

Giuseppe Del Vecchio Del Vecchio | Curriculum Vitae

Paris, France

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Introduction

This CV is interactive and relevant words contain a link. If you want to expand your knowledge about it, just click it. I am currently a Post-Doc at Université Paris-Saclay, specifically LPTMS. I am a curious mind, believer that this world rules can be hacked using appropriate **mathematical methods, physical intuition and computational knowledge**. My main expertise is on quantum and classical physics out-of-equilibrium and investigation methods rely on advanced mathematics and computational techniques. I speak fluently Italian, English and Spanish and have basic knowledge of French.

Academic Career

Laboratoire de Physique Theorique et Modelées Statistiques

Post-doctoral scientist

Topic: out-of-equilibrium dynamics of constrained models

Supervisor: Maurizio Fagotti

Paris

2023-present

King's College London

Ph. D. Applied Mathematics and Theoretical Physics

Thesis: Generalised Hydrodynamics and correlation functions

Supervisor: Benjamin Doyon

London

2019-2023

Università degli Studi di Milano

B. Sc. + M.Sc., Final Grade: 110/110 cum Laude

Thesis:

- Exact Out-of-Equilibrium Dynamics in Classical Integrable Field Theories

Keywords: Out-of-equilibrium physics, exact results, large scale simulations

- On the Random Euclidean Assignment Problem in One Dimension

Keywords: Random Combinatorial Optimisation, Disordered systems, large scale simulations

Supervisors: Giuseppe Mussardo, Sergio Caracciolo

Milan

2014-2019

Jobs and Internships

London School of Economics

Graduate Teaching Assistant

Courses: Further Mathematical Methods.

London

2022-2023

King's College London

Graduate Teaching Assistant

Courses: Stochastic Analysis, Deep Learning, Numerical Methods, Probability and Statistics, Applied Differential Equations, Statistics in Finance

London

2019-2022

Lotus Project

Machine Learning Intern

Development and deployment of unsupervised learning algorithm helping in understanding suitable zones in developing countries for the application of the Rural Development Model.

London

2021

Computer skills

Julia: 8 years experience in using Julia for high performance and scientific computing. Relevant packages include basics of SciML for machine learning and ITensor and QuantumOptics for quantum mechanics.

Python: 5 years experience doing all sort of things. I have knowledge of Keras, Numpy, Pandas, Scipy and Scikit-learn for machine learning and QuTiP for quantum mechanics.

Slurm/Torque: I have been using computer clusters for 5+ years and I am confident in using such kind of technology at all levels.

Others: Git, C++, Bash

Techniques: Deep Learning, Unsupervised Learning, basics of Reinforcement Learning, Quantum Simulation, Time Series Analysis, MonteCarlo, Genetic Programming, Parallel Computing

Publication list

Journal Article: *Quantum fluctuating theory for one-dimensional shock waves*, arXiv 2403.08875

Journal Article: *Exact large-scale fluctuations of the phase field in the sine-Gordon model*, Phys. Rev. Lett. 131, 263401

Journal Article: *Entanglement Rényi Entropies from Ballistic Fluctuation Theory: the free fermionic case*, SciPost Phys. Core 7, 005 (2024)

Journal Article: *Transport through interacting defects and lack of thermalisation*, SciPost Phys. 12, 060 (2022)

Journal Article : *The hydrodynamic theory of dynamical correlation functions in the XX chain*, J. Stat. Mech. (2022) 053102

Journal Article: *Exact out-of-equilibrium steady states in the semiclassical limit of the interacting Bose gas*, SciPost Phys. 9, 002 (2020)

In preparation: At least 3 papers are in draft stage.

International Experience

Institute Pascal

Visiting Student

I spent 2 month in Paris supported by the Institute to work with local researchers.

Orsay (Paris)

2022

SISSA

Visiting Student, Statistical Physics Group

I spent 8 month in the school supported by a scholarship to carry out my master thesis project. Relevant Ph.D. level courses have been part of the training including: Random Matrix Theory, Integrable models and cold atoms.

Trieste

2019

Technische Universität and Ludwig Maximilian Universität

Erasmus Exchange Student

Munich

2018

Honours and Awards

King's College London

*Department poster competition **winner**, Mathematics Department*

London

2022

Invited talks

Centre International de Rencontres Mathématiques

Fluctuations from hydrodynamics in integrable models

Marseille

10/2023

International Institute for Theoretical Physics

Hydrodynamic theory of dynamical correlation functions

Trieste

10/2022

City University of London

Hydrodynamic theory of dynamical correlation functions in the XX spin chain

London

11/2021

King's College London

Random Circuits and Black Holes

London

4/2020

King's College London

Thermodynamic Bethe Ansatz: a gentle introduction

London

2/2020

University of Amsterdam

Exact out-of-equilibrium steady states in the interacting Bose gas: a semiclassical approach

Amsterdam

12/2019

Schools and Conferences

: *Disorder in complex systems*, Institute Pascal, Orsay (6/2022)

- : *Student Workshop on Integrability*, Leibniz University Hannover, Hannover (3/2022)
- : *Lectures on Statistical Field Theories*, Galileo Galilei Institute, Florence (2/2022)
- : *Mathematical Harmony and the Quantum World*, Ecole Normale Supérieure, Paris (10/2021)
- : *Lectures on Statistical Field Theories*, Galileo Galilei Institute, Florence (2/2021)
- : *Clean and Disordered Systems Out-of-Equilibrium*, Institut d'Études Scientifique de Cargèse, Cargèse (9/2020)
- : *JuliaCon 2020* (7/2020)
- : *CMI-HIMR Integrable Probability Online Summer School*, University of Oxford, Oxford (7/2020)
- : *Emergent Hydrodynamics in Integrable Quantum Many-body Systems and Beyond*, International Centre for Theoretical Physics, Trieste (6/2020)
- : *Lectures on Statistical Field Theories*, Galileo Galilei Institute, Florence (2/2020)
- : *Thermalization, Many Body Localization and Hydrodynamics*, International Institute for Theoretical Sciences, Bangalore (11/2019)
- : *Disordered Serendipity: A glassy path to discover*, Università La Sapienza, Rome (10/2018)