

Curriculum Vitae

Rodrigo VEIGA

Full name: Rodrigo Soares Veiga.

Nationality: Brazilian.

Date of birth: 02/05/1988 (dd/mm/yyyy).

Professional address:

École Polytechnique Fédérale de Lausanne (EPFL);
School of Computer and Communication Sciences (IC);
Information Processing Group (IPG);
Lab for Statistical Mechanics of Inference in Large Systems (SMILS).
Bâtiment INR 138, Station 14, 1015 Lausanne, Switzerland.

Email: rodrigo.veiga@epfl.ch

Webpage: <https://rodsveiga.github.io/>

GitHub: <https://github.com/rodsveiga>

Orcid: [0000-0002-6835-4871](https://orcid.org/0000-0002-6835-4871)

LinkedIn: [rodrigo-soares-veiga](https://www.linkedin.com/in/rodrigo-soares-veiga)

Google Scholar: [SIzY0mgAAAAJ&hl](https://scholar.google.com/citations?user=SIzY0mgAAAAJ&hl)

Education

- **PhD, Physics.**
University of São Paulo; São Paulo; Brazil.
Thesis: *Statistical Physics Analysis of Machine Learning Models*.
Date of Graduation: 04/08/2022.
- **Master of Sciences, Physics.**
University of São Paulo; São Carlos; Brazil.
Thesis Title: *Effects of Correlated Hybridization in the Single-impurity Anderson Model*.
Date of Graduation: 31/05/2012.
- **Bachelor in Physics.**
University of São Paulo; São Carlos; Brazil.
Date of Graduation: 21/12/2009.

Research/Employment History

- **Postdoctoral researcher.**
École Polytechnique Fédérale de Lausanne (EPFL); Lausanne; Switzerland.
SMILS - Lab for Statistical Mechanics of Inference in Large Systems.
Supervisor: Prof. Nicolas Macris.
Dates: 10/2022 – (current job).

- **Visiting PhD student.**
École Polytechnique Fédérale de Lausanne (EPFL); Lausanne; Switzerland.
IdePHICS - Information, Learning and Physics Lab.
Supervisor: Prof. Florent Krzakala.
Dates: 02/2021 – 01/2022.
- **PhD student.**
University of São Paulo (USP); São Paulo; Brazil.
IFUSP - Institute of Physics.
Supervisor: Prof. Renato Vicente.
Dates: 07/2017– 08/2022.
- **Financial administrator.**
Primos Materiais para Construções Ltda; Sorocaba; Brazil.
Non-academic employment.
Dates: July 2013 – March 2017.
- **PhD student.**
University of São Paulo (USP); São Carlos; Brazil.
IFSC - São Carlos Institute of Physics.
Supervisor: Prof. Miled Moussa.
Dates: 08/2012– 05/2013 (interrupted).
- **Master student.**
University of São Paulo (USP); São Carlos; Brazil.
IFSC - São Carlos Institute of Physics.
Supervisor: Prof. Valter Líbero.
Dates: 03/2010– 05/2012.
- **Undergraduate student project.**
University of São Paulo (USP); São Carlos; Brazil.
IFSC - São Carlos Institute of Physics.
Supervisor: Prof. Valter Líbero.
Dates: 04/2008– 12/2009.

Publications

- **Stochastic gradient flow dynamics of test risk and its exact solution for weak features.**
Authors: **R. Veiga**, A. Remizova, N. Macris.
- Published: *Proceedings of the 41st International Conference on Machine Learning (ICML)*, PMLR [235:49310-49344](#) (2024).
- arXiv: [2402.07626](#)
- **Phase diagram of stochastic gradient descent in high-dimensional two-layer neural networks.**
Authors: **R. Veiga**, L. Stephan, B. Loureiro, F. Krzakala, L. Zdeborová.

