MATTEO **ROBBIATI**
Doctoral student in Physics

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Geneve, CERN

Research interests

- **Machine Learning** models and their physical application: supervised and unsupervised ML, with a strong focus on **images** recognition and data generation through Generative Adversarial Networks (GANs);
- **Quantum computation**: gates computation, adiabatic computation, Quantum Machine Learning (QML) and QML HEP applications, hardware-compatible optimization techniques, error mitigation methods;
- **Computational Physics**: numerical simulation, Monte Carlo Integration (MCI).
- **Cosmology** and **astrophysics**;

Education

2022 - current	**Ph.D. candidate at CERN**, enrolled with University of Milan.
2019 - 2022	**Master degree in Physics**, University of Milan, Milan, Italy.
2015 - 2019	**Bachelor degree in Physics**, University of Milan, Milan, Italy.

Experience

Jun. 2022 – Sep. 2016 — **Math and Physics lessons, Private lessons,**

- Private lessons in math and physics to high school students.

simplification of concepts | exposition | self-check

Dec. 2021 – Mar. 2021 — **Research and data analysis, Cooperative "La Valle di Ezechiele",**

- Studying the impact of social cooperatives in getting prisoners back to work and lowering recidivism rates.
- Study of "*Social Impact Bonds*" as a financial instrument to support social welfare.
- Production of an explanatory report on the current conditions of the Italian prison system.

Data analysis | networking | social impact

Skills

GitHub	https://github.com/MatteoRobbiati.
Programming	C/C++, Python, HTML, CSS, Nextjs, BASH, LaTeX.
Frameworks	TensorFlow, Keras, Root, Qibo, PennyLane, MPI.
Data frame	Pandas.
OS	Linux, Windows.
Languages	Fluent in english and italian.

Partecipation in research grants

2021 – 2022 — **Collaborator**, *Automatic Monte Carlo on GPU*, Linea 2A, University of Milan.

Partecipation in conferences and workshops

Nov. 2022	**QT4HEP**, CERN
Mar. 2023	**Openlab Technical Workshop**, CERN
Jun. 2023	**Quantum Technologies (Computing, Sensing and Simulation)**, INFN, Turin

Talks

Jen. 2023 **Introduction to quantum computation with `qibo`**, QTI-TH Forum, CERN, *Geneve*
Jen. 2023 **Introduction to quantum machine learning using `qibo`**, QTI-TH Forum, CERN, *Geneve*
Feb. 2023 **Introduction to quantum computation with `qibo`**, Nikhef, *Amsterdam*
Mar. 2023 **Density estimation via quantum adiabatic computing**, QTI-TH Forum, CERN, *Geneve*
May 2023 **Quantum simulation, control and calibration with `qibo`**, QTI lectures, CERN, *Geneve*
May 2023 **Full-stack quantum machine learning using `qibo`**, Technology Innovation Institute, *Abu Dhabi*

Contributions in Schools, Conferences and Workshops

May. 2023 `POSTER`, **Determining probability density functions with adiabatic quantum computing**, EQAI2023, *Udine*
Jen. 2023 `POSTER`, **qibo: a full-stack framework for simulation, control and calibration of self-hosted qubit devices**, Workshop INFN CSN4&5, *Torino*

Publications

Preprints

2023 Matteo Robbiati, Juan Manuel Cruz-Martinez and Stefano Carrazza: *Determining probability density functions with adiabatic quantum computing*, arXiv:2303.11346

Proceedings of Science

2022 Matteo Robbiati, Stavros Efthymiou, Andrea Pasquale and Stefano Carrazza: *A Quantum Analytical Adam Descent through Parameter Shift Rule using Qibo*, in 41st International Conference on High Energy Physics, (2022). arXiv:2210.10787

Outreach and Volunteering

2022 **Scout educator, AGESCI,**
2016 › ability to interact constructively with the group, problem solving.
team-work | adaptation | interplay | relationship | challenge

2022 **Volunteer, Apwoyo ONLUS,**
2019 › menagement of stressful situations, emphaty.
team-work | empathy

Last update
June 4, 2023