

# Bruno Loureiro

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## Personal Information

Dr. Bruno Loureiro

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📄 <https://scholar.google.com/citations?user=DXl3ir8AAAAJ&hl>

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## Employment history

10.2022–present **École Normale Supérieure - Département d'Informatique**, *CNRS researcher*.

09.2020–09.2022 **École Polytechnique Fédérale de Lausanne**, *Postdoctoral researcher*.

Advisor: Prof. Florent Krzakala

07.2018–08.2020 **Institut de Physique Théorique**, *Postdoctoral researcher*.

Advisor: Prof. Lenka Zdeborová

04.2018–08.2018 **BTG Pactual UK**, *Data Science Intern*.

01.2011–06.2011 **University of Paris 7 - Department of Physics**, *Assistant librarian*.

## Education

10.2014–06.2018 **PhD in Physics**, *University of Cambridge*.

Title: *Disorder in holographic field theories: inhomogeneous geometries, momentum relaxation and SYK models*

Advisor: Prof. A.M. García-García

10.2013–07.2014 **MASt in Applied Mathematics**, *University of Cambridge*, *Merit*.

Master Thesis: *Integrability and Self-Duality*,

Advisor: Dr. Maciej Dunajski

06.2012–07.2012 **Internship**, *Laboratoire de physique nucléaire et des hautes énergies*.

Project: *Non-gaussianities in the CMB*

Advisor: Dr. Pierre Astier

09.2011–08.2013 **BSc Mathematics and Physics**, *King's College London*, *First Class Honours*.

BSc Thesis: *Non-gaussianities in the CMB*

Advisor: Prof. Eugene Lim

09.2010–08.2011 **BSc Physics**, *University of Paris 7 – Denis Diderot*, *Result – 16.674/20*.

08.2008–04.2010 **Internship**, *Fundação Oswaldo Cruz*.

Project: *Characterization of the Oligopeptidase B2 of Leishmania Amazonensis*

Advisor: Prof. Herbert Guedes

## Funding

11.2022–10.2026 **SNF Ambizione grant**, *785k CHF ( $\approx$  815k €)*, *Declined*.

10.2022–09.2027 **Choose France - CNRS AI Rising Talents**, 1M €.

## Scientific Reviewing

**Machine Learning conferences:** NeurIPS, ICML, ICLR, AISTATS, ALT, MSML.

**Machine Learning workshops:** TOPML, SEDL.

**Machine Learning journals:** JMLR, TMLR, MLST, IEEE TNNLS, IEEE TIT, PNAS.

**Physics journals:** Nature Communications, JSTAT, PRE, PRX, PRL, JSP, Physica A.

## Scientific Organisation

- 23-25.10.2023 **Analytical Approaches for Neural Network Dynamics**, Institut Henri Poincaré, *Co-organised with Stefano Sarao and Gabriele Sicuro.*
- 10.2023–Current **ENS Data Science Colloquium**, *Co-organised with Giulio Biroli, Stephane Mallat, Gabriel Peyré and Christian Lorenzi.*
- 31.07-12.08.2023 **Statistical Physics and Machine Learning back together, again**, Cargèse, *Co-organised with Florent Krzakala, Lenka Zdeborová, Vittorio Erba and Damien Barbier.*
- 05.2023–Current **Statistical Physics & Machine Learning Journal club**, *Co-organised with Giulio Biroli..*
- 03.2022 **AI & Physics track**, Applied Machine Learning Days (AMLD), *Organiser.*
- 11.2021–09.2022 **Foundations of Learning and AI Research (FLAIR)**, Junior meetings, *Organiser.*
- 09.2020–09.2022 **SPOC+IdePHICS+PCLS Joint group meeting**, *Organiser.*

## Research interests

I am interested in theoretical problems in high-dimensional Statistics which are motivated by practical challenges in Statistical Inference, Signal Processing and Machine Learning, e.g. low-rank matrix factorisation, phase retrieval and learning in neural networks, to cite a few. My approach to these problems leverage techniques originally developed in the context of Statistical Physics and Disordered Systems to address questions of interest in these fields. As an example, two questions often motivating my works are: what is the typical algorithmic complexity of an inference task? How many samples are needed for a neural network to learn a target rule?

## Numerical Skills

PYTHON, MATHEMATICA, L<sup>A</sup>T<sub>E</sub>X.

## Languages

English (Fluent), French (Fluent), Italian (Intermediate), Portuguese (Native).