

Rodrigo Veiga

Postdoctoral
researcher

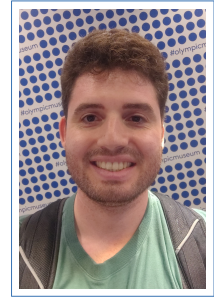
École Polytechnique Fédérale de Lausanne (EPFL)
Lab for Statistical Mechanics of
Inference in Large Systems (SMILS)

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Education

- 2017–2022 : **Doctor of Science, Physics**, *University of São Paulo*, São Paulo, Brazil.
Thesis: [Statistical Physics Analysis of Machine Learning Models](#)
- 2010–2012 : **Master of Science, Physics**, *University of São Paulo*, São Carlos, Brazil.
Thesis: [Effects of Correlated Hybridization in the Single-impurity Anderson Model](#) (in portuguese)
- 2006–2009 : **Bachelor in Physics**, *University of São Paulo*, São Carlos, Brazil.

Publications

Articles

- 2024 **R. Veiga**, A. Remizova, and N. Macris. Stochastic gradient flow dynamics of test risk and its exact solution for weak features, [arxiv:2402.07626](#) (*preprint*), 2024.
- 2023 **R. Veiga**, L. Stephan, B. Loureiro, F. Krzakala, and L. Zdeborová. Phase diagram of stochastic gradient descent in high-dimensional two-layer neural networks*. *Journal of Statistical Mechanics: Theory and Experiment*, volume 2023, page 114008. [IOP Publishing](#), *Updated version of the proceeding published in Advances in Neural Information Processing Systems 35 (NeurIPS 2022), nov 2023.
- 2023 E. Cornacchia*, F. Mignacco*, **R. Veiga***, C. Gerbelot, B. Loureiro, and L. Zdeborová. Learning curves for the multi-class teacher–student perceptron. *Machine Learning: Science and Technology*, volume 4, page 015019. [IOP Publishing](#), *Equal contribution, 2023.
- 2020 **R. Veiga** and R. Vicente. Restricted Boltzmann machine flows and the critical temperature of Ising models, [arxiv:2006.10176](#) (*preprint*), 2020.
- 2020 **R. Veiga**, R. Murta, and R. Vicente. Age-structured estimation of COVID-19 ICU demand from low quality data, [arxiv:2006.06530](#) (*preprint*), 2020.

Conference Proceedings

- 2022 **R. Veiga**, L. Stephan, B. Loureiro, F. Krzakala, and L. Zdeborová. Phase diagram of stochastic gradient descent in high-dimensional two-layer neural networks. In *Advances in Neural Information Processing Systems NeurIPS*, volume 35, pages 23244–23255, 2022.

- 2013 V. Líbero and **R. Veiga**. Effects of correlated hybridization in the single-impurity Anderson model. In *APS March Meeting Abstracts*, volume 2013 of *APS Meeting Abstracts*, page R19.004, March 2013.

Research Experience

École Polytechnique Fédérale de Lausanne (EPFL), Switzerland

Oct 2022–present **Postdoctoral researcher.**

SMILS - Lab for Statistical Mechanics of Inference in Large Systems

Supervisor: [Prof. Nicolas Macris](#)

- Financial support: EPFL, École Polytechnique Fédérale de Lausanne.

Feb 2021–Jan 2022 **Vising doctoral student.**

IdePHICS - Information, Learning and Physics Lab

Supervisor: [Prof. Florent Krzakala](#)

- Financial support: CAPES-PrINT, Program for Institutional Internationalization; Brazil; Grant number 88887.467036/2019-00. EPFL, École Polytechnique Fédérale de Lausanne.

University of São Paulo (USP), Brazil

Jul 2017–Aug 2022 **Doctoral student.**

IFUSP - Physics Institute

Supervisor: [Prof. Renato Vicente](#)

- Project: Statistical physics and machine learning models
- Financial support: CNPq, The National Council for Scientific and Technological Development; Brazil. Grant number 162857/2017-9.

Aug 2012–May 2013 **Doctoral student.**

IFSC-USP São Carlos Physics Institute

Supervisor: [Prof. Miled Moussa](#)

- Project: Entanglement and quantum discord in the superradiance and applications of quantum information theory in NMR
- Financial support: CAPES, Coordination for the Improvement of Higher Education Personnel; Brazil. PROEX.

