CURRICULUM VITAE

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Education

1. PhD student in Mathematics jointly at "Università degli Studi di Firenze" and "Aix-Marseille Université" (November 2020 - present), advisors Prof. Francesca R. Nardi, Dr. Gianmarco Bet and Prof. Alexandre Gaudillière

2. MSc in Mathematics at "Università degli Studi di Firenze" in July 15, 2020 with vote 110/110 cum laude and thesis title "Metastability in a lattice gas with strong anisotropic interactions under Kawasaki dynamics", advisor Prof. Francesca R. Nardi

3. BSc in Mathematics at "Università degli Studi di Firenze" in July 18, 2018 with vote 110/110 cum laude and thesis title "Il teorema di Hasse-Minkowski", advisor Prof. Orazio Puglisi

Scientific Activity

1. List of publications

[1] S. Baldassarri, A. Gallo, V. Jacquier, A. Zocca, "Ising model on clustered networks: A model for opinion dynamics", *Physica A: Statistical Mechanics and its Applications*, **623** (2023).

[2] S. Baldassarri, V. Jacquier, "Metastability for Kawasaki dynamics on the hexagonal lattice", *Journal of Statistical Physics*, **190(46)**, 1–44 (2023).

[3] S. Baldassarri, G. Bet, "Asymptotic normality of degree counts in a general preferential attachment model", *Markov Processes and Related Fields*, **28(4)**, 577–603 (2022).

[4] S. Baldassarri, F.R. Nardi, "Critical Droplets and sharp asymptotics for Kawasaki dynamics with weakly anisotropic interactions", *Stochastic Processes and their Applications*, **147**, 107–144 (2022).

[5] S. Baldassarri, F.R. Nardi, "Critical Droplets and sharp asymptotics for Kawasaki dynamics with strongly anisotropic interactions", *Journal of Statistical Physics*, **186(34)**, 1–46 (2022).

[6] S. Baldassarri, F.R. Nardi, "Metastability in a lattice gas with strong anisotropic interactions under Kawasaki dynamics", *Electronic Journal of Probability*, **26(137)**, 1–66 (2021).

List of preprints

[7] S. Baldassarri, A. Gaudillière, F. den Hollander, F.R. Nardi, E. Olivieri, E. Scoppola, "Droplet dynamics in a two-dimensional rarefied gas under Kawasaki dynamics", arXiv preprint, arXiv:2304.14099 (2023).

Papers in preparation

[8] S. Baldassarri, A. Gaudillière, F. den Hollander, F.R. Nardi, E. Olivieri, E. Scoppola, "Homogeneous nucleation for two-dimensional Kawasaki dynamics", in preparation.

[9] S. Baldassarri, V. Jacquier, A. Zocca, "Critical configurations of the hard-core model on square grid graphs", in preparation.

2. Areas of research

Specialization: Probability theory, Statistical Mechanics

Skills: Large deviations, random graphs

Interests: Metastability, lattice gas models, Markov chains

My ongoing research concerns mainly the study of the metastability for lattice gas models via a probabilistic approach. I have investigated the metastable behaviour for a two-dimensional Ising lattice gas that evolves under Kawasaki dynamics and subject to isotropic and anisotropic (both weak and strong) interactions between nearest-neighbour particles. I am currently working on the infinite-volume version of this model.

Moreover, with regards to random graphs, I have investigated the asymptotic normality of degree counts in a general preferential attachment model and I am currently working on phase transitions for exponential random graphs.

3. Research visits

1. 1 week (May 2022), University of Rome Tre, Italy. Host: Elisabetta Scoppola
2. 3 days (September 2022), CERMICS, France. Hosts: Julien Reygner and Tony Lelièvre
3. 4 days (October 2022), Universiteit Leiden, The Netherlands. Host: Frank den Hollander
4. 1 week (January 2023), University of Rome La Sapienza, Italy. Host: Matteo Quattropani
5. 1 week (May 2023), University of Rome Tre, Italy. Host: Elisabetta Scoppola
6. 1 week (September 2023), Universiteit Leiden, The Netherlands. Host: Frank den Hollander (to be done)

4. Honours and Awards

1. 450 euros funding by GNAMPA-INdAM for the workshop *"Third Italian Meeting on Probability and Mathematical Statistics"*, Bologna (Italy), 2022.
2. Master degree award for the announcement *"Premi di laurea in Matematica e Informatica anno 2021"* organized by *Dipartimento di Matematica e Informatica "U. Dini"*
3. 400 euros funding by GNAMPA-INdAM for the workshop *"First Conference of Young Applied Mathematicians in Leuca"*, Santa Maria di Leuca (Italy), 2021.

