Lucas da Rocha Schwengber

Albany, CA, United States

Email: lucas.schwengber@berkeley.edu
Website: https://lucas-schwengber.github.io
GitHub: https://github.com/lucas-schwengber

Education

PhD in Statistics — Aug 2024 - Current
University of California, Berkeley, United States.

MS in Applied Mathematics — Aug 2021 - Jun 2023
Instituto de Matemática Pura e Aplicada, IMPA, Brazil.
Advisor: Roberto Imbuzeiro Oliveira
Area: High-Dimensional Probability, Mathematical Statistics and Machine Learning.

BS in Applied Mathematics (with honors) — Mar 2017 - Jun 2021
Universidade Federal do Rio Grande do Sul, UFRGS, Brazil.

Industry Experience

Petrobras — IMPA, Mar 2024 - Jul 2024

- Worked in a project for Petrobras at IMPA's Centro Pi. The project involved investigating the use of physics-informed neural networks to solve inverse problems in geophysics. Gained more experience with `pytorch`, `tensorboard` and building machine learning pipelines.

Rede Globo — IMPA, Mar 2022 - Jun 2022

- Worked in a project for Rede Globo at IMPA's Centro Pi. The project involved recommendation systems and natural language processing. Worked with `sklearn`, pre-trained models from Hugging Face, `nltk` and collaborative coding using `github`.

Master Soluções que Conectam — Aug 2020 - Dec 2020

- Helped setting up a data collecting system for a project involving computer vision applied to leather data. Mostly worked with `opencv` and `sklearn`.

Research Projects

Geometric planted matchings beyond the Gaussian model (arXiv:2403.17469) — 2024

- Developed upper and lower bounds for the number of mistakes made by a particle tracking algorithm, under weak assumptions on the distribution of the underlying data.

Deep Hashing via Householder Quantization (arXiv:2311.04207) — 2023

- Developed a strategy to improve deep hashing methods by optimizing an orthogonal transformation to mitigate quantization error. Worked with `pytorch`.

Languages

Portuguese — Native

	English	Advanced

Code Skills

Python	Advanced
Fortran	Intermediate
Git, R	Basic

Personal Projects

Music Clust (Executable) — Mar 2020

- Created a program to automatically clusterize similar music files into folders. Worked with `librosa` and `sklearn`. A demo can be downloaded here.

Teaching Assistanship

Probability I (Graduate course) — IMPA, Mar 2024 - Jun 2024

- Formulated and graded all assignments. Gave weekly tutoring sessions.

Programming II (Undergraduate course) — IMPA, Aug 2023 - Dec 2023

- Gave weekly tutoring sessions. Helped formulate assignments and exams. Graded all assignments.

Probability I (Graduate course) — IMPA, Mar 2023 - Jun 2023

- Formulated and graded all assignments. Gave weekly tutoring sessions.

Machine Learning (Graduate course) — IMPA, Jan 2023 - Feb 2023

- Helped formulate assignments and exams. Gave weekly tutoring sessions.

Precalculus (Undergraduate course) — UFRGS, May 2018 - Jun 2018

- Graded exams. Gave tutoring sessions.

Honors and Awards

PIBIC CNPq scholarship	UFRGS, 2017-2018
Best presentation in the pure Mathematics thematic session at the XXX Scientific Initiation Meeting	UFRGS, Oct 2018
PIBIC CNPq scholarship	UFRGS, 2020-2021

Summer Courses

Combinatorics I	IMPA, Jan 2024 - Feb 2024
Concentration Inequalities	FGV-EMAp, Jan 2021 - Feb 2021
Topological Data Analysis	FGV-EMAp, Jan 2021 - Feb 2021
Markov Chains	IMPA, Jan 2021 - Feb 2021
Machine Learning and Statistical Modeling	IME-UFRGS, Jan 2020 - Feb 2020
Summer Course on Bioinformatics	USP, Feb 2018

Undergraduate Research Experience

Centrality in Complex Networks — Aug 2019 - Aug 2021

Advisor: Silvio Dahmen (UFRGS) — Funded by: PIBIC, CNPq

- Studied classical and new centrality measures in complex networks. Used this knowledge to analyze data from historical networks from *Ecclesiastical History*

of the English People by Bede. Formulated a new idea of centrality measure with a scale parameter resulting in a technical report (arXiv:2108.09248).

Random Walks and Electric Networks — Jun 2017 - Jun 2018
Advisor: Ricardo Misturini (UFRGS) — Funded by: PIBIC, CNPq

- Covered in detail most of *Random Walks and Eletric Networks* by P. Doyle and J. Snell and simulated some random walks.

Events

Workshop on Learning and Inference from Structured Data: Universality, Correlations and Beyond	Italy, Jul 2023
IMPA 70 Years conference	Brazil, Oct 2022
XXV Brazilian School of Probability	Brazil, Aug 2022
XXXIII Scientific Initiation Meeting UFRGS	Brazil, Sep 2021
XXXII Scientific Initiation Meeting UFRGS	Brazil, Sep 2020
18th School on Time Series and Econometrics	Brazil, Sep 2019
XXX Scientific Initiation Meeting UFRGS	Brazil, Oct 2018