

Pedro Brunialti Lima de Andrade

Curriculum Vitae

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Education

- 2022-Present **Ph.D. in Mathematics – Advisor: Julia E. Bergner**, *University of Virginia*, Charlottesville
- 2020-2022 **M.Sc. in Mathematics – Advisor: Prof. Rodney Josué Biezuner**, *Federal University of Minas Gerais - UFMG*, Belo Horizonte
Title: Comparing Models for $(\infty, 1)$ -categories: The Quillen Equivalence between Simplicial Categories and Simplicial Sets
- 2016-2019 **B.Sc. in Physics**, *Federal University of Minas Gerais - UFMG*, Belo Horizonte
Bachelor in Physics with Complementary Formation in Mathematics.

Schools

- Summer 2023 **Topological Moonshine**, Urbana-Champaign, IL, USA
A School on Topological Moonshine
- Spring 2023 **Atlantic TQFT Spring School**, Wolfville, NS, Ca
A School of Topological Quantum Field Theory
- 12/2020 **Online CIMPA Pre-School**, *Centre International de Mathématiques Pures et Appliquées (CIMPA)*
Pre-School of “Algebraic Methods in Topology”. It consisted in 4 online mini-courses covering foundational topics in Algebra and Topology.
- Summer 2019 **Summer Program**, *National Institute of Pure and Applied Mathematics (IMPA)*, Rio de Janeiro
Intensive two month course in Real Analysis, Undergraduate Research level.

Research and Work Experience

Teaching

- Spring 2024 **Instructor of record**, *Calculus I*, Mathematics Department, UVA
- Fall 2023 **Instructor of record**, *A Survey of Calculus II*, Mathematics Department, UVA
- Spring 2023 **Teaching assistant**, *Calculus II*, Mathematics Department, UVA
- Fall 2022 **Teaching assistant**, *Calculus III*, Mathematics Department, UVA
- 10/2021-01/2022 **Teaching assistant**, *Differential Equations A*, Dep. of Mathematics, ICEx, UFMG
- 05/2021-09/2021 **Teaching assistant**, *Analytic Geometry and Linear Algebra*, Dep. of Mathematics, ICEx, UFMG

Other Projects

- 2023-present **Mentor in the DRP program at UVA**
Since 2023 I am mentor the the mathematics department Directed Reading Program (DRP). The DRP pairs undergraduate students with graduate student or postdoc mentors for independent reading projects. Each reading project lasts the duration of a semester and culminates with the undergraduate student giving a presentation by the end of the next semester.
- 2020-2022 **Member of Math-Phys-Cat**
I was a member of the group **Math-Phys-Cat**, a Brazilian research group on Mathematical-Physics and Categorification. We had weekly meetings to discuss what the members are studying as well as a platform for the discussion of topics of active research. During my time at the group I produced notes and presentations on some subjects, all of which can be found at my homepage.

04/2020- **Group study on basic Category Theory**

05/2020 In the beginning of the lockdown due to the Covid Pandemic I organized a study group on Category Theory. We would study certain topics and have weekly online meetings to discuss what was read. We were able to cover from the definition of a category to the notion of limits and colimits.

2018-2019 **Member of GFT**

I have participated in the research group Group for Fundamental Theory ([GFT](#)), in which we had weekly presentations by our members and invited speakers. We also had viewing sessions of research seminars provided by the Perimeter Institute through the [PIRSA website](#).

Talks

01/2024 **What are universal properties?, UVA**

An expository about universal properties for people who might not be familiar with category theory.

01/2023 **A mathematical formulation of Quantum Mechanics, UVA**

A talk explaining one of the axiomatizations of Quantum Mechanics and how to physically interpret these axioms.

09/2021 **Equivalence between two presentations of the Concept of Homotopy Theory**

Short [prerecorded](#) presentation on the Quillen equivalence between quasi-categories and Kan enriched categories for the [I Mathematics Meeting of Minas Gerais](#).

01/2021 **Modern Homotopy Theory: Model Categories, UFES**

A [lecture](#) I gave as the first part of a mini-course on modern homotopy theory offered in the First Brazilian Meeting on Category Theory ([IEBTC](#)).

01/2021 **Tutorial: categories and functors, UFES**

A [lecture](#) I gave in the tutorial day of the First Brazilian Meeting on Category Theory, which had as goal to make the event more accessible to undergraduates.

06/2021 **Interpreting the Measurement Axiom, GFT**

A talk on how to interpret the measurement axiom from Quantum Mechanics and how to retrieve what is taught in introductory QM courses from it.

06/2021 **The Mathematics of Gauge Theories, GFT**

A talk on the mathematical machinery used in Gauge Theory.

01/2021 **The Serre-Swan Theorem and K-theory, Math-Phys-Cat**

A talk about the Serre-Swan theorem and how it can be used to establish an equivalence between algebraic and topological K-theory.

10/2020 **An Invitation to Model Categories, Math-Phys-Cat Group**

A talk on Model Categories and the Serre-Quillen model structure on topological spaces.

Scholarships

2020-2022 **Academic Excellence Program (PROEX)**, Supervisor: Prof. Rodney Josué Biezuner, Dep. of Mathematics, ICEx, UFMG
M.Sc. program scholarship.

08/2018- **Program of Undergraduate Research Scholarships (CNPq)**, Supervisor: Prof. Jussara de
08/2019 Matos Moreira, Dep. of Mathematics, ICEx, UFMG
Scholarship for the research project on Fourier and Functional analysis.

Publications

Articles

- [1] Abdelmalek Abdesselam, Pedro Brunialti, Tristan Doan, and Philip Velie. A bijection for tuples of commuting permutations and a log-concavity conjecture, 2024. [arXiv: 2309.09407](#).

Languages

Portuguese Native
English Fluent
Spanish Intermediate
French Intermediate