4. Fully funded (food and accomodation) by CIRM for the Summer School *"Ecole d'été Graphes et Arbres Aléatoires"*, Marseille (France), 2019.

5. Productivity and merit scolarship for the academic year 2016/2017 by *"Università degli Studi di Firenze"*.

6. Productivity and merit scolarship for the academic year 2015/2016 by *"Università degli Studi di Firenze"*.

5. Invited talks

1. "Droplet dynamics in a two-dimensional rarefied gas under Kawasaki dynamics", *Stochastic Process, metastability and applications*, Nancy (France), 31/05-02/06/2023 (held online due to healthy issues)

2. "Droplet dynamics in a two-dimensional rarefied gas under Kawasaki dynamics", Università di Roma Tre (Italy), 09/05/2023

3. "Droplet dynamics in a two-dimensional rarefied gas under Kawasaki dynamics", *Analysis and simulations of metastable systems*, CIRM Marseille (France), 03-07/04/2023

4. "Droplet growth for anisotropic models with Kawasaki dynamics on a finite box with open boundary conditions", *iPOD Seminar Leiden*, Leiden (The Netherlands), 03/11/2022

5. "Nucleation for the metastable Kawasaki dynamics with strongly anisotropic interactions", *Francesca Romana Nardi: A life in probability, building communities across Europe*, Firenze (Italy), 18-22/07/2022

6. "Critical Droplets and sharp asymptotics for Kawasaki dynamics with strongly anisotropic interactions", *Seminar Interacting Random Systems*, WIAS Berlin (Germany), 06/04/2022

7. "Metastability in a lattice gas with strong anisotropic interactions under Kawasaki dynamics", *Insalate di Matematica*, Università degli Studi Milano-Bicocca (Italy), 10/02/2022

6. Contributed talks

1. Poster Session "Critical Droplets and sharp asymptotics for Kawasaki dynamics with strongly anisotropic interactions", *Probability and Mathematical Physics 2022*, University of Helsinki (Finland), 28/06-07/07/2022

2. "Critical Droplets and sharp asymptotics for Kawasaki dynamics with strongly anisotropic interactions", *Third Italian Meeting on Probability and Mathematical Statistics*, University of Bologna (Italy), 13-16/06/2022

3. "Critical Droplets and sharp asymptotics for Kawasaki dynamics with strongly anisotropic interactions", *Mathematical Physics and Probability Seminar*, 13/04/2022 (Online)

4. "Metastability in a lattice gas with strong anisotropic interactions under Kawasaki dynamics", *GIM Seminars*, 14/01/2022 (Online)

5. "Critical Droplets and sharp asymptotics for Kawasaki dynamics with strongly anisotropic interactions, *Probability Seminar Essen*, 21/12/2021 (Online)

6. 2-hours mini course "Metastability in a lattice gas evolving under Kawasaki dynamics", *First Conference Of Young Applied Mathematicians in Leuca*, Santa Maria di Leuca (Italy), 13/09-17/09/2021

7. Partecipation at International Summer Schools

1. Summer School *"Online Open Probability School"* 2020:

   - 1st week: mini course *"Rank-one matrix estimation and Hamilton-Jacobi equations"* taught by Jean-Cristophe Mourrat;
   - 2nd week: mini course *"Critical and near-critical percolation"* taught by Gady Kozma;
   - 3rd week: mini course *"Branching random walks: some recent results and open questions"* taught by Nina Gantert;
   - 6th week: mini course *"Metastability for interacting particle systems"* taught by Frank den Hollander and Elena Pulvirenti.

2. Summer School *"Ecole d'été Graphes et Arbres Aléatoires"*, mini courses taught by Igor Kortchemski (Condensation in random trees), Justin Salez (Local weak limits of graphs) and Irène Marcovici (Automata and percolation), 1/07-5/07/2019, at CIRM, Marseille (France).

Partecipation at International Conferences and Workshops

1. Working group *"QuAMProcs–Quantitative Analysis of Metastable Processes"*, Inria Paris, 08-09/03/2022.

2. Workshop *"Rencontres de Probabilités 2021"*, mini courses taught by Valentin Féray (Central limit theorems via (weighted) dependency graphs), Patricia Gonçalves (Fluctuations of symmetric exclusion with an open boundary) and Claudio Landim (Metastable Markov chains), Rouen/online, 21-22/10/2021.

