

Lucas Affonso

FAPESP Postdoctoral Fellow

Institute of Mathematics, Statistics and Computer Science,
University of São Paulo (IME-USP)

Visiting Scholar at NYU Shanghai

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Research Interests

Rigorous equilibrium statistical mechanics and probability, with emphasis on phase transitions for long-range spin systems and cluster expansions. Current interests also include percolation and quantum spin systems.

Academic Positions and Research Visits

NYU Shanghai

Visiting Scholar; host: Roberto Fernández

Shanghai, China
Dec. 2025–Nov. 2026

Institute of Mathematics, Statistics and Computer Science (IME-USP)

FAPESP Postdoctoral Fellow; postdoctoral supervisor: Anatoli Iambartsev

São Paulo, Brazil
Aug. 2023–present

Education

University of São Paulo

Ph.D. in Applied Mathematics; advisor: Rodrigo Bissacot

São Paulo, Brazil
2017–2023

Thesis: “Multidimensional Contours à la Fröhlich–Spencer and Boundary Conditions for Quantum Spin Systems.”

University of São Paulo

B.Sc. in Physics

São Paulo, Brazil
2013–2016

Published Article

1. **L. Affonso**, R. Bissacot, E. O. Endo, and S. Handa, “Long-Range Ising Models: Contours, Phase Transitions and Decaying Fields,” *Journal of the European Mathematical Society* **27** (2025), no. 4, 1679–1714. [doi:10.4171/JEMS/1529](https://doi.org/10.4171/JEMS/1529).

Preprints

1. **L. Affonso**, R. Bissacot, J. Maia, J. F. Rodrigues, and K. Welsch, “Cluster Expansion and Decay of Correlations for Multidimensional Long-Range Ising Models,” [arXiv:2508.15666](https://arxiv.org/abs/2508.15666) (2025).
2. **L. Affonso**, R. Bissacot, H. Corsini, and K. Welsch, “Phase Transitions on 1d Long-Range Ising Models with Decaying Fields: A Direct Proof via Contours,” [arXiv:2412.07098](https://arxiv.org/abs/2412.07098) (2024).
3. **L. Affonso**, R. Bissacot, G. Faria, and K. Welsch, “Phase Transition in Long-Range q -state Models via Contours. Clock and Potts Models with Fields,” [arXiv:2410.01234](https://arxiv.org/abs/2410.01234) (2024; revised 2025).
4. **L. Affonso**, R. Bissacot, and J. Maia, “Phase Transitions in Multidimensional Long-Range Random Field Ising Models,” [arXiv:2307.14150](https://arxiv.org/abs/2307.14150) (2023; revised 2025).
5. **L. Affonso**, R. Bissacot, and M. Laca, “Quantum Statistical Mechanics via Boundary Conditions. A Groupoid Approach to Quantum Spin Systems,” [arXiv:2211.06520](https://arxiv.org/abs/2211.06520) (2022).

Selected Talks and Seminars

2026	“Decay of correlations for long-range Ising models at low temperatures.” <i>Probability Seminar, Peking University, Beijing, China</i>
2026	“Decay of correlations for multidimensional ferromagnetic long-range Ising models.” <i>Probability Seminar, NYU Shanghai, Shanghai, China</i>
2024	“Phase transition for the long-range Ising model and the Peierls argument.” <i>Mathematical Physics Seminar, ICMC-USP, São Paulo, Brazil</i>
2024	“On the decay of correlations for long-range Ising models.” <i>Randomness 2024, IME-USP, São Paulo, Brazil</i>
2023	“Multidimensional contours à la Fröhlich–Spencer and boundary conditions for quantum spin systems.” <i>Interfaces Between Quantum and Classical Statistical Mechanics, IME-USP, São Paulo, Brazil</i>
2023	“DLR equations for quantum spin systems.” <i>Probability Seminar, NYU Shanghai, Feb. 16, 2023 (online)</i>
2022	“Phase transition in Ising systems with long-range interactions.” <i>Probability and Dynamics Seminar, University of Victoria, Canada (online)</i>
2021	“Long-range multidimensional Ising models: a contour argument based on Fröhlich–Spencer.” <i>Applied Mathematics Seminar, Utrecht University, Netherlands (online)</i>
2021	“Long-range Ising models and decaying fields: a contour approach.” <i>Probability Seminar, Federal University of Rio de Janeiro, Brazil (online)</i>

Teaching

Institute of Mathematics, Statistics and Computer Science (IME-USP), University of São Paulo

Instructor , Poisson Point Processes in Statistical Mechanics	Aug.–Dec. 2024
Instructor , Long-Range Ising Models: Phase Transitions and Multiscale Methods	Summer 2024
Teaching Assistant , C^* -Algebras and Quantum Gibbs States	Feb.–Jun. 2023
Teaching Assistant , An Introduction to Ergodic Theory	Aug.–Dec. 2020

Fellowships and Research Funding

FAPESP Research Internship Abroad Fellowship (BEPE), grant 2025/21244-2	Dec. 2025–Nov. 2026
FAPESP Postdoctoral Fellowship, grant 2023/00854-1	Aug. 2023–present
FAPESP Doctoral Fellowship, grant 2017/18152-2	Oct. 2017–Feb. 2023
FAPESP Research Internship Abroad Fellowship (BEPE), grant 2020/14563-0	Jun. 2021–Mar. 2022

Languages

Portuguese (native); English (fluent).