

MATTEO SAPONATI

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🐙 [@matteosaponati](#)



My goal is to understand the principles of learning in brains and machines, develop innovative learning algorithms for Neuromorphic devices, and contribute to the evolution and interpretability of Deep Learning. I conduct my research using analytical and numerical tools, within a multidisciplinary approach getting inspiration from Physics, Theoretical Neuroscience, and Statistical Learning Theory.

Work experience

- Oct 2023 - present **Postdoctoral Researcher**
Institute of Neuroinformatics, ETH/UZH, Zurich (CH)
- Design novel learning algorithms for Neuromorphic computing.
 - Lead scientific projects on mechanistic interpretability of Deep Neural Networks (DNNs), Transformer models, and Recurrent Neural Networks (RNNs).
 - Supervise master students from the University of Zürich (UZH) and ETH Zürich.
- Sep 2019 - Sep 2023 **Ph.D. Candidate**
Ernst Strüngmann Institute for Neuroscience, Max-Planck Institute for Brain Research, Frankfurt Am Main (DE)
- Design and implement learning algorithms for Spiking Neural Networks (SNNs), with applications in Machine Learning and Computational Neuroscience.
 - Publish scientific articles and present at international conferences.
 - Employ state-of-the-art ML frameworks (PyTorch, Tensorflow).
- Mar 2019 - Aug 2019 **Assistant Research Scientist**
Institute des Neurosciences des Systemes Aix-Marseille University, Marseille (FR)
- Jul 2018 - Aug 2018 **Research Intern**
Barcelona Biomedical Research Park, Barcelona (ESP)

Education

- May 2020 - Nov 2023 **Ph.D. in Neurophysics**
Highest Honors (top 5%) - Donders Centre for Neuroscience, Radboud University (NL)
- Sep 2016 - Oct 2018 **M.Sc. in Physics**
110/110 - Department of Physics, University of Pisa (IT)
- Sep 2011 - Jun 2016 **B.Sc. in Physics**
94/110 - Department of Physics, University of Pisa (IT)

Research

Grants and Awards

Jan 2024 - Jan 2026	ETH Fellowship - 235200 CHF ETH Zurich Postdoctoral Fellowship programme (Zürich, CH)
Mar 2023	Cosyne Presenters Travel Grant - 1000 USD Cosyne Conference 2023 (Montreal, CA)
Sep 2019 - Sep 2023	PhD Research Fellowship - 35000 EUR (estimate) International Max Planck Research School (IMPRS) for Neural Circuits, MPI for Brain Research, Frankfurt am Main (DE)
Jul 2018 - Aug 2018	Erasmus+ Grant - 700 EUR Erasmus program (EU)

Conference presentations and proceedings

2023	Cosyne Conference (Montreal, CA) Poster: "A predictive plasticity rule entails the anticipation of multiple spike sequences"
2022	SfN, Society for Neuroscience Meeting (San Diego, USA) Poster: "A predictive plasticity rule explains the anticipation of spike patterns at the single neuron level and the emergence of spike-timing-dependent plasticity mechanisms"
2022	Bernstein Conference (Berlin, DE) Poster: "V1 classical receptive field response is shaped by the spatio-temporal properties of the input"
2021	Neuromatch Conference (online) Poster: "Sequence anticipation and STDP emerge from a predictive learning rule"

Skills

Language Skills	Italian (Mother tongue), English (Fluent), Portuguese (Intermediate)
Coding Skills	Python, PyTorch, Matlab, C++, LaTeX, Adobe Illustrator, Music production DAWs
Research Skills	Mathematical Modelling, Data Analysis, Critical Thinking, Teamwork, Public Speaking, Problem Solving