Matteo Barbetti

Data Scientist

May 6, 1994

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matteo-barbetti

mbarbetti

Summary

8+ years of Python development, applied to scientific computing and industrial solutions.

5+ years of hands-on ML experience, designing and deploying predictive models.

Former academic researcher in Particle Physics, with strong foundations in data analysis and simulation.

AI consultant, building data-driven solutions for real-world industrial problems.

Strong interest in emerging technologies, particularly AI, GenAI, and Quantum Computing.

Strengths

Analytical problem solver. Structured, data-driven approach to complex challenges.

Autonomous, execution-driven. Owns tasks end-to-end and delivers effective solutions.

Collaborative, client-focused. Strong teamwork and clear communication aligned with client needs.

Experience

Data Scientist

Accenture

2024 – Present Modena (IT)

AI consulting role in the Utilities, Resources & Chemicals sector, developing data-driven solutions to optimize industrial systems and decision-making processes:

- Led the design and industrialization of **data-driven optimizers for oil and gas applications**, integrating AI-based surrogate models to calibrate and optimize production systems using field data
- Led multidisciplinary teams of Data Scientists and Software Engineers to develop and deploy **AI solutions within custom web applications** for industrial clients
- Explored the **scalability of industrial optimization problems** on HPC infrastructures and emerging Quantum Computing paradigms
- Delivered **technical training on Anomaly Detection** to client Data Science teams in the materials industry
- Contributed to the design of **AI and GenAI proposals** for client tenders

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Technological Researcher

INFN-CNAF

2023 – 2024 Bologna (IT)

Research position within the ICSC project, contributing to the operation of large-scale cloud and data center services:

- Extended the LHCb fast simulation framework to run on **federated and heterogeneous computing infrastructures**
- Served as the data center technical contact for LHCb, monitoring the use of **large-scale storage and computing resources** for simulation workflows
- Designed and implemented a **GenAI-powered chatbot** to enhance user support services at the data center

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Doctoral Student

University of Firenze

2020 – 2024 Firenze (IT)

Ph.D. at the intersection of Particle Physics and Computer Science, applying AI and scalable computing to scientific simulation:

- Designed a cloud-based microservice orchestrating **large-scale optimization workflows** across on-premise, cloud, and HPC resources
- Developed and optimized **GAN-based models for fast simulation** of the LHCb detector response using heterogeneous infrastructures
- Integrated the optimized models into a pure Python simulation framework, achieving up to $\times 1000$ speed-up and **accelerating Physics analyses**

Research Intern

CERN

2019 Geneva (CH)

Selected for a three-month research internship at CERN to explore the use of **Deep Generative Models** (in particular GANs) for **fast simulation** within the LHCb experiment, marking my first hands-on experience with AI-driven approaches in large-scale scientific computing

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Technical Skills

Data Science Toolkit

- Data handling: `numpy`, `pandas`, `geopandas`
- Data visualization: `matplotlib`, `seaborn`
- Classical ML models: `scikit-learn`, `xgboost`
- Neural networks: `pytorch`, `tensorflow`, `keras`
- Model optimization: `optuna`, `gurobipy`, `ortools`

Scalable Computing

- Cloud Computing: Azure & AWS (compute, storage, ML services)
- High-Performance Computing: SLURM-based batch systems
- GPU-powered acceleration: CUDA-enabled workflows

MLOps & Deployment

- Containerization: Docker, Singularity / Apptainer
- Orchestration: Kubernetes
- CI/CD pipelines: GitHub Actions, GitLab CI

Memberships

Italian National Research Center for HPC, Big Data and Quantum Computing (ICSC)
2023 – 2024 Research

LHCb Collaboration at CERN
2017 – 2024 Research

Italian National Institute for Nuclear Physics (INFN)
2017 – 2024 Research

Italian Association of Physics Students (AISF)
2017 – 2021 Community

Languages

Italian ●●●●●

English ●●●○○

Education

Ph.D. in Smart Computing

University of Firenze
2020 – 2024 Firenze (IT) **Score:** Ph.D. entitled *cum laude*

Thesis: Development of a scalable fast simulation framework for the LHCb experiment at CERN, based on Deep Generative Models and large-scale training on HPC and Cloud systems

M.Sc. in Particle Physics

University of Firenze
2017 – 2020 Firenze (IT) **Score:** 110/110 *cum laude*

Thesis: Design of a Python-based simulation framework using AI surrogate models for fast detector simulation in the LHCb experiment at CERN

B.Sc. in Physics and Astrophysics

University of Firenze
2013 – 2017 Firenze (IT) **Score:** 110/110

Thesis: Data analysis and validation of simulated Particle Physics datasets from the LHCb experiment at CERN

Licenses & Certifications

Quantum Machine Learning
Issued by: IBM Badge 2026

Basics of Quantum Information
Issued by: IBM Badge 2025

Outreach & Dissemination

Plenary speaker
2024 Fondazione Uniser Pistoia
Invited plenary talk on Artificial Intelligence applications in Physics, delivered within a science outreach seminar series organized by Uniser Pistoia (Tuscany, Italy)

Plenary speaker
2023 Festival della Scienza Alto Vicentino
Invited plenary talk on Artificial Intelligence at a city-wide science outreach festival held in Schio (Veneto, Italy)

Book author
2021 Sassi Junior
Contributor, on behalf of INFN, to a children's science book featuring a section dedicated to Artificial Intelligence

January 16, 2026 Matteo Barbetti