Bruno Loureiro

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Website `https://brloureiro.github.io/`.

Academic Jobs

2020 – **Postdoctoral researcher**, *École Polytechnique Fédérale de Lausanne*, Florent Krzakala group.
My current research interests lie in the crossroads between Statistical Physics and Machine Learning. I apply the toolbox of statistical physics to high-dimensional problems relevant to modern machine learning - a regime for which the classical statistical learning tools fall short. In particular, I am interested in Bayesian methods for inference and learning problems, graphical models, approximate message passing algorithms and deep learning.

2018 – 2020 **Postdoctoral researcher**, *Institut de Physique Théorique*, Lenka Zdeborová group.

Education

2014 – 2018 **PhD in Physics**, *University of Cambridge*, Advisor: A.M. García-García.

2013–2014 **MASt in Applied Mathematics**, *University of Cambridge*.
Merit

2011–2013 **BSc Mathematics and Physics**, *King's College London*, *Result – 89/100*.
First Class Honours

2010–2011 **BSc Physics**, *University of Paris 7 – Denis Diderot*, *Result – 16.674/20*.

Publications

Phase retrieval in high dimensions: Statistical and computational phase transitions, *A Maillard, B Loureiro, F Krzakala, L Zdeborová*, arXiv: 2006.05228 [math.ST].

Generalisation error in learning with random features and the hidden manifold model, *F Gerace, B Loureiro, F Krzakala, M Mézard, L Zdeborová*, arXiv: 2002.09339 [math.ST], (Accepted for ICML 2020).

Exact asymptotics for phase retrieval and compressed sensing with random generative priors, *B Aubin, B Loureiro, A Baker, F Krzakala, L Zdeborová*, arXiv: 1912.02008 [math.ST] (Accepted for MSML 2020).

The spiked matrix model with generative priors, *B Aubin, B Loureiro, A Maillard, F Krzakala, L Zdeborová*, NeurIPS 2019.

Coherence effects in disordered geometries with a field-theory dual, *AM Garcia-Garcia, B Loureiro, T Andrade*, J. High Energ. Phys. (2018) 2018: 187.

Stability and Chaos in a generalised Sachdev-Ye-Kitaev model, *AM Garcia-Garcia, B Loureiro, A Romero-Bermudez and T Masaki*, Phys. Rev. Lett. (2018) - Accepted.

Transport in a gravity dual with a varying gravitational coupling constant, *AM Garcia-Garcia, B Loureiro and A Romero-Bermudez*, Phys. Rev. D 94 086007 (2016).

Marginal and irrelevant disorder in Einstein-Maxwell backgrounds, *AM Garcia-Garcia and B Loureiro*, Phys. Rev. D 93 065025 (2016).

Professional Experiences

2018 **BTG Pactual UK**, *Data Science Intern*.
During this internship I applied standard natural language processing algorithms to study the correlation between news articles and the movement of stock classes. As a result, I developed a dashboard to help traders keeping track of relevant news and giving a specialised indicator for the fluctuations of market mood.

Awards and Distinctions

2013-2017 CAPES/Cambridge Overseas Trust Science Without Borders Scholarship

2013 Nikon Prize for the best Physics Project, King's College London

2012 Prize for the best performance in Mathematics modules by a Joint Honours student, King's College London

2011 Ranked 2/209 in the general rank of the Natural Sciences Department, University of Paris 7 – Denis Diderot

2010 Selected among best projects in the Program of Scientific Vocation (PROVOC) FioCruz

Presentations and Participations

2020 Seminar, "*What can Statistical Physics teach us about machine speaker?*", EMAP/FGV

2020 Seminar, "*Are generative models the new sparsity?*", CMAP/École Polytechnique

2019 Poster at NeurIPS, Vancouver

2019 Poster at Workshop on Science of Data Science, ICTP, Trieste

2019 Visitor at Machine Learning for Quantum Many-Body Physics, KITP, Santa Barbara

2017 Short Visit, Brazilian Centre for Research in Physics (CBPF)
Presented seminar *All you wanted to know on the SYK model*.

2017 School on AdS/CMT Correspondence, ICTP-SAIFR
Short Talk *Disorder in AdS/CMT*

2017 Disorder in Condensed Matter and Black Holes, Lorentz Center, Leiden University

2016 Condensed Matter and Beyond, University of Oxford

2016 Quantum Information in String Theory and Many-body Systems ,Yukawa Institute for Theoretical Physics, Kyoto University

2015 Poster at Physics by the Lake, Cumberland Lodge

2015 Eurostrings, University of Cambridge

2015 Holographic Methods for Strongly Coupled Systems , Galileo Galilei Institute for Theoretical Physics

2013 Tomorrow's Mathematicians Today, University of Greenwhich

2011 28th Brazilian Colloquium of Mathematics, IMPA

2010 VIII School of the Brazilian Centre for Research in Physics (CBPF)

2010 XV Week of Scientific Vocation
Presented project *Localization of the Oligopeptidase B2 of Leishmania Amazonensis*

2009 XXIV International Meeting of the Federation of Experimental Biology (FeSBE).
Presented project *Identification and Cellular Localization of the Oligopeptidase B2 of Leishmania Amazonensis*

2008 XIII Week of Scientific Vocation, FioCruz

Presented project *Cloning and Characterization of the Oligopeptidase B2 of Leishmania Amazonensis*

Numerical Skills

PYTHON (Intermediate), MATHEMATICA (Intermediate), MATLAB (Intermediate), LaTeX (Advanced).

Languages

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

Past Projects

2014 Integrability and Self-Duality, *Advisor: Dr Maciej Dunajski*, University of Cambridge

2013 Non-gaussianities in the CMB, *Advisor: Dr Eugene Lim*, King's College London

2012 A study on the LSST filters, *Advisor: Dr Pierre Astier*, LPNHE Paris

2008-2010 Characterization of the Oligopeptidase B2 of Leishmania Amazonensis, *Advisor: Dr Herbert Guedes*, FioCruz