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 Superieure 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.
  arXiv preprint arXiv:2502.13249 – Submitted to Physical Review E
  https://arxiv.org/abs/2502.13249

- 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 Mechanic: 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