

# JÉRÔME GARNIER-BRUN

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French citizen, born March 1998.

## EXPERIENCE

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### Università Bocconi, Milan

*June 2025 - current*

Marie Skłodowska-Curie research fellow

Marie Skłodowska-Curie Action funding for project SPIRAL (Structured Physics-Inspired Representations and dAta models for efficient Learning), carried out under the supervision of Prof. M. Mézard

### Università Bocconi, Milan

*Jan. 2024 - June 2025*

Postdoctoral research fellow

Grant holder in the Theoretical Physics of Matter sector, working with Prof. M. Mézard (Dept. of Computing Sciences) on the role of the structure of data in learning and Prof. C. Tebaldi (Dept. of Finance) on networks of firms.

### Kyoto University, Kyoto

*July 2022 - Oct. 2022*

Visiting PhD student

JSPS fellowship for research on accelerating slow dynamics using nonequilibrium driving with Prof. S.-i. Sasa.

### ENSAE and École polytechnique, Paris

*Oct. 2020 - June 2022*

Teaching assistant

Supervision of tutorials in socio/econophysics and simulations in Python (84h total, 100% positive student ratings).

### Imperial College, London

*March 2019 - Aug. 2019*

Undergraduate researcher

Final year project on mathematical modelling for diffusion MRI under the supervision of Prof. D. J. Doorly.

## EDUCATION

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### École polytechnique, Paris

*Oct. 2020 - Dec. 2023*

PhD, Theoretical Physics

Thesis on the out-of-equilibrium statistical physics of complex and disordered systems, with a focus on socioeconomic-inspired models [\[link\]](#). Supervised by Profs. J.-P. Bouchaud and M. Benzaquen at the [Econophysix lab](#).

### Sorbonne Université, Paris

*Sept. 2019 - June 2020*

Master of Physics, Physics of Complex Systems

**High honours**

### Imperial College, London

*Oct. 2015 - July 2019*

Master of Engineering, Aeronautical Engineering

**Highest honours**

## PUBLICATIONS

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9. **G.-B. J.**, Biggio L., Mézard M., & Saglietti L. (2025). “Early-stopping Too Late? Traces of Memorization Before Overfitting in Generative Diffusion.” *Accepted at MemFM ICML 2025 Workshop*
8. **G.-B. J.**, Zakine R. & Benzaquen M. (2024). “From nonequilibrium to equilibrium: insights from a two-population occupation model.” *arXiv preprint*, arXiv:2412.14996 [[arXiv](#)]
7. **G.-B. J.**, Mézard M., Moscato E. & Saglietti L. (2025). “How transformers learn structured data: insights from hierarchical filtering.” *Proceedings of the 42<sup>nd</sup> International Conference on Machine Learning (ICML)*, PMLR 267 [[OpenReview](#)]

6. **G.-B. J.**, Benzaquen M. & Bouchaud J.-P. (2024). “Unlearnable games and ‘satisficing’ decisions: a simple model for a complex world.” *Phys. Rev. X* 14, 021039 [[OA journal](#)], also featured in the popular science magazine *New Scientist* [[link](#)]
5. Zakine R., **G.-B. J.**, Becharat, A.-C. & Benzaquen M. (2024). “Socioeconomic agents as active matter in nonequilibrium Sakoda-Schelling models.” *Phys. Rev. E* 109, 044310 [[journal](#), [arXiv](#)]
4. Dechant A., **G.-B. J.** & Sasa S.-I. (2023). “Thermodynamic bounds on correlation times.” *Phys. Rev. Lett.* 131, 167101 (Editor’s Suggestion) [[journal](#), [arXiv](#)]
3. **G.-B. J.**, Bouchaud J.-P. & Benzaquen M. (2023). “Bounded rationality and animal spirits: a fluctuation-response approach to Slutsky matrices.” *J. Phys. Complex.* 4, 015004 [[OA journal](#)]
2. Alemany I., Rose J. N., **G.-B. J.**, Scott A. D., & Doorly D. J. (2022). “Random walk diffusion simulations in semi-permeable layered media with varying diffusivity.” *Sci. Rep.* 12, 10759 [[OA journal](#)]
1. **G.-B. J.**, Benzaquen M., Ciliberti S., & Bouchaud J.-P. (2021). “A new spin on optimal portfolios and ecological equilibria.” *J. Stat. Mech.* 093408 (featured in Highlights) [[OA journal](#)]

## SEMINARS, SCHOOLS & CONFERENCES

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- *Forty-Second International Conference on Machine Learning*, Vancouver, 13-19/07/2025 — poster
- *Learning with Machines, Physics and Minds summer school*, Beg Rohu, 02-13/06/2025
- *Towards a theory for typical-case algorithmic hardness winter school*, Les Houches, 27/01-07/02/2025
- *Young Seminar*, Società Italiana di Fisica Statistica (SIFS), 14/11/2024 — seminar
- *Conference on Inference and AI* (Rockin’AI), Roccella Ionica, 03/09/2024 — contributed talk
- *Glassy and Complex Systems summer school*, Cargèse, 08-19/07/2024 — poster
- *From Ecology to Economics and back workshop*, CFM & ENS, 13-14/05/2024 — **co-organizer**
- *Ergodicity Economics 2024*, Santa Fe Institute (remote), 19/02/2024 — contributed talk
- *Statistical Physics of Complex Systems summer school*, Beg Rohu, 05-16/06/2023 — poster
- *Recent advances in understanding artificial and biological neural networks winter school*, Les Houches, 20-24/02/2023 — poster
- *Yoshino lab.*, Osaka University, 06/10/2022 — seminar
- *Sasa lab.*, Kyoto University, 01/08/2022 — seminar
- *Laboratoire Gulliver theory group*, ESPCI Paris, 21/04/2022 — seminar
- *Nonequilibrium physics of living matter research group*, RIKEN Kobe (remote), 15/12/2021 — seminar
- *Conference on Complex Systems – Econophysics satellite*, Lyon, 27-28/10/2021 — poster
- *Fundamental Problems in Statistical Physics XV summer school*, Brunico, 12-24/07/2021
- *Glassy Systems and Inter-Disciplinary Applications summer school*, Cargèse, 28/06-08/07/2021 — poster

## GRANTS & PRIZES

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- Marie Skłodowska-Curie Action *Postdoctoral fellowship*, Sept. 2025 - Sept. 2027
- French Complex Systems Society *Best thesis prize* – finalist, Oct. 2024 [[link](#)]
- G-Research *Grant for PhD students*, Feb. 2023 [[link](#)]
- Japanese Society for the Promotion of Science (JSPS) *Summer fellowship*, Jul. - Oct. 2022 [[link](#)]
- Imperial College Faculty of Engineering *Dean’s list*, June 2018 & June 2019

## REFERENCES

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- Marc Mézard (Università Bocconi & Académie des Sciences): [marc.mezard@unibocconi.it](mailto:marc.mezard@unibocconi.it)
- Jean-Philippe Bouchaud (CFM & Académie des Sciences): [jean-philippe.bouchaud@cfm.com](mailto:jean-philippe.bouchaud@cfm.com)
- Michael Benzaquen (CNRS & École polytechnique): [michael.benzaquen@polytechnique.edu](mailto:michael.benzaquen@polytechnique.edu)