



Aldo Battista, Ph.D.
Italian and British Citizen

Date of Birth: June 7, 1993

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Personal Website

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Interests

- Computational Neuroscience
- Machine Learning
- Statistical Physics
- Complex Systems

Skills

Programming:

Python

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C, C++

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MATLAB

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Mathematica

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R

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Julia

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Tools:

Latex, Office

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Scikit-learn

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Pytorch

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TensorFlow/Keras

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Languages

- Italian ●●●●●
- English ●●●●●
- French ●●●●●

Education and Research

Postdoctoral Research Experiences

2022 – 2025

Swartz fellow in Theoretical Neuroscience

New York University

Project 1:

Towards a multi-regional model of prefrontal cortex

Skills 1:

Multi-task learning

Project 2:

Lifelong learning without forgetting

Skills 2:

Continual learning

Project 3:

Categorization in the large-scale cortex

Skills 3:

Training multi-regional models and development of hybrid convolutional and recurrent architecture

2020 – 2022

Postdoc in Computational Neuroscience

New York University

Project 1:

Fundamental understanding of the neural mechanisms of value-based decision-making

Skills 1:

Deep reinforcement learning and training biologically constrained recurrent neural networks

Supervisor:

Prof. Xiao-Jing Wang

Project 2:

Mechanistic understanding of distributed perceptual decision processes in a large-scale model of macaque cortex

Skills 2:

Multi-regional large-scale model simulations

Supervisor:

Prof. Xiao-Jing Wang

Project 3:

Neural representational geometries reflect behavioral differences in monkeys and recurrent neural networks

Skills 3:

Analysis of representational geometry in trained recurrent neural networks

Supervisor:

Prof. Stefano Fusi

Postgraduate Studies

2017 – 2020

Ph.D. in Theoretical (Statistical) Physics

École Normale Supérieure

Project:

Low-dimensional continuous attractors in high-dimensional data: from statistical physics to computational neuroscience

Skills:

Supervised learning, multiple continuous attractors neural networks, autoencoders, support vector machines, Hopfield networks, replica theory, and random matrix theory

Supervisor:

Prof. Rémi Monasson

Grade:

Avec félicitations du jury

2015 – 2017

M.Sc. in Theoretical (Statistical) Physics

Sapienza University of Rome

Thesis:

Machine learning and phase transitions in the Ising model

Skills:

Deep learning with feed-forward and convolutional neural networks

Supervisor:

Prof. Federico Ricci-Tersenghi

Grade:

110/110 with honors

Undergraduate Studies

2012 – 2015

B.Sc. in Physics

Sapienza University of Rome

Thesis:

Dynamics of the bidimensional Ising model

Skills:

Monte Carlo method and simulated annealing

Supervisor:

Prof. Giorgio Parisi

Grade:

110/110 with honors

2008 – 2012

High School Scientific Diploma

Liceo Scientifico Leonardo da Vinci

P.N.I. program:

Focused on mathematics, physics and informatics

Grade:

96/100

Awards

2022 – 2025	Swartz Fellowship in Theoretical Neuroscience	Swartz Foundation
	Research Fellowship to work on NeuroAI	
2024	Spotlight Paper at NeurIPS 2024	NeurIPS
	Recurrent neural network dynamical systems for biological vision	
2020	Physical Review Letters Cover	Download
	Journal Cover	
2017 – 2020	HFSP Ph.D. Fellowship	École Normale Supérieure
	Analog Computation Underlying Language Mechanisms	
2012 – 2015	Excellence Program Fellowship	Sapienza University of Rome
	Additional courses during B.Cs. in computer science and optimization	

