

Curriculum Vitae

Louise Budzynski
louise.budzynski@ens.psl.eu

1 Research Experience

- Computer science department of Ecole Normale Supérieure (DI ENS), PSL, Paris, France
Maître de conférence (Associate professor) September 2024 – Now
- Physics department, La Sapienza University, Rome, Italy April 2023 - August 2024
Post-doc position. Supervisors: Prof. F. Ricci-Tersenghi and Prof. E. Marinari
- Department of Applied Science and Technology (DISAT), Polytechnic University of Turin, Italy November 2020- March 2023
Post-doc position. Supervisors: Prof. A. Braunstein and Prof. A. Pagnani

2 Education

- Ph.D. in Statistical Physics 2017–2020
Title: Algorithmic barriers in random Constraint Satisfaction Problems
At Laboratoire de Physique de l'École Normale Supérieure (LPENS), Paris
Supervisor: Prof. G. Semerjian.
- Master in theoretical physics 2014–2016
Master ICFP (International Center for Fundamental Physics) option physique théorique at École Normale Supérieure de Paris.
 - Master thesis *Title: Matrix product states and Temperley-Lieb algebra,*
At Laboratoire de Physique de l'École Normale Supérieure (LPENS), Paris
Supervisor: Prof. J. L. Jacobsen
- Undergraduate program in physics 2013–2014
Licence FIP (Formation Inter-universitaire de Physique) at École Normale Supérieure de Paris

3 Teaching

My teaching experience, in reverse chronological order:

- Lectures and exercise sessions for the course *Introduction to algorithms* 2024-now
For undergraduate students (L2), Cycle Pluridisciplinaire d'Études Supérieures (CPES), ‘Sciences des données, Art et Culture’, PSL University.
- Exercise sessions for the course *Randomized algorithms* 2024-now
For undergraduate students (L3) at the Computer Science department of Ecole Normale Supérieure de Paris, (DI ENS)
- Exercise sessions for the course *Scientific programming: ‘C-language, algorithms and models in science’* Fall 2023
For undergraduate students (L2) at the Physics department of La Sapienza University of Rome
- Exercise sessions for the course *Special Relativity and Electromagnetism* Spring 2019
For undergraduate students (L3, Licence FIP) at the Physics department of Ecole Normale Supérieure de Paris

4 Supervision

- Spring 2025: **Research Internship** of A. V. Dell'Abate, enrolled in the international master Physics of Complex Systems, co-supervised with Prof. Alfredo Braunstein (DISAT, Polytechnic University of Turin).

5 Scientific talks and seminars

I delivered the following talks:

- Title: *Bayesian inference with structured signals: from planted spin glasses to epidemic models*
GdR-IASIS “Thematic day on phase transitions in high-dimensional inference”, LPENS, Paris
Dates: 28/10/2025
- Title: *Evidence of Replica Symmetry Breaking under the Nishimori conditions in epidemic inference on graphs*
Conference “Towards a Theory for Typical-Case Algorithmic Hardness”, Les Houches, France
Dates: 27/01/2025 – 07/02/2025
- Title: *Phase transitions in Epidemic Spreading Inference*
Group seminar at the Laboratoire de Physique Théorique de la Matière Condensée (LPTMC), Paris, France.
Date: 17/09/2024
- Title: *Statistical mechanics of inference and optimization problems in high dimensions: application to spreading processes on random networks*
Group seminar at the Physics department of ENS Lyon, team Machine Learning and Signal Processing
Date: 12/03/2024
- Title: *The Closest Vector Problem: A Constrained Optimization Problem for Lossy Compression.*
 - Workshop CAMBI (Computational Aspects and Modelling of Biological Information), at Bocconi University, Milan, Italy.
Organized by R. Mulet, A.P. Muntoni, A. Pagnani, M. Weigt and R. Zecchina
Dates: 12/12/2022 – 15/12/2022.
 - Group seminar at the Laboratory of Theoretical Physics and Statistical Models (LPTMS), in Orsay, France. *Date: 30/03/2022*
- Title: *Small Coupling Expansion for Multiple Sequence Alignment.*
Workshop “Complex networks : from socio-economic systems to biology and the brain” In Lipari Island, Italy.
Dates: 10/07/2022 – 16/07/2022.
- Title: *Biased landscapes in random Constraint Satisfaction Problems*
 - Conference “Youth in High-dimensions : Machine Learning, High-dimensional Statistics and Inference for the New Generation”, at ICTP, Trieste.
Organized by F. Krzakala and J. Barbier.
Dates: 29/06/2020 – 03/07/2020
 - Journées de Physique Statistique, Paris, France.
Dates: 31/01/2019 – 01/02/2019

6 Other working responsibilities

Referee for the following scientific journals:

- PRE - Physical Review E
- SciPost Physics

7 Publications

Publication list in reverse chronological order.

- Maria Chiara Angelini, **Louise Budzynski**, Federico Ricci-Tersenghi.
Interacting Copies of Random Constraint Satisfaction Problems.
arXiv preprint arXiv:2504.15158
<https://arxiv.org/abs/2504.15158>
- Alfredo Braunstein, **Louise Budzynski**, Matteo Mariani, Federico Ricci-Tersenghi.
Evidence of Replica Symmetry Breaking under the Nishimori conditions in epidemic inference on graphs.
Physical Review E 111, 064308 – Published 13 June, 2025
<https://doi.org/10.1103/tbd5-25vf>
- Alfredo Braunstein, **Louise Budzynski**, Matteo Mariani.
Statistical Mechanics of Inference in Epidemic Spreading.
Physical Review E 108, 064302 – Published 15 December 2023
<https://doi.org/10.1103/PhysRevE.108.064302>
- **Louise Budzynski**, Andrea Pagnani.
Small Coupling Expansion for Multiple Sequence Alignment.
Physical Review E 107, 044125 – Published 25 April 2023
<https://doi.org/10.1103/PhysRevE.107.044125>
- Alfredo Braunstein, **Louise Budzynski**, Stefano Crotti and Federico Ricci-Tersenghi.
The closest vector problem and the zero-temperature p -spin landscape for lossy compression.
Physical Review E 106, 054101 – Published 1 November 2022
<https://doi.org/10.1103/PhysRevE.106.054101>
- **Louise Budzynski**, Guilhem Semerjian.
Biased measures for random constraint satisfaction problems: larger interaction range and asymptotic expansion.
Journal of Statistical Mechanics: Theory and Experiment 2020 (10), 103406.
<https://doi.org/10.1088/1742-5468/abb8c8>
- **Louise Budzynski**, Guilhem Semerjian.
The Asymptotics of the Clustering Transition for Random Constraint Satisfaction Problems.
Journal of Statistical Physics 181 (5), 1490–1522 (2020).
<https://link.springer.com/article/10.1007/s10955-020-02635-8>
- **Louise Budzynski**, Federico Ricci-Tersenghi and Guilhem Semerjian.
Biased landscapes for random constraint satisfaction problems.
Journal of Statistical Mechanics: Theory and Experiment 2019 (2), 023302
<https://doi.org/10.1088/1742-5468/ab02de>
- Etienne Granet, **Louise Budzynski**, Jérôme Dubail, and Jesper Lykke Jacobsen.
Inhomogeneous Gaussian free field inside the interacting arctic curve.
Journal of Statistical Mechanics: Theory and Experiment 2019 (1), 013102
<https://doi.org/10.1088/1742-5468/aaf71b>