Patrícia Muñoz Ewald

Contact Information

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Research Interests

Mathematical foundations of deep learning, geometry, mathematical physics.

Education

2021 –	**Ph.D. in Mathematics, University of Texas at Austin** Advisor: Thomas Chen
2019 – 2021	**M.Sc. in Mathematics, University of São Paulo** Advisor: Cristian Ortiz Thesis: "Compactness in gauge theory"
2015 – 2018	**B.Sc. in Physics, University of São Paulo**

Awards and Fellowships

2025	**UT Austin Graduate Recognition Fellowship** ($1,000)
2024	UT Austin Graduate Student Professional Development Award ($400)
2024	Princeton School of Machine Learning Travel Award ($500)
2024	UT Austin Graduate School Summer Fellowship ($11,000)
2023	**Frank Gerth III Teaching Excellence Award** ($2,000)
2022	Microlocal Analysis Conference Travel Award ($800)
2022	MSRI/SLMath Workshops Travel Award ($3,500)
2022	Perimeter Institute Workshop Travel Award ($1,000)
2022	UT Austin Math Department Graduate Travel Award ($350)
2019	MSRI Workshop Travel Award
2019	IMPA Workshops and Conference Travel Awards
2019 – 2021	CNPq Master's Fellowship (R$36,000)

Papers

(1) T. Chen, P. M. Ewald. "Interpretable global minima of deep ReLU neural networks on sequentially separable data". 2024. *arXiv:2405.07098. J. Mach. Learn. Res., to appear.*

(2) T. Chen, P. M. Ewald. "On non-approximability of zero loss $\mathcal{L}^2$ minimizers by gradient descent in deep learning". 2023. *arXiv:2311.07065. Theor. Appl. Mech., 52 (1), 67-73 (2025).*

Preprints

(3) P. M. Ewald. "Explicit neural network classifiers for non-separable data". 2025. *arXiv:2504.18710*, *submitted.*

(4) T. Chen, C.-K. Chien, P. M. Ewald, A. G. Moore. "Architecture independent generalization bounds for overparametrized deep ReLU networks". 2025. *arXiv:2504.05695*, *submitted*.

(5) T. Chen, P. M. Ewald. "Gradient flow in parameter space is equivalent to linear interpolation in output space". 2024. *arXiv:2408.01517*, *submitted*.

(6) T. Chen, P. M. Ewald. "Geometric structure of deep learning networks and construction of global $\mathcal{L}^2$ minimizers". 2023. *arXiv:2309.10639*, *submitted*.

(7) T. Chen, P. M. Ewald. "Geometric structure of shallow neural networks and constructive $\mathcal{L}^2$ cost minimization". 2023. *arXiv:2309.10370*, *submitted*.

Service and Leadership

Spring 2025	Co-organizer: UT Austin Math/IFML Mathematics of Deep Learning Workshop
Fall 2023	Reviewer: Journal of Machine Learning Research
2022 – 2025	Co-organizer: UT Austin Distinguished Women in Math Lecture Series
2023 – 2025	Mentor: UT Austin Directed Reading Program
Spring 2023	Organizer: UT Austin Junior Geometry Seminar
Spring 2023	Organizer: UT Austin Microlocal Analysis Learning Seminar

Teaching Experience

	Teaching Assistant, University of Texas at Austin:
Fall 2024	*Elements of Effective Thinking*
Fall 2023	*Matrices and Matrix Calculations*
Spring 2023	*Advanced Calculus for Applications II*
Fall 2022	*Integral Calculus*
Spring 2022, Fall 2021	*Differential Equations with Linear Algebra*
	Teaching Assistant, University of São Paulo:
Winter 2020	*Geometric Calculus on* $\mathbb{R}^n$

Selected Talks

September 2025	SIAM Texas-Louisiana Section (Invited)
January 2025	Joint Mathematics Meetings (Invited)
April 2023	Sunday Morning Math Group (Outreach)
February 2023	UT Math Club (Outreach)
October 2021	Federal University of Espírito Santo Math Seminar (Invited)
August 2021	University of São Paulo Theoretical Physics Winter School (Invited, 5 lectures)

Updated: July 11, 2025