016, University of Malta	Valletta (MT)
	◦ 15min contributed talk	

Participation to conferences

24-26/06/2019	**XXIV Statistical Physics Meeting**	
	University of Parma	Parma (IT)
	◦ Poster on "Intrinsic dimension estimation for locally undersampled data"	
7-14/08/2017	**XXXII International Conference of Physics Students**	
	University of Torino	Torino (IT)
11-13/05/2017	**III Italian Conference of Physics Students**	
	University of Bari	Bari (IT)
11-17/08/2016	**XXXI International Conference of Physics Students**	
	University of Malta	Valletta (MT)
	◦ Contributed talk on "Jack polynomials and quantum Hall effect"	

22-24/04/2016	**II Italian Conference of Physics Students**	
	University of Torino	Torino (IT)
15-17/05/2015	**I Italian Conference of Physics Students**	
	University of Torino	Torino (IT)

Other experiences

12/2017	**Secretary and IT contributor**	
09/2014	*Italian Association of Physics Students*	
	○ Responsible for the bureaucracy of the non-profit association	
	○ Contributor to the public website and the private online database of the association	
	○ Organizer of the PAPAP16 event	
	○ Organizer of outreach events	
	○ Volunteer for the XXXII International Conference of Physics Students	
12/2017	**Supervisor for 6 Junior Camps**	
09/2014	*Sardinia Radio Telescope & Nus Observatory*	Cagliari (IT) & Nus (IT)
	○ Responsible for up to 54 high school students	
	○ Teaching support to lecturers	

Scholarships & Awards

2021-2019	**Ph.D Scholarship**	
	Awarded by Università degli Studi di Milano	
2015-2017	**Excellence Scholarship**	
	Yearly scholarship awarded by Università degli Studi di Milano to students complying with annual courses requirements	
2012	**Valerio Filippini Scholarship**	
	First prize for a physics contest for high school students	
2012 & 2005	**Classical Guitar studies Scholarship**	
	Awarded by the municipality of Besozzo (IT) to excellent students	
2008	**Diplom in music theory and solfège**	
	Awarded by Conservatorio di Novara (IT)	

Computer Skills

Wolfram Mathematica	Proficient user
Office suites	Proficient user
C++	Intermediate user, familiar with LEMON and CGAL libraries
Python	Intermediate user, proficient with the scientific and machine learning stack (numpy, scipy, matplotlib, pytorch)
UNIX shell	Intermediate user. Experience with bash scripting and vim text editor
HTML, CSS, PHP	Intermediate user. Experience with static websites and php interfaces to SQL databases
LaTeX	Intermediate user
Julia	Beginner user
Haskell	Beginner user

Languages

Italian	Mothertongue

English   CEFR C1 (Certifications: BULATS C1 (2019), Cambridge FCE B2 (2012))