Aldo Battista, Ph.D.

Italian and British Citizen

ℹ **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	● ● ● ● ●
C, C++	● ● ● ● ●
MATLAB	● ● ● ● ●
Mathematica	● ● ● ● ●
R	● ● ● ● ○
Julia	● ● ● ● ○

Tools:

Latex, Office	● ● ● ● ●
Scikit-learn	● ● ● ● ●
Pytorch	● ● ● ● ●
TensorFlow/Keras	● ● ● ● ●

Languages

🇮🇹 Italian	● ● ● ● ●
🇬🇧 English	● ● ● ● ●
🇫🇷 French	● ● ● ● ○

Education and Research

Industry Research Experiences

2025 –   **Research Scientist Machine Learning**   **Meta**
Meta Recommender Systems AI Team

Academic 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

Publications

2025   **Journal article**
Title: A neural circuit framework for economic choice: from building blocks of valuation to compositionality in multitasking
Authors: Aldo Battista, Camillo Padoa-Schioppa, Xiao-Jing Wang
Journal: Neuron

2024   **Preprint**
Title: Bifurcation in space: emergence of function modularity in the neocortex
Authors: Xiao-Jing Wang, Junjie Jiang, Roxana Zeraati, Aldo Battista, Julien Vezoli, Henry Kennedy, Ulises Pereira-Obilinovic
Journal: Under review in Cell

2024   **Conference article**
Title: Recurrent neural network dynamical systems for biological vision
Authors: Wayne Soo, Aldo Battista, Puria Radmard, Xiao-Jing Wang
Journal: NeurIPS 2024 (spotlight)

2024   **Journal article**
Title: Neural representational geometries reflect behavioral differences in monkeys and recurrent neural networks
Authors: Valeria Fascianelli, Aldo Battista, 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: Aldo Battista 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 –	**Research Scientist Machine Learning**	**Meta**
	Meta 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	