Hamburg, Germany 20253
+39 388 074 2539
gama.lorenz@gmail.com
mati-lorenz
0009-0006-3129-906X
mati-lorenz.github.io

Gabriel Matías Lorenz

Current Position

2024 – Present **Postdoctoral Researcher**, *University Medical Center Hamburg-Eppendorf (UKE)*, Hamburg, Germany
Member of the Institute of Neural Information Processing led by Prof. Dr. Stefano Panzeri.

Education

2020 – 2024 **Ph.D. in Data Science and Computation**, *University of Bologna*, Italy
In collaboration with the Italian Institute of Technology.
- **Advisor:** Prof. Dr. Stefano Panzeri
- **Thesis:** *Multivariate information theoretic methods for the analysis of neural network function*
- **Selected Courses:** Pattern Recognition, Applied Machine Learning, Information Theory in Biology

2018 – 2019 **Master in Physics, Complex Systems**, *Balseiro Institute*, Argentina
- **Advisor:** Dr. Damián G. Hernández
- **Thesis:** *Functional interaction between neurons: application to the retina*
- **Selected Courses:** Stochastic Processes, Non-Equilibrium Statistics, Dynamical Systems

2016 – 2018 **Bachelor in Physics (continuation)**, *Balseiro Institute*, Argentina

2014 – 2016 **Bachelor (Licenciatura) in Physics (first 2.5 years out of 5)**, *National University of Tucumán*, Argentina

Research interests

Computational Neuroscience, Information Theory, High-dimensional Data Analysis, Spiking Neural Networks, Neuron Models, and Machine Learning for Neuroscience

Publications

2025 Urdu, **Lorenz**, Huang, Panzeri, Koren. *Firing rates and representational error in efficient spiking networks are bounded by design*. Accepted preprint at the 34th International Conference on Artificial Neural Networks

2025 **Lorenz**, Engel, Celotto, Koçillari, Curreli, Fellin, Panzeri. *MINT: A toolbox for the analysis of multivariate neural information coding and transmission*. *PLOS Computational Biology*, 21(4), e1012934.

2024 Koçillari, **Lorenz**, Engel, Celotto, Curreli, Malerba, Engel, Fellin, Panzeri. *Sampling bias corrections for accurate neural measures of redundant, unique, and synergistic information*. *bioRxiv*.

2023 Bertelsen, Mancini, Sastre-Yagüe, Vitale, **Lorenz**, Blanco Malerba, Bolis, Mandelli, Martínez-Cañada, Gozzi, Panzeri, Lombardo. *Electrophysiologically-defined excitation-inhibition autism neurosubtypes*. *medRxiv*.

2023 **Lorenz**, Martínez-Cañada, Panzeri. *A Model of the Contribution of Interneuron Diversity to Recurrent Network Oscillation Generation and Information Coding*. In *International Conference on Brain Informatics*, pp. 33–44. Springer.

Talks and Poster Presentations

2024 **FENS Forum** (Vienna, Austria) – Poster presentation: *Spiking neural networks of developmental frequency acceleration in the mouse prefrontal cortex*.

2023 **Brain Informatics Conference** (New York, USA) – Talk: *A model of interneuron diversity in network oscillations*.

2023 **DGKN Conference** (Hamburg, Germany) – Poster presentation: *Spiking network models of developing mouse prefrontal cortex*.

Courses and Workshops

2023 Anatomy and function of the prefrontal cortex across species – EBRAINS (France)

2022 Fundamentals of Accelerated Computing with CUDA C/C++ – NVIDIA DLI (Online)

2022 Fundamentals of Accelerated Computing with CUDA Python – NVIDIA DLI (Online)

2020 Latin American School on Computational Neuroscience (Brazil)

2019 Princeton Neuroscience Summer School (USA)

Technical Skills

Programming	Python (fluent), MATLAB (fluent), R, C, Bash
Modeling	scikit-learn, TensorFlow, NEST, NetPyNE, NEURON, TVB
Tools	CUDA, Docker, Conda, Make, Git
Documentation	LaTeX, Markdown, Seaborn, Matplotlib, Gnuplot

Scholarships

2020–2024 Full-time scholarship – University of Bologna

2019 Princeton Neuroscience Summer School scholarship – Burroughs Wellcome Fund and NIH

2016–2019 Full-time scholarships – Argentinian National Commission of Atomic Energy (CNEA)

Languages and interests

Languages	Spanish (Native), English (Advanced), Italian (Intermediate), German (Intermediate)
Interests	Reading, rock climbing, hiking, playing piano, writing, learning languages, chess, Go, museums, photography