Publications

2025	Under review in Neuron
	Title: A neural circuit framework for economic choice: from building blocks of valuation to compositionality in multitasking
	Authors: <u>Aldo Battista</u> , Camillo Padoa-Schioppa, Xiao-Jing Wang
2024	Under review in Nature
	Title: Bifurcation in space: emergence of function modularity in the neocortex
	Authors: Xiao-Jing Wang, Junjie Jiang, Roxana Zeraati, Ulises Pereira-Obilinovic, <u>Aldo Battista</u> , Julien Vezoli, Henry Kennedy
2024	NeurIPS 2024 (spotlight)
	Title: Recurrent neural network dynamical systems for biological vision
	Authors: Wayne Soo, <u>Aldo Battista</u> , Puria Radmard, Xiao-Jing Wang
2024	Journal article
	Title: Neural representational geometries reflect behavioral differences in monkeys and recurrent neural networks
	Authors: Valeria Fascianelli, <u>Aldo Battista</u> , Fabio Stefanini, Satoshi Tsujimoto, Aldo Genovesio, Stefano Fusi
	Journal: Nature Communications
2020	Journal article
	Title: Capacity-Resolution Trade-Off in the Optimal Learning of Multiple Low-Dimensional Manifolds by Attractor Neural Networks
	Authors: <u>Aldo Battista</u> and Rémi Monasson
	Journal: Physical Review Letters
2020	Journal article
	Title: Spectrum of Multi-Space Euclidean Random Matrices
	Authors: Aldo Battista and Rémi Monasson
	Journal: Physical Review E

Working Experience

2025 –	Incoming Research Scientist Machine Learning (Ph.D.)	Meta
	Modern Recommender Systems AI Team	
2020 –	Scientific Reviewer	Academic Journals
	Nature Neuroscience, PNAS, Cerebral Cortex, Cognition, PeerJ, etc.	
2023 & 2024	Grant applications	Wang Lab
	Contributed with preliminary results and writing of U19, RO1, and CRCNS grants for the Wang Lab	
2024	Workshop organizer	Cosyne
	Organizer of the workshop “Brain-wide modeling in the era of large-scale recordings and high resolution multi-omics”	
2022 & 2023	Swartz seminars organizer	New York University
	Organizer of the Swartz seminars in Computational Neuroscience at the Center for Neural Science (NYU)	
2022 & 2023	Lecturer	New York University
	Lecturer of “Computational Neuroscience of Cognition” at the Center for Neural Science (NYU)	
2022	Teaching assistant	New York University
	Teaching assistant of “Computational Neuroscience of Cognition” at the Center for Neural Science (NYU)	
2022 & 2023	Research Facilitator	Marine Biological Laboratory
	Teaching assistant at the summer school “Methods in Computational Neuroscience” held in Woods Hole, MA	
2021	Research Facilitator	Marine Biological Laboratory
	IT manager and teaching assistant at the summer school “Methods in Computational Neuroscience” held in Woods Hole, MA	
2021	Lab meeting organizer	New York University
	Organizer of weekly Wang lab meetings at the Center for Neural Science (NYU)	
2012 – 2017	Teacher	
	Private teacher in physics, mathematics, informatics, and chemistry for high school and university students	
2013 – 2014	Librarian	Sapienza University of Rome
	Working at the library of the physics department	

Conferences

2024	Conference	NeurIPS
	NeurIPS 2024	
2024	Conference	Society for Neuroscience
	Neuroscience 2024	
2024	Conference	Cosyne
	Computational and Systems Neuroscience	
2023	Conference	Society for Neuroscience
	Neuroscience 2023	
2022	Conference	Society for Neuroscience
	Neuroscience 2022	
2022	Workshop	Okinawa University (Virtual)
	International Symposium on AI and Brain Science 2022	
2021	Conference	Cosyne (Virtual)
	Computational and Systems Neuroscience	
2020	Workshop	Bernstein (Virtual)
	Bernstein Conference	
2019	Workshop	Sorbonne Université
	Replay in Paris	
2019	Workshop	ICTP
	Workshop on Science of Data Science	
2018	School	CNRS
	Statistical physics and machine learning back together	
2018	School	SISSA
	TEX2018 M-GATE School: Under the Surface of Memory Phenomena	