

Education

Ph.D. in Theoretical Physics Università degli Studi di Milano	10/2018 - Present Milano (IT)
<ul style="list-style-type: none">– Supervisor: Sergio Caracciolo– Research topics: Euclidean random combinatorial optimization, Theoretical data science– Main collaborators: Sergio Caracciolo, Pietro Rotondo, Andrea Sportiello	
M.Sc. in Physics (110 cum laude/110) Università degli Studi di Milano	10/2016 - 10/2018 Milano (IT)
B.Sc. in Physics (110 cum laude/110) Università degli Studi di Milano	10/2013 - 07/2016 Milano (IT)

Schools & Internships

Mathematical and Computational Aspects of Machine Learning Ennio De Giorgi center	10/2019 Pisa (IT)
<ul style="list-style-type: none">– Lectures on optimal transport, mean field Bayesian inference, numerical methods in machine learning and approximation theory	
Lectures on Statistical Field Theories Galileo Galilei Institute	02/2019 Firenze (IT)
<ul style="list-style-type: none">– Lectures on tensors networks, Floquet physics, Luttinger liquids and transport phenomena in 1d	
Internship in Electronic Structure European Synchrotron Radiation Facility	09/2015 Grenoble (FR)
<ul style="list-style-type: none">– Lectures on X-ray and neutron physics and imaging techniques– Experimental project with the ID26 - “X-ray absorption and emission spectroscopy” group (PI: Pieter Glatzel) on the measurement of Eu3+ fluorescence spectrum	

Publications

6. **The p-Airy distribution.** Caracciolo, Erba* & Sportiello. Preprint Arxiv (2020)
5. **Statistical learning theory of structured data.** Pastore, Rotondo, Erba & Gherardi. Physical Review E (2020, Editor’s suggestion)
4. **Random geometric graphs in high dimension.** Erba, Ariosto, Gherardi & Rotondo. Physical Review E (2020)
3. **The Dyck bound in the concave 1-dimensional random assignment model.** Caracciolo, D’Achille, Erba* & Sportiello. Journal of Physics A (2020)
2. **Intrinsic dimension estimation for locally undersampled data.** Erba, Gherardi & Rotondo. Scientific Reports (2019)
1. **Unified Fock space representation of fractional quantum Hall states.** Di Gioacchino, Molinari, Erba & Rotondo. Physical Review B (2017)

*: authors are listed in alphabetical order. I had a major role in the research, simulation and writing of these papers.

Talks & Posters

Invited talk: Intrinsic dimension estimation for locally undersampled data Michele Parrinello's group, Università della Svizzera Italiana	12/11/2019 Lugano (CH)
Talk: Intrinsic dimension estimation for locally undersampled data Complex System Meeting, Università degli Studi di Milano	31/10/2019 Milano (IT)
Poster: Intrinsic dimension estimation for locally undersampled data Complex System Meeting, Università degli Studi di Milano	24/06/2019 Parma (IT)

Teaching

Thesis supervision University of Milan	Milano (IT)
<ul style="list-style-type: none">– Fall 2019, Sebastiano Ariosto, “Random geometric graphs in high dimension”– Fall 2019, Mirko Rossini, “Geometry of structured datasets via multi-scale persistency analysis”	
Tutoring for university courses University of Milan	Milano (IT)
<ul style="list-style-type: none">– Fall 2020: Numerical treatment of experimental data (C++, OOP and numerical methods)– Fall 2020: Precourse of mathematics for freshmen in physics (basic maths)– Spring 2020: Mathematical methods in physics (complex and functional analysis)– Fall 2019: Recovery course of mathematics for freshman in natural sciences (basic maths)– Spring 2019: Mathematical methods in physics (complex and functional analysis)	
Substitute physics teacher for a secondary public school Istituto Professionale “L. Einaudi”	20/2016 - 06/2017 Varese (IT)

Scholarships

Ph.D Scholarship Awarded by Università degli Studi di Milano	2021-2019
Excellence Scholarship Awarded by Università degli Studi di Milano to students complying with annual courses requirements	2015-2017

Skills

- **Programming:** Julia, C++, Mathematica, Python
- **M. Learning/Optimization::** PyTorch, Flux, JuMP, CPLEX
- **Tools/Techs:** Bash, LaTeX, Inkscape
- **Web:** HTML/CSS

Languages

- **Italian:** Mothertongue
- **English:** Fluent, CEFR C1 (Certifications: Cambridge BULATS C1 (2019), Cambridge FCE B2 (2012))

Participation to conferences

Brain Criticality Meeting Virtual venue	10/2020
Complex Systems Meeting University of Milan	10/2019 Milano (IT)
Statistical Physics Meeting University of Parma	06/2019 Parma (IT)
International Conference of Physics Students Organized by IAPS	2016 & 2017
Italian Conference of Physics Students Organized by AISF	2015, 2016 & 2017

Other experiences

Teacher for an e-textiles workshop for elementary school students Makerstown 2018	22/05/2018 Brussels (BE)
– Guided multiple groups of 20 children into making a bracelet with conductive sewing threads and LED lights	
Student job at the office for didactics Università degli Studi di Milano, Maths dept.	11/2017 - 03/2018 Milano (IT)
– Responsible for exams' scheduling	
– Responsible for the update of the informations on courses, professors and exams on the department websites	
Secretary and IT contributor Italian Association of Physics Students	09/2014 - 12/2017
– 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, a visit to the Gran Sasso national laboratories with 40 participants from all around Europe	
– Organizer of outreach events	
– Volunteer for the XXXII International Conference of Physics Students	
Supervisor for 6 Junior Camps Sardinia Radio Telescope & Nus Observatory	09/2014 - 12/2017 Cagliari (IT) & Nus (IT)
– Responsible for up to 54 high school students	
– Teaching support to lecturers	