

Education

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| 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

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| 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)

Talks & Posters

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| 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

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| 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

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| 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

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| 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

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| 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 | |