Lucas Rufino Curriculum Vitae

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General Information

Born in: April 08, 2000. Rio de Janeiro, RJ, Brazil.
Current address: Street Senador Vergueiro, 80 - Rio de Janeiro, RJ, Brazil.
Current association: National Institute of Pure and Applied Mathematics, Brazil.
ORCID: 0009-0009-2402-7949.
CV last updated in: June, 2025.

Education

Federal University of Rio de Janeiro — Rio de Janeiro, Brasil
Bachelor's in Computer Science — 2018 - 2023

- Advisor: Prof. João Antônio Recio da Paixão
- Dissertation: Relational Graphical Linear Algebra (view)
- GPA: 3.0/4.0

National Institute of Pure and Applied Mathematics — Rio de Janeiro, Brasil
Master's in Pure Mathematics — 2023 - 2025

- Advisor: Prof. Hossein Movasati
- Dissertation: Explicit Computation on Elliptic Curves (view)
- GPA: 4.0/4.0

Projects & Awards

Scientific initiation: During my Bachelor's, I participated in a project of scientific initiation, which started in the second semester of 2019 and ended in the second semester of 2022, while advised by Prof. João Paixão, and whose objective was to study and contribute to the development of a graphical and relational language for linear algebra.

Award of best presentation on the JICTAC: I was awarded for the presentation named "Rewriting Linear Algebra using Diagrams", in a joint work with Gabriel Ferreira, the title of "Best Work in the Presentation Session of the Center of Nature and Mathematical Sciences" in the Federal University of Rio de Janeiro during the 42th Giulio Massarani Journey of Scientific, Technological, Artistic and Cultural Initiation (JICTAC 2020 - Special Edition), held between March 22 and 26, 2021.

Programming: I worked as a professional `Python` programmer between July 2021 and Ferbuary 2024. My experience with this language has proven to be very useful in my research as a pure mathematician. I also have basic knowledge of `C`, `Java`, `Javascript`.

Publications

1. (Preprint) Iago Leal, João Paixão, Júlia Mota, **Lucas Rufino**. "Generalizing the Invertible Matrix Theorem with Linear Relations using Graphical Linear Algebra" *arXiv*, 2025. IDENTIFIER: arXiv:2502.16783.
2. (Published) João Paixão, Júlia Mota, **Lucas Rufino**. "Point-free Calculational Proofs and Program Derivation in Linear Algebra using a Graphical Syntax" *Journal of Functional Programming*, 2025. DOI: 10.1017/S0956796825000085.
3. (Published) João Paixão, Paweł Sobocinski, **Lucas Rufino**. "High-level Axioms for Graphical Linear Algebra" *Science of Computer Programming*, 2022. DOI: 10.1016/j.scico.2022.102791.

Talks & Presentations

03/2021 "Rewriting Linear Algebra using Diagrams" Presentation for the Journey of Scientific, Technological, Artistic and Cultural Initiation - JICTAC. Joint work with Gabriel Ferreira. *UFRJ, Brasil.*

03/2021 "Graphical Linear Algebra" Presentation for the Journey of Scientific, Technological, Artistic and Cultural Initiation - JICTAC. Joint work with Gabriel Ferreira. *UFRJ, Brasil.*

05/2022 "Symmetries on the Plane" Seminar of Computer Science. *UFRJ, Brasil.*

04/2023 "Relational Graphical Linear Algebra" Presentation for the Journey of Scientific, Technological, Artistic and Cultural Initiation - JICTAC. *UFRJ, Brasil.*

06/2024 "The Nagell-Lutz Theorem" GADEPs seminar. *IMPA, Brasil.*

09/2024 "Counting points of elliptic curves over finite fields" GADEPs seminar. *IMPA, Brasil.*

10/2024 "The Mordell-Weil Theorem" GADEPs seminar. *IMPA, Brasil.*

12/2024 "Visualizing the torsion subgroup of elliptic curves over $\mathbb{Q}$" Poster presentation during a conference. *USACH, Chile.*

03/2025 "Heegner Points and Quadratic Forms" GADEPs seminar. *IMPA, Brasil.*

04/2025 "Unfolding Integrals with the Rankin-Selberg Method" GADEPs seminar. *IMPA, Brasil.*

05/2025 "Local Heights on Projective Varieties" GADEPs seminar. *IMPA, Brasil.*

Conferences

- **Arithmetic and p-adic geometry in Chile**
  Santiago, Chile. December, 2024. (Website)
- **GADEPS Focused Meetings: Differential Equations and Prime Numbers**
  Rio de Janeiro, Brazil. June, 2025. (Event link)

Languages

Portuguese: Native.
English: Fluent *(117/120 in TOEFL iBT, done in 2025)*.
Japanese: Intermediate *(JLPT N3, done in 2024)*.