Flavio Nicoletti

Curriculum Vitae (April 2025)

Place and Date of Birth:

Rome, Italy, 29 November 1994

Citizenship:

Italian

Current Position:

PostDoc at Chalmers University of Technology in Gothenburg, Sweden.

Links:

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Google Scholar: https://scholar.google.com/citations?user=EshHrYEAAAAJ&hl=it&authuser=3&oi=ao.
ResearchGate: https://www.researchgate.net/profile/Flavio-Nicoletti/publications.
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References:

Prof. Federico Ricci-Tersenghi: riccife@gmail.com Prof. Silvio Franz: silvio.franz@gmail.com Dr. Stefano Sarao-Mannelli: s.saraomannelli@chalmers.se

Research Interests:

Neural Networks and Machine Learning Spin glasses and structural glasses Random matrix theory applications

Spoken Languages:

Italian (native) English (level C1) French (level A2)

Coding Skills:

Programming Languages: C, C-sharp, Python, SQL Software Languages: Mathematica

Contacts:

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Affiliations:

Department of Data Science and AI, Computer Science and Engineering, Chalmers University of Technology

Education

Oct 2013-Oct 2016	Bachelor Degree in Physics, Università di Roma 'La Sapienza'
	Dissertation : Oltre l'approssimazione di dipolo elettrico nelle transizioni atomiche"-"Beyond the dipolar approximation in atomic transitions".
	Supervisor: Prof. Giovanni M. Bachelet.
	Final mark: <u>110/110 cum laude</u>
Oct 2016-Oct 2018	Master Degree in Theoretical Physics, Università di Roma 'La Sapienza'
	Description : Two years master degree with a portfolio based on <u>Statistical Mechanics</u> and <u>Field Theory</u> .
	Master Thesis : One Dimensional long range percolation: a numerical study in the vicin- ity of the effective lower critical dimension.
	Supervisor: Prof. Federico Ricci-Tersenghi.
	Final mark: 110/110 cum laude
Nov 2019 – <u>May 2023</u>	PhD in Theoretical Physics
	Description : PhD student in the Disordered Systems group <i>CHIMERA</i> (Sapienza Università di Roma, Rome, Italy) and in <i>LPTMS</i> -Laboratoire Physique Theorique et Modelles Statistiques (Université Paris-Saclay, Orsay, France)-under a <u>Joint Internation Cotutelle</u> PhD program.
	Supervisors: Prof. Federico Ricci-Tersenghi (Sapienza) and Prof. Silvio Franz (Paris-Saclay).
	PhD thesis: Low energy excitations of vector spin glasses, available online at https://arxiv.org/abs/2306.09228 (version with Sapienza frontespice) and https://www.theses.fr/2023UPASP047 (version with Paris-Saclay frontespice).
	Date of defence: May 9th 2023.
	Final mark: Ottimo cum laude (Italian highest mark for PhD graduation).

Research

July 2023 – March 2025	PostDoc in <i>Sapienza Università di Roma</i> : I worked in the CHIMERA group of Physics Department on the two following projects: the first is about the study of vector spin glasses in sparse random graphs at low temperatures, the second is related to generalized Hopfield networks with vector spins.
March 2025 – Ongoing	PostDoc in <i>Chalmers University of Technology</i> : I am working in the Statistical Physics of Learning group of the Data Science and AI department as a postdoc. My research relates to theoretical aspects of Machine Learning, such as the effect of bias in training.

Jan 2019-Oct 2019 Jun

Junior Developer at Indra Company

Description: I worked as a junior developer in Rome for Indra Company, an IT multinational company. I learned the object-oriented language C-sharp, which I applied to front-end programming, and to write SQL procedures to handle data of large databases.

