

Santiago Aranguri Diaz

EDUCATION

Courant Institute of Mathematical Sciences, New York University

Ph.D. student in Mathematics. September 2022 - May 2027 (expected)

Department of Mathematics, Stanford University

B.S. in Mathematics with Honors. September 2018 - June 2022

RESEARCH EXPERIENCE

Research, New York University, working with Professor Eric Vanden-Eijnden on phase transitions and scaling limits of diffusion models and with Professor Arthur Jacot on scaling laws for neural networks. (2023-)

Research, Hebrew University of Jerusalem, worked with Professor Ohad Feldheim on characterizing the persistence probability of Gaussian Stationary Processes. (Summer 2022)

Undergraduate Thesis, Stanford University, proved a central limit theorem for the Coulomb Gas in the two-dimensional torus with Professor Amir Dembo. (2022)

Graph Theory and Computational Topology Research, worked on algorithms for efficiently untangling planar curves, with Computer Science Professor Hsien-Chih Chang from Dartmouth College. (2020 - 2021)

Stanford NLP Lab, worked at Professor Christopher Manning's Lab, doing research on Memory-augmented Neural Networks and their ability to generalize using compositionality. (2018)

International Summer Science Institute, Weizmann Institute, Israel, [found a causality relationship](#) between the activity of two parts of the brain in mice, with Ph.D. Student Michael Sokoletsky from the Neuroscience Lab at Weizmann Institute. (2018)

PUBLICATIONS

S. Aranguri, G. Biroli, M. Mezard, E. Vanden-Eijnden. *Optimizing Noise Schedules of Generative Models in High Dimensions*. arXiv preprint arXiv:2501.00988. Under review

S. Aranguri, F. Insulla. *Phase-aware Training Schedule Simplifies Learning in Flow-Based Generative Models*. arXiv preprint arXiv:2412.07972. Under review

Z. Tu, S. Aranguri, A. Jacot. *Mixed Dynamics In Linear Networks: Unifying the Lazy and Active Regimes*. Advances in Neural Information Processing Systems, 2024

S. Aranguri, H. Chang, D. Fridman. *Untangling planar graphs and curves by staying positive*. Proceedings of the 2022 Annual ACM-SIAM Symposium on Discrete Algorithms, 211–225.

RELEVANT GRADUATE COURSEWORK

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| <input type="checkbox"/> Mathematical Problems in ML (taught by Prof. Montanari) | <input type="checkbox"/> Optimization Theory |
| <input type="checkbox"/> Theory of Deep Learning (taught by Prof. Jacot) | <input type="checkbox"/> Machine Learning |
| <input type="checkbox"/> Probability Theory (year-long) | <input type="checkbox"/> Gaussian Fields |
| <input type="checkbox"/> Functional Analysis | <input type="checkbox"/> Computational Complexity |
| | <input type="checkbox"/> Partial Differential Equations |
| | <input type="checkbox"/> Algorithms |

SUMMER SCHOOLS

- Princeton Theory of Machine Learning Summer School (2024)*
- Cargese Complex and Glassy Systems Summer School (2024)*
- Saint-Flour Probability and Statistics Summer School (2024)*
- Princeton Theory of Machine Learning Summer School (2023)*

MISCELLANEOUS

Interact Fellow (cohort 2022). Interact is a fellowship for young technologists dedicated to social impact.

Argentina Coding Olympiads. First place in the National Coding Olympiads, i.e. best coding student in the country (2014 and 2016)

Founder: personasperdidas.org.ar. Created a website and app to find missing people. The platform reached around 500,000 visualizations every month through social networks. (2014 - 2017)

Talks I gave. “Problems at School” at TEDxRiodelaPlataED to 1k people. “Imagine you are lost” at TEDxORTArg. “The Importance of Science for Teens” at UNESCO’s Forum “Project-based Learning” at FiiS to 3k people. (2014-2015)