3. Workshop *"Junior female researchers in probability"*, Berlin/online, 04-06/10/2021.

4. *Young European Probabilists* Workshop (YEP XVII: "Interacting particle systems"), mini courses taught by Patricia Gonçalves (Scaling limits for symmetric exclusion with open boundary), Jan Swart (Interacting Particle Systems: Almost sure uniqueness, pathwise duality, and the mean-field limit) and Cristina Toninelli (Kinetically Constrained Spin Models), 30/08-03/09/2021 (Online).

5. Workshop *"Random excursions with Jean Bertoin"*, organized by Sorbonne Université, Paris (France), 05-09/07/2021 (Online).

6. Workshop *"Recent Progress on Random Walks"*, organized by CIRM, Marseille (France), 12-16/04/2021 (Online).

7. *"Graphs and Randomness in Turin"*, Turin (Italy), 20-21/01/2020 (fully funded by "Università degli Studi di Firenze").

8. Workshop *"An Autumn Day in Probability and Statistical Physics"*, mini courses taught by Sabine Jensen (Large deviations and metastability for Widom-Rowlinson model) and Luca Avena (Explorations of networks through random spanning forests: theory and applications), Florence (Italy), 22/11/2019.

9. Workshop *"A Late-Summer Day in Probability and Statistical Physics"*, mini courses taught by Pierre Picco (One dimensional Ising model with long range interactions) and Rui Pires da Silva Castro (Testing for the presence of communities in inhomogeneous random graphs), Florence (Italy), 27/09/2019.

10. Workshop *"A Winter Day in Probability and Statistical Physics"*, mini courses taught by Giovanni Gallavotti (Statistical ensembles, entropy and probability in statistical mechanics, and extension to chaotic motions) and Silke Rolles (Processes with reinforcement), Florence (Italy), 22/03/2019.

11. Workshop *"An Autumn Day in Probability and Statistical Physics"*, mini courses taught by Giovanni Jona Lasinio (Singular stochastic partial differential equations) and Gianbattista Giacomin (Infinite disorder renormalization fixed point: the big picture and one specific result), Florence (Italy), 23/11/2018.

Teaching activity

1. Teaching tutoring

1. Teaching Tutor, March 2023 - December 2023 (70 hours): (Bachelor Degree in Mathematics).

2. Teaching Tutor, March 2023 - December 2023 (60 hours): analysis (40 hours) and discret mathematics (20 hours) for first-year students (Bachelor Degree in Computer Science).

3. Teaching Tutor, March 2023 - December 2023 (20 hours): mathematics and statistics for first-year students (Bachelor Degree in Natural Sciences).

4. Teaching Tutor, February 2022 - December 2022 (100 hours): probability (60 hours) for third-years students, analysis (25 hours) and dynamical systems (15 hours) for first-year students (Bachelor Degree in Mathematics).

5. Teaching Tutor, February 2022 - December 2022 (50 hours): analysis (30 hours) and discret mathematics (20 hours) for first-year students (Bachelor Degree in Computer Science).

6. Teaching Tutor, March 2021 - December 2021 (150 hours): probability (80 hours) for third-years students, geometry (50 hours) and analysis (20 hours) for first-year students (Bachelor Degree in Mathematics).

7. Teaching Tutor, November 2019 - December 2020 (150 hours): probability (90 hours) for third-years students, geometry (40 hours) and analysis (20 hours) for first-year students (Bachelor Degree in Mathematics).

8. Teaching Tutor, November 2019 - December 2020 (50 hours): probability (40 hours) for third-year students and analysis (10 hours) for first-year students (Bachelor Degree in Mechanical Engineering).

2. Orientation and third mission

1. Supervision for the *"Gara Matematica"*, organized by "Università degli Studi di Firenze", 29/03/2021 (Online).

2. Supervision and exercises sessions for the *"Settimana Matematica Fiorentina"*, organized by "Università degli Studi di Firenze", 01-04/02/2021 (Online).

3. Supervision and assesment of exams for the *"Gara Matematica"*, organized by "Università degli Studi di Firenze", Florence (Italy), 15/04/2019.

Service activity

Refereeing activity

Journal of Nonlinear Science, Mathematical Reviews