

## Education

- Oct. 2022 - **PhD at ENS-PSL**, *Learning dynamics in biologically plausible neural networks: theory and Now data-driven modeling. Under the supervision of Alex Cayco Gajic and Jonathan Kadmon. Recipient of a selective scholarship (CDSN).*
- 2021-2022 **M2 MVA (Mathematics, Vision and Learning)**, Université Paris-Saclay.  
o *Classes:* Algorithms for speech and natural language processing; Computational statistics; Convex optimization and applications in machine learning; Information and Complexity; Modeling in neuroscience; Theoretical neuroscience; Topological data analysis for imaging and machine learning; Responsible machine learning.
- 2020-2021 **M2 ICFP : Theoretical physics track and École normale supérieure diploma (DENS).**  
o *Classes:* Machine Learning; Advanced topics in Markov-chain Monte Carlo; Advanced Statistical Physics and New Applications; Numerical Physics and Machine Learning; Complex systems : from physics to social sciences; Information, inference, networks : from statistical physics to big biological data; Biophysics; Quantum Field Theory; General Relativity.
- 2018-2019 **M1 ICFP and DENS**, École normale supérieure de Paris.
- 2017-2018 **Bachelor in physics and DENS**, École normale supérieure de Paris, admitted through competitive examination (rank 25/1137).
- 2014 - 2017 **Preparatory classes for the Grandes Ecoles, Physics and chemistry track**, Lycée Aux Lazaristes, Lyon.

## Research experience

- May - Sept. 2022 **Hebrew University of Jerusalem**, *Analyzing neural dynamics in the cortico-cerebellar pathway of non-human primate brain during learning. Supervision by Jonathan Kadmon and Yifat Prut.*  
o Data analysis on electrophysiological neural recordings.  
o implementation of dimensionality reduction techniques (Targeted dimensionality reduction) for analysis of neural trajectories through adaptation in the motor cortex.
- April 2021 - **ENS-PSL**, *Inference of learning rules in biologically plausible recurrent neural networks.*  
July 2021 *Supervised by Rémi Monasson.*  
o Data analysis on calcic recordings of zebra fish brain activity.  
o Modeling this brain activity and its learning process based on a RNN model.
- Dec. 2019 - **LaDHyX, École Polytechnique - Capital Fund Management**, *Studying and modeling emergence phenomena in price heterogeneities. Supervised by Michael Benzaquen and Alan Kirman.*  
o Data extraction and analysis  
o Comparison between usual statistical physics model to fit the data and conception of an agent based model having phases associated to the different behaviours observed.
- Aug. - Nov. 2019 **Canada France Hawaii Telescope**, *Development of a convolutional neural network for detecting parasite sources in the data harvested by the SITELLE spectrometer. Supervision by Simon Prunet and Laurie Rousseau-Nepton.*  
o Making of a training set through defect generation on clean images.  
o Conception and training of a deep neural network able to detect and label the different types of defects.
- Febr.-July 2019 **University of California San Diego**, *Synthesis of self-propelled swimmers and studying of emergence phenomena in their collective behaviour. Supervision by Jérémie Palacci.*  
o Participation in developing an experimental setup together with exploring unknown phenomena.  
o Developement of a synthesis protocol for self-propelled diffusio-phoretic swimmers able to resist high constraints.
- 2018-2019 **Lycée Michelet and Lycée Saint-Louis**, Oral examiner (prépa PCSI and MP\*).

- June 2018 **Institut Lumière Matière**, *Electro-cinetic flows in wetting films. Supervision by Anne-Laure Biance.*  
o Making of an experimental setup enabling the measure of electro-cinetic flows in a wetting film.

## Publications

- Sept. 2025 **Curl Descent: Non-Gradient Learning Dynamics with Sign-Diverse Plasticity**, *Hugo Ninou, Jonathan Kadmon, N. Alex Cayco-Gajic, Neurips 2025 Spotlight.*
- March 2025 **Cerebellar output shapes cortical preparatory activity during motor adaptation**, *Sharon Israely\*, Hugo Ninou\*, Ori Rajchert, Lee Elmaleh, Ran Harel, Firas Mawase, Jonathan Kadmon, Yifat Prut, \*These authors contributed equally, Nature Communications.*

## Conferences and presentations

- Oct. 2025 **Bernstein 2025**, Poster 'Curl Descent: Non-Gradient Learning Dynamics with Sign-Diverse Plasticity'.
- July 2025 **OCNS 2025**, Poster 'Curl Descent: Non-Gradient Learning Dynamics with Sign-Diverse Plasticity'.
- Apr. 2025 **ShineLab, University of Sydney**, Talk on 'Cerebellar output shapes cortical preparatory activity during motor adaptation'.
- Jan. 2025 **Najafi Lab SYBECO journal club, Georgia Tech**, Talk on 'Cerebellar output shapes cortical preparatory activity during motor adaptation'.
- March 2024 **COSYNE 2024**, Poster 'Cerebellar output shapes cortical preparatory activity during motor adaptation'.

## Awards

**NeurIPS 2025 Scholar Award.**

## Other

- Feb. 2025 **Artificial Intelligence Action Summit, Paris**, Took part in the PSL student assembly as a participant.