

Dario Liotta

Master Student in Physics of Data

Education

- 2023 - Present **Master's Degree in Physics of Data**, *Università degli Studi di Padova*, Padova
Currently pursuing a Master's degree that combines advanced physics knowledge with high-level training in data science, applied mathematics, and computational sciences, with elective courses focusing on complex systems and artificial intelligence, as well as efficient computational frameworks such as GPU computing and distributed data processing.
- 2018 - 2023 **Bachelor's Degree in Physics**, *Università degli Studi di Catania*, Catania
The program provided a solid foundation in classical and quantum mechanics, electromagnetism, astrophysics, nuclear and condensed matter physics, complemented by elective courses in numerical methods and complex systems. Developed foundational skills in mathematical modeling, laboratory techniques, and scientific communication.
- 2013 - 2018 **Scientific High School Diploma**, *Liceo Scientifico "Archimede"*, Acireale
Focused on mathematics, physics, and natural sciences.

Research Projects

Newton's Fractals: Complex and Chaotic Dynamics, *Bachelor's Thesis*

Thesis focused on the study of fractal and chaotic structures emerging from deterministic dynamical systems, with applications ranging from numerical analysis of Newton fractals to physical models such as the Chaotic Magnetic Pendulum and the Hamiltonian Mean Field.

Earthquake Data Analysis, *Laboratory of Computational Physics*

Processed and analyzed a century of earthquake data to identify recurring patterns and structural correlations. The project utilized statistical and computational techniques to model the seismic activity and create visualizations for a deeper understanding of earthquake behavior.

<https://github.com/darioliotta/Project-LCP-mod-A>

Transformer Model Geometrical Analysis, *Laboratory of Computational Physics*

Conducted an in-depth investigation into the Transformer model architecture, with a specific focus on the geometrical properties of the Chat GPT-2 small variant. The project aimed to understand how geometric representations within the model contribute to its performance in natural language processing tasks.

<https://github.com/darioliotta/Project-LCP-mod-B>

Muon Batch Analysis, *Management and Analysis of Physics Dataset*

Processed and analyzed experimental data from a particle physics experiment to reconstruct the trajectories of muons originating from cosmic rays. The project involved using advanced data processing techniques with Apache Spark on a distributed computing cluster to handle large datasets and extract meaningful patterns in the muon trajectories.

<https://github.com/darioliotta/MAPD-B-Muon-Batch-Analysis>

Earthquake Data Analysis, *Advanced Statistics for Physics Analysis*

Expanded on previous research by applying advanced statistical methods, including dendrogram analysis and further clustering in R, to refine the understanding of earthquake data.

https://github.com/darioliotta/Earthquake_Data_Analysis_in_R

ResNet Variants for Vehicle Image Classification, *Neural Networks and Deep Learning*

Developed convolutional and residual architectures for car image classification and verification using the CompCars dataset. Compared models trained from scratch with pre-trained ResNet variants, showing the effectiveness of transfer learning in improving accuracy and reducing training time.

https://github.com/darioliotta/NN_project/tree/Dario

Simulation and Analysis of 1D Wave Propagation, *Quantum Information and Computing*

Developed and executed simulations of 1D classical and quantum wave propagation using the Finite Element Method implemented via the FEniCS library, focusing on stability criteria and energy analysis in varied media.

<https://github.com/darioliotta/Quantum-Information-Project>

Technical skills

Programming C, R, Python, MATLAB, SQL
HPC Apache Spark, CUDA
Environments Linux, Git, Docker, Jupyter
Reporting \LaTeX , Microsoft Office

Languages

Italian Native
English B2

Details

2017 Driving licence
2019 - Present Private tutoring