



# Matteo Barbetti

Ph.D. Student in  
Smart Computing

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## About Me

Ph.D. Student in Smart Computing at the University of Florence, I deal with Artificial Intelligence and its applications to Particle and Medical Physics. Passionate about innovation and scientific dissemination, I never refuse going out to discuss new ideas.

## Memberships

-  Istituto Nazionale di  
Fisica Nucleare
-  LHCb Collaboration
-  Associazione Italiana  
Studenti di Fisica

## Social Network

-  matteo-barbetti
-  @mbarbetti
-  mbarbetti

## Education

### Study

- 2020 – now **Ph.D. in Smart Computing** University of Florence  
Exploration and development of Artificial Intelligence strategies applied to Medical Physics, Nuclear Physics and Particle Physics.
- 2017 – 2020 **M.Sc. in Particle Physics** University of Florence  
Curriculum of studies oriented to Data Analysis with a strong focus on Artificial Intelligence techniques.  
Score: 110/110 cum laude  
**Master thesis**  
Development of a Python framework for Particle Physics simulation based on Deep Learning models.  
Title: “Techniques for parametric simulation with deep neural networks and implementation for the LHCb experiment at CERN and its future upgrades”.
- 2013 – 2017 **B.Sc. in Physics and Astrophysics** University of Florence  
Basic training in Physics where I discovered a natural inclination towards Experimental Physics and Data Analysis.  
Score: 110/110  
**Bachelor thesis**  
Data Analysis work in Particle Physics in collaboration with the LHCb experiment at CERN.  
Title: “Study of the charmonium resonances in  $B^+ \rightarrow p\bar{p}K^+$  and  $\bar{B}^+ \rightarrow p\bar{p}\gamma K^+$  decays with the LHCb experiment at CERN”.

### Other courses

- 2018 – 2019 **Impresa Campus Unifi** University of Florence  
Development of innovative ideas and business culture in university context with Team Building path and personal expert support.
- 2018 **Palestra di Intraprendenza** University of Florence  
Evaluation of personal motivation and entrepreneurial propensity thanks to Design Thinking and LEGO Serious Play® methods.

## Experience

### Research

- 2020 – now **Graduate Researcher** University of Florence, Firenze (IT)  
Research focused on development and deployment of Machine Learning models for the Ultra-Fast Simulation of the LHCb experiment.
- 2020 **Student Researcher** INFN-Florence, Firenze (IT)  
Traineeship focused on application of Artificial Intelligence techniques to High Energy Physics.
- 2019 **Research Intern** CERN, Geneva (CH)  
Research focused on development of Deep Learning models to parameterize the LHCb particle identification system.

### Teaching

- 2020 – 2021 **Teaching Assistant** University of Florence, Firenze (IT)  
Responsible for introductory lessons to Python for third year students of the B.Sc. in Physics of the University of Florence.
- 2018 – now **Laboratory Tutor** University of Florence, Firenze (IT)  
Support to Physics Laboratory activities for the B.Sc. in Biological Sciences, Mathematics and Physics of the University of Florence.

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## Soft Skills

- Complex problem-solving
- Analytical thinking and innovation
- Critical thinking and analysis
- Attention to detail, trustworthiness
- Leadership and social influence

## Technical Skills

### Operating systems

- Windows
- Mac OS
- Linux

### Programming languages

- Python
- C/C++
- HTML

### Machine Learning frameworks

- TensorFlow
- Scikit-Learn
- Optuna

### Other suites

- Visual Studio Code
- Google Workspace
- Microsoft Office
- LaTeX
- Git

## Languages

- Italian
- English
- Spanish

## Italian Association of Physics Student

- 2019 – 2021 **Secretary**  
Member of the Executive Committee that manages and coordinates events and activities together with the national Local Committees.
- 2018 – 2019 **President of the Florence Local Committee**  
Organization of outreach events and representative role for about 40 members from the University of Florence.
- 2018 – 2021 **Member of the Editorial Board of *Sistemi di Riferimento***  
Scientific dissemination with articles and live interviews to promote the research activity of Italian Physics Departments.

## Conferences, Workshops and Schools

- 2022 **Learning to Discover** Orsay, France  
Talk: “Simulating the LHCb experiment with Generative Models”
- 2021 **LPCC Fast Detector Simulation Workshop** online  
Talk: “OptunAPI”
- 2021 **107° Congresso Nazionale della SIF** online  
Talk: “Simulating the LHCb detector with GANs”
- 2021 **8th Thematic CERN School of Computing** online  
Theme: Scientific software for heterogeneous architectures
- 2021 **Workshop della Commissione Calcolo e Reti dell’INFN** online  
Talk: “Simulating the LHCb detector with GANs”
- 2021 **1st CloudBank EU Workshop** online  
Talk: “LHCb deployment in AWS”

## Outreach and Dissemination

- 2021 **Book author** Sassi Junior  
On behalf of the INFN, I have prepared a paragraph dedicated to Artificial Intelligence for “Inventions”, a science book for kids.
- 2018 **Jury member** Premio Galileo  
“Premio Galileo” is a literary prize for science communication.
- 2017 – 2018 **Blog author** Fisici Senza Palestra  
Dissemination of science on “Fisici Senza Palestra” blog.

## Awards

- 2021 **“Giulia Vita Finzi” award** INFN  
National award for the best Master Thesis on computing of INFN.
- 2020 – 2023 **Ph.D. Scholarship in Smart Computing** INFN  
Scholarship to carry out Artificial Intelligence techniques for High Energy Physics applications.
- 2019 **Scholarship for research activity** INFN  
National grant to pass three months at CERN for research activity.
- 2017 **Scholarship for thesis abroad** University of Florence  
Local grant to pass ten days at CERN for bachelor thesis.