Supervision and Teaching Experience

Sept 2020-Jan 2021	Teaching at LUISS University, Rome, Italy
	Description : Tutor for the course 'Mathematics I', held by Prof. Giovanni Zanco, of the Bachelor degree program 'Management and Computation' of <i>LUISS Guido Carli</i> university in Rome.
	Tasks : Basic calculus exercises for students, assistance to Prof. Giovanni Zanco for written and oral exams.
Apr 2022-Jun 2022	Co-supervision of the M1 Internship of the student Kristiana Mihali in LPTMS, Université Paris-Saclay
	Description : I was Co-supervisor of the M1 Paris-Saclay student Kristiana Mihali, to- gether with Prof. Silvio Franz. She worked for three months on numerical simulations concerning the out-of-equilibrium properties of an Edwards-Anderson spin glass model in four dimensions.
March 2023-October 2023	Co-supervision of the master thesis of the student Luca Maria Del Bono in Sapienza Università di Roma
	Description : I co-supervised the master thesis of the student Luca Maria Del Bono, to- gether with Prof. Federico Ricci-Tersenghi. He studied how to compute the instability line of the Sparse Random Field Heisenberg Spin Glass, by studying the instability of Belief propagation equations.

Schools, Workshops and Conferences

14 September
2020-18 September
2020Summer School 'Non-equilibrium clean and disordered systems' in Cargése, France.2020Description: school held at the Scientific Institute of Cargése on different topics of re-
search concerning non-equilibrium physics.Contribution: poster on numerical simulations of vector spin glasses.

28 June 2021-7 July	Summer School 'Glassy Systems and Interdisciplinary Applications' in Cargése, France.
2021	Description : school held at the Scientific Institute of Cargése about theory and simula- tions of Glassy Systems (Structural Glasses, Spin Glasses, Jamming) and Applications (Machine Learning, Ecology, Economy and many others).
	Contribution : <u>poster</u> about theory and simulations of vibrational spectra of mean field vector spin glasses.
14 November 2021-18 November 2021	Simons Collaboration 'Cracking the Glass Problem' Workshop in Venice, Italy.
	Description : workshop on the open theoretical problem of the glass transition.
	Contribution : <u>Short-talk</u> on the vibrational spectrum of mean field vector spin glasses with multi-body interactions.
10 March 2022-11	Simons Collaboration 'Cracking the Glass Problem' Annual Meeting in New York, USA.
March 2021	Description : Annual meeting of the collaboration 'Cracking the Glass Problem' of Simons Foundations.
26 April 2022-6 May 2022	Spring School 'Mathematics meets Physics of Disordered Systems' in Cortona, Tuscany, Italy.
	Description : this school held at 'Palazzetto di Cortona' consisted in a series of lessons and seminars concerning the mathematical efforts and results in the field of disordered systems and in particular of Spin Glasses.
9 May 2022	A day with Giorgio Parisi in Rome, Italy
	Description: a one-day Conference to celebrate Giorgio Parisi's nobel prize.
12 June 2022-16 June	MECO 47 Conference in Statistical Physics in Erice, Sicily, Italy.
2022	Description: conference about recent results in classical and quantum statistical physics.
	Contribution : <u>poster</u> about the vibration spectrum of mean field vector spin glasses.
8 September 2022-9 September 2022	JP 60 in Paris, France
	Description : a two-day conference to celebrate Jean-Philippe Bouachaud sixtieth birth- day.
15 November 2022-19 November 2022	Simons Collaboration 'Cracking the Glass Problem', Workshop in Venice, Italy
	Description : workshop about recent advancements on the problem of the glass transi- tion.
	Contribution : <u>short-talk</u> (10 minutes) about the vibrational spectrum of diluted vector spin glass models.

