



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
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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

- 2021 – 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 – now **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

- 2021 **LPCC Fast Detector Simulation Workshop** online
Presentation: “OptunAPI”.
- 2021 **107° Congresso Nazionale della SIF** online
Presentation: “Simulating the LHCb detector with GANs”.
- 2021 **8th Thematic CERN School of Computing** online
Theme: Scientific software for heterogeneous architectures.
- 2021 **1st CloudBank EU Workshop** online
Presentation: “LHCb deployment in AWS”.
- 2020 **2nd Summer School in Physical Sensing and Processing** online
Theme: Sensing devices, DAQ systems and data processing.

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

- 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.