- Published: *Advances in Neural Information Processing Systems (NeurIPS)*. Volume 35; [pages 23244-23255](#) (2022).
 - Re-published: *Journal of Statistical Mechanics; Theory and Experiment*. Volume 2023, page 114008, DOI [10.1088/1742-5468/ad01b1](#) (2023).
 - arXiv: [2202.00293](#)
- **Learning curves for the multi-class teacher–student perceptron.**
Authors: E. Cornacchia*, F. Mignacco*, **R. Veiga***, C. Gerbelot, B. Loureiro, L. Zdeborová (*equal contribution).
 - Published: *Machine Learning: Science and Technology*. Volume 4; pages 05019; DOI [10.1088/2632-2153/acb428](#) (2023).
 - arXiv: [2203.12094](#)
- **Restricted Boltzmann machine flows and the critical temperature of Ising models.**
Authors: **R. Veiga**, R. Vicente.
 - Published: *Preprint* (2020).
 - arXiv: [2006.10176](#)
- **Age-structured estimation of COVID-19 ICU demand from low quality data.**
Authors: **R. Veiga**, R. Murta, R. Vicente.
 - Published: *Preprint* (2020).
 - arXiv: [2006.06530](#)

Participation in events

Oral presentations

- **The Abdus Salam International Centre for Theoretical Physics (ICTP); Trieste, Italy.**
Contributed talk: *Time Evolution of the Test Risk under Stochastic Gradient Flow Dynamics*.
Event: Youth in High Dimensions: Recent Progress in Machine Learning, High-Dimensional Statistics and Inference.
Date: 05/2024.
- **African Institute for Mathematical Sciences (AIMS); Kigali, Rwanda.**
Invited speaker: *Time Evolution of the Test Risk under Stochastic Gradient Flow Dynamics*.
Event: From Theory to Practice: Workshop in Data Science.
Date: 04/2024.
- **TOPML, Workshop on the Theory of Overparameterised Machine Learning; Houston, USA.**
Contributed talk: *Phase diagram of stochastic gradient descent in high-dimensional two-layer neural networks*.
Virtual event.
Date: 04/2022.

Poster presentations

- **ICML, International Conference on Machine Learning; Vienna; Austria.**
Poster title: *Stochastic Gradient Flow Dynamics of Test Risk and its Exact Solution for Weak Features.*
Date: 07/2024.
- **Institut d'Études Scientifiques de Cargèse; Cargèse, France.**
Poster title: *Phase diagram of stochastic gradient descent in high-dimensional two-layer neural networks.*
Event: Statistical Physics and Machine Learning Back Together.
Date: 08/2023.
- **NeurIPS, Conference on Neural Information Processing Systems; New Orleans, USA.**
Poster title: *Phase diagram of stochastic gradient descent in high-dimensional two-layer neural networks.*
Date: 12/2022.
- **University of São Paulo, São Carlos Institute of Physics; São Carlos, Brazil.**
Poster title: *Entanglement and quantum Discord in the superradiance.*
Event: II SIFSC - São Carlos Physics Institute Graduate Workshop.
Date: 10/2012.
- **University of São Paulo, São Carlos Institute of Physics; São Carlos, Brazil.**
Poster title: *Effects of correlated hybridization in the single-impurity Anderson model.*
Event: I SIFSC - São Carlos Physics Institute Graduate Workshop.
Date: 10/2011.
- **Federal University of Rio Grande do Norte, International Institute of Physics; Natal, Brazil.**
Poster title: *Effects of correlated hybridization in the single-impurity Anderson model.*
Event: Brazilian School on Statistical Mechanics.
Date: 07/2011.
- **University of São Paulo, São Carlos Institute of Physics; São Carlos, Brazil.**
Poster title: *Correlated hybridization in the single-impurity Anderson model and non-local functional in the Heisenberg model.*
Event: XIV São Carlos Physics Institute Graduate Workshop.
Date: 10/2010.

