Pierre Mergny — PhD

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Google Scholar Profile

ACADEMIC POSITION

CSD ENS - Postdoctoral fellow — **Paris, France**
P.I: Bruno Loureiro — *Nov. 2025 –*
Feature Learning - Statistical Learning - Random Matrix Theory

- Random Matrix Theory for Feature Learning.

IdePHICS group (EPFL) - Postdoctoral fellow — **Lausanne, Suisse**
P.I: Pr. Florent Krzakala — *Nov. 2022 – Nov. 2025*
Information Theory - Statistical Learning - Random Matrix Theory

- Study of Models and algorithms in information theory and statistical learning problems.

EDUCATION

PhD in Theoretical Physics (Random Matrix Theory) — **Paris, France**
LPTMS, Paris-Saclay University and EconophysiX Lab, Ecole Polytechnique — *2019 – 2022*
thesis title : *Spherical integrals and their applications to random matrix theory*

Master of Applied and Theoretical Mathematics (M2 MATH) — **Paris, France**
Paris Sciences et Lettres Research University — *2018 – 2019*

Master of Physics of Complex Systems (M2 PCS) — **Paris, France**
Sorbonne University — *2017 – 2018*

ESPCI Paris, *École Supérieure de Physique et de Chimie Industrielles* — **Paris, France**
Graduate engineering school of physics, chemisty and biology — *2014 – 2018*

PAST RESEARCH EXPERIENCES

LPTMS (Paris-Saclay U.) & EconophysiX Lab (E. Polytechnique) - PhD student — **Paris, France**
Supervisors: Satya Majumdar, PhD (LPTMS) & Marc Potters, PhD (CFM) — *Oct. 2019 – Oct. 2022*
Random Matrix Theory -Free Probability - Spherical Integrals - Large Deviation

- Study of several problems arising in random matrix theory

Capital Fund Management (CFM) & E. Polytechnique - Master's student — **Paris, France**
Supervisor: Marc Potters, PhD — *Mar. – Aug. 2019*
Random Matrix Theory - Covariance matrix estimation

- build efficient algorithms (Cython) using leave-one-out cross-validation

The Laboratory of Computational and Quantitative Biology, SU - Master's student — **Paris, France**
Supervisors: Martin Weigt, PhD and Anne-Florence Bitbol, PhD — *Apr. – Jul. 2018*
Predicting protein-protein interactions using maximum entropy methods

- build algorithm to efficiently reconstruct community-based random graphs - one publication (PRE)

Massachusetts Institute of Technology - Master's student — **Boston, USA**
Supervisor: Thorsten Emig, PhD — *May – Aug. 2017*
Modeling Urban Heat Island

- build an algorithm (Python, C++ and Mathematica) for modeling Urban Heat Island in NYC.

PUBLICATIONS & PREPRINTS (selected)

- C. A. Gandarilla-Pérez, **P. M.**, M. Weigt, and A.F. Bitbol, Phys. Rev. E 101, 032413;
- **P. M.** and Marc Potters, SciPost Phys. 12, 022 (2022);
- **P. M.** and Satya Majumdar, J. Stat. Mech. (2021) 123301.
- **P. M.** and Marc Potters, J. Stat. Mech. (2022) 06330.
- **P. M.** and Marc Potters, arXiv:2007.09421.
- **P. M.** ,arXiv:2204.07744.
- Alice Guionnet, Justin Ko, Florent Krzakala, **P. M.*** and Lenka Zdeborová, arXiv:2310.14055 (submitted to appear in EJP, * : corresponding author)

- **P. M.**, Justin Ko and Florent Krzakala,(ICML24) PMLR 235:35470-35491.
- **P. M.**, Justin Ko, Florent Krzakala and Lenka Zdeborová, (COLT 24) full version available at arXiv:2403.04234.
- Leonardo Defilippis, Yatin Dandi, **P. M.**, Florent Krzakala, Bruno Loureiro, arXiv:2502.02545 (Neurips25),
- Hugo Tabanelli, **P.M.**, Florent Krzakala and Lenka Zdeborová arxiv:2506.02664 ,
- **P.M.** and Lenka Zdeborová *Spectral Thresholds in Correlated Spiked Models: Suboptimality of Partial Least Squares* (arXiv:2510.17561,(to appear in AIStats26).

TALKS AND POSTERS (selected)

- "Matrice Et Graphes Aléatoires" 2022 seminar (talk)
- Trieste "Random Matrices, Random Graphs and Statistical Physics for Machine Learning and Inference" school (poster)
- Porquerolles "High Dimensional Statistics and Random Matrices" 2023 Conference (talk),
- Brunel-Bielfeld "Random Matrix Theory and Applications" 2023 workshop (talk),
- Cargèse 2023 "Summer School on Stat. Phys. and Machine Learning" (talk),
- COLT 2024 (poster),
- ICML 2024 (poster),
- Les Houches "Towards a theory of typical-case algorithmic hardness" 2025 workshop (poster).
- StatPhys29 (poster),
- Cargèse 2025 "Statistical Physics and Machine Learning : moving forward" (poster).

TEACHING AND MONITORING EXPERIENCE

- Taught and design a complete Introduction to Probability and Statistics Bachelor's course at EPFL (28h) to a class of 250+ students (EE-209,2024)
- Mini-Course on Random-Matrix-Theory (9h) for PhD Students.
- Head of teaching assistants for the course "Introduction to Statistical Physics" (PHYS 338, 2024 and 2025)
- Supervision of the Master thesis of three EPFL students.
- write and organize R. Monasson's lecture notes during Les Houches 2022 summer school, published in Journal of Statistical Mechanics: Theory and Experiment 2024 (10), 104002.

PROGRAMMING LANGUAGE

Python (Numpy, Pandas,...), **Mathematica**, C/C++, **Latex**.

LANGUAGE

French (native), **English** (Fluent), **Spanish** (intermediate).