6 March 2023-8 March 2023	APS March Meeting, Las Vegas, Nevada, USA
	Description: I participated to the 2023 APS March Meeting in Las Vegas.
	Contribution : <u>short-talk</u> (10 minutes) about the vibrational spectrum of fully-connected and diluted vector spin glasses.
9 March 2023-10 March 2023	Simons Collaboration 'Cracking the Glass Problem' Annual Meeting in New York, USA
March 2023	Description : Annual meeting of the collaboration 'Cracking the Glass Problem' of Simons Foundations.
30 March 2023-31 March 2023	Journées interdisciplinaires de physique statistique in Orsay, France
	Description : conference held at LPTMS Paris-Saclay concerning recent advancements in applications of statistical physics.
10 July 2023-14 July	SigmaPhi 2023 in Platanias, Crete, Greece
2023	Description: conference about recent advancements in Statistical Physics.
	Contribution : <u>talk</u> (20 minutes) about the vibrational spectrum of fully-connected and diluted vector spin glasses.
8 Sept 2023	Journal club of King's College London Disordered systems group, London, UK
	Description: invited talk.
	Contribution : <u>invited talk</u> (60 minutes) about the vibrational spectrum of fully-connected and diluted vector spin glasses.
11 Sept 2023-12 Sept	Disordered Systems at King's College London, London, UK
	Description: Workshop on recent advancements in disordered systems.
18 Dec 2023-19 Dec	Random Matrix Theory And Its Applications in Zif, Bielefeld, Germany
2023	Description : Workshop on recent advancements random matrix theory and applica- tions, ranging from quantum transport to quenched disordered systems and pure mathematics.
	Contribution : <u>poster</u> on the "Random matrix Bose-Einstein Condensation" in Spin Glasses.
20 May 2024-24 May 2024	Conceptual Challenges in AI: from ML to Average-Case Computation and Cryptography in Milan, Lombardia, Italy
	Description: Workshop on recent advancements in Machine Learning and Cryptography.
10 Jun 2024-14 Jun	Lake Como 'Statistical Physics of Deep Learning II' in Como, Lombardia, Italy
2024	Description: Summer School on Deep Learning.
	Contribution : <u>poster</u> on the Vector Hopfield model.

24 Jun 2024-26 Jun 2024	IV Convegno della Società Italiana di Fisica Statistica (SIFS) in Parma, Emilia-Romagna, Italy
	Description: Annual Conference of SIFS.
	Contribution : <u>Talk</u> on the low energy excitations of vector spin glasses.
02 Sep 2024-06 Sep	ROC(K)IN' AI 2024 in Roccella Jonica, Calabria, Italy
2024	Description : Conference on recent advancements in theoretical studies of Artificial In- telligence.
	Contribution : poster on the Vector Hopfield model.
25 Nov 2024	Invited talk at Chalmers University of Technology's Journal Club, Gotheborg, Sweden.
	Description : Invited talk on vector hopfield models at Chalmers University of Technology.
	Contribution : <u>invited talk</u> on the Vector Hopfield model.

Publications

2022	⁵ S. Franz, F. Nicoletti, G. Parisi, and F. Ricci-Tersenghi, "Delocalization transition in low energy excitation modes of vector spin glasses", SciPost Phys. (2022).
	⁶ S. Franz, F. Nicoletti, and F. Ricci-Tersenghi, "Linear low energy excitations in fully-connected models of glasses", Journal of Statistical Mechanics: Theory and Experiment (2022).
2023	⁴ F. Nicoletti, "Low energy excitations of vector spin glasses", PhD thesis (Università di Roma 'La Sapienza', Université Paris-Saclay, 2023).
2024	² L. M. Del Bono, F. Nicoletti, and F. Ricci-Tersenghi, "Analytical solution to heisenberg spin glass models on sparse random graphs and their de almeida–thouless line", Phys. Rev. B 110 , 184205 (2024) 10.1103/PhysRevB.110. 184205.
	³ L. M. Del Bono, F. Nicoletti, and F. Ricci-Tersenghi, "The most uniform distribution of points on the sphere", PLOS ONE 19 , 1–24 (2024) 10.1371/journal.pone.0313863.
2025	¹ S. Franz, C. Lupo, F. Nicoletti, G. Parisi, and F. Ricci-Tersenghi, "Soft modes in vector spin glass models on sparse random graphs", Phys. Rev. B 111 , 014203 (2025) 10.1103/PhysRevB.111.014203.

Preprints

January 2025 | No unpublished preprints available.