Aldo Battista, Ph.D.

Italian and British Citizen

Date of Birth: June 7, 1993

4 Washington Pl, New York, NY 10003, USA

+1 (646)-906-6580

aldo.battista@nyu.edu

LinkedIn: A. Battista

ORCID:0000-0003-1018-0247

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

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: Aldo Battista, Camillo Padoa-Schioppa, Xiao-Jing Wang

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

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

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 – **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