Mar 2010–May 2012 **Master student.**

IFSC-USP São Carlos Physics Institute

Supervisor: [Prof. Valter Líbero](#)

- Project: Effects of correlated hybridization in the single-impurity Anderson model
- Financial support: FAPESP, The State of São Paulo Research Foundation; Brazil. Grant number 2009/13065-8.

Apr 2008–Dec 2009 **Undergraduate student project.**

IFSC-USP São Carlos Physics Institute

Supervisor: [Prof. Valter Líbero](#)

- Project: Density functional theory applied to the antiferromagnetic Heisenberg model
- Financial support: FAPESP, The State of São Paulo Research Foundation; Brazil. Grant number 2007/59988-4.

Teaching

Spring, 2024 : **CS526 Learning theory**, EPFL, Lausanne, Switzerland.


Master's course taught by Prof. Nicolas Macris. I was responsible for two lessons:

- 18th March: *Bias variance tradeoff and the double descent phenomenon.*
- 25th March: *Double descent, continuation and derivation for weak features model.*

Participation in events

- May 2024 Youth in High Dimensions: Recent Progress in Machine Learning, High-Dimensional Statistics and Inference; Trieste, Italy.
Contributed talk: *Time Evolution of the Test Risk under Stochastic Gradient Flow Dynamics*.
- Apr 2024 From Theory to Practice: Workshop in Data Science; African Institute for Mathematical Sciences; Kigali, Rwanda.
Invited talk: *Time Evolution of the Test Risk under Stochastic Gradient Flow Dynamics*.
- Aug 2023 Statistical Physics and Machine Learning Back Together; Cargèse, France.
Poster presentation: *Phase diagram of stochastic gradient descent in high-dimensional two-layer neural networks*.
- Jun 2023 Mathematical Physics of Complex Systems; Cortona, Italy.
- Dec 2022 NeurIPS, Conference on Neural Information Processing Systems; New Orleans, USA.
Poster presentation: *Phase diagram of stochastic gradient descent in high-dimensional two-layer neural networks*.
- Apr 2022 TOPML, Workshop on the Theory of Overparameterized Machine Learning; Houston, USA; [Virtual event](#).
Contributed talk: *Phase diagram of stochastic gradient descent in high-dimensional two-layer neural networks*.
- Jun 2020 Youth in High-dimensions: Machine Learning, High-dimensional Statistics and Inference for the New Generation, ICTP; Trieste, Italy; [Virtual event](#).
- Dec 2019 First School on Data Science and Machine Learning, ICTP-SAIFR; São Paulo, Brazil.
- Sep 2017 Minicourse on Machine Learning for Many-Body Physics, ICTP-SAIFR; São Paulo, Brazil.
- Oct 2012 II SIFSC - São Carlos Physics Institute Graduate Workshop, IFSC-USP; São Carlos, Brazil.
Poster presentation: *Entanglement and quantum Discord in the superradiance*.
- Out 2011 I SIFSC - São Carlos Physics Institute Graduate Workshop, IFSC-USP; São Carlos, Brazil.
Poster presentation: *Effects of correlated hybridization in the single-impurity Anderson model*.
- Jul 2011 Brazilian School on Statistical Mechanics, IIP-UFRN; Natal, Brazil.
Poster presentation: *Effects of correlated hybridization in the single-impurity Anderson model*.
- Nov 2010 XIV São Carlos Physics Institute Graduate Workshop, IFSC-USP; São Carlos, Brazil.
Poster presentation: *Correlated hybridization in the single-impurity Anderson model and non-local functional in the Heisenberg model*.

Computer skills `</>`

Programming Python, R, Fortran, Cython, Wolfram Mathematica
Machine learning PyTorch, Scikit-learn, Keras
Text L^AT_EX
OS Linux 

Languages

English Fluent
French Basic
Portuguese Native

Complementary training

May 2018 Machine Learning Engineer Nanodegree – Udacity
Udacity Online Programs. Online [course](#).

References

Prof. Nicolas Macris

École Polytechnique Fédérale de Lausanne
✉ nicolas.macris@epfl.ch

Prof. Florent Krzakala

École Polytechnique Fédérale de Lausanne
✉ florent.krzakala@epfl.ch

Prof. Renato Vicente

University of São Paulo
✉ rvicente@usp.br

Prof. Nestor Caticha

University of São Paulo
✉ ncaticha@usp.br

Non-academic work experience

Jul 2013– Mar 2017 **Financial administrator.**
Primos Materiais para Construções Ltda, Brazil.