Schools

- **ICTP South American Institute for Fundamental Research; São Paulo, Brazil.**
Event: First School on Data Science and Machine Learning.
Date: 12/2019.

- **ICTP South American Institute for Fundamental Research; São Paulo, Brazil.**
Event: Minicourse on Machine Learning for Many-Body Physics.
Date: 09/2017.

Scholarships

- **CAPES-PrInt, Program for Institutional Internationalization; Brazil.**
Scholarship for a PhD internship abroad.
Project: Statistical physics inference on machine learning algorithms.
Grant number: 88887.467036/2019-00.
Host: École Polytechnique Fédérale de Lausanne; Switzerland.
Dates: 02/2021 - 01/2022.
- **CNPq, The National Council for Scientific and Technological Development; Brazil.**
PhD scholarship.
Project: Statistical physics and machine learning models.
Grant number: 162857/2017-9.
Dates: 08/2017 - 02/2020.
- **FAPESP, The State of São Paulo Research Foundation; Brazil.**
PhD scholarship.
Project: Entanglement and quantum discord in the superradiance and applications of quantum information theory in NMR.
Grant number: 2012/12065-7.
Dates: Declined.
- **CAPES, Coordination for the Improvement of Higher Education Personnel; Brazil.**
PhD scholarship.
Project: Entanglement and quantum discord in the superradiance and applications of quantum information theory in NMR.
Grant number: PROEX.
Dates: 08/2012 - 05/2013.
- **FAPESP, The State of São Paulo Research Foundation; Brazil.**
Master scholarship.
Project: Effects of correlated hybridization in the single-impurity Anderson model.
Grant number: 2009/13065-8.
Dates: 03/2010 - 02/2012.
- **FAPESP, The State of São Paulo Research Foundation; Brazil.**
Undergraduate research scholarship.
Project: *Density functional theory applied to the antiferromagnetic Heisenberg model.*
Grant number: 2007/59988-4.
Dates: 04/2008 - 12/2009.

Teaching

- **CS526 Learning theory, EPFL; Lausanne; Switzerland.**
Spring semester 2024.
Master's course taught by Prof. Nicolas Macris. Responsible for two lessons:
 - 18/03/2024: Bias variance tradeoff and the double descent phenomenon.
 - 25/03/2024: Double descent and the weak features model.

Other projects

- **Modeling growth rate and growth acceleration rate of COVID-19 cases in Brazil.**
Code available on [GitHub](#).
Brazilian newspaper *Folha de S. Paulo* used this model to construct an [acceleration monitor](#) of COVID-19 in Brazil.
 - Several press reports followed from the acceleration monitor based on the project: [[1](#), [2](#), [3](#), [4](#), [5](#), [6](#), [7](#), [8](#), [9](#), [10](#)]

References

- **Prof. Nicolas Macris.**
École Polytechnique Fédérale de Lausanne (EPFL); Lausanne; Switzerland.
IC - School of Computer and Communication Sciences.
SMILS - Lab for Statistical Mechanics of Inference in Large Systems.
nicolas.macris@epfl.ch
- **Prof. Florent Krzakala.**
École Polytechnique Fédérale de Lausanne (EPFL); Lausanne; Switzerland.
STI - School of Engineering.
IdePHICS - Information, Learning and Physics Lab.
florent.krzakala@epfl.ch
- **Prof. Renato Vicente.**
University of São Paulo (USP); São Paulo; Brazil.
IME - Institute of Mathematics and Statistics.
MAP - Applied Mathematics Department.
rvicente@usp.br
- **Prof. Nestor Caticha.**
University of São Paulo (USP); São Paulo; Brazil.
IF - Institute of Physics.
FGE - General Physics Department.
ncaticha@usp.br
- **Dr. Bruno Loureiro.**
École Normale Supérieure - PSL & CNRS; Paris; France.
Département d'Informatique.
Center for Data Science.
brloureiro@gmail.com