# Ph.D. Simon Luca Villani

simon.luca.villani@gmail.com
via A. Binda 56, 20143, MI
+39 346 515 9009

## Working experiences

### Ph.D. Researcher in Theoretical Particle Physics

April 2019 - September 2022 / University of Göttingen (DE)

- **Improved the theoretical modelling** of subatomic processes that include four detected leptons in LHC experiments
- **Simulated the scattering process** in order to compare it with the experimental dataset, very good agreement was found
- **Built a C++ code** to manage and deal with very large files needed to interpolate a 4-dimensional function in order to **improve the simulation time by a factor of 100**
- **Ph.D. students and Post-Doc representative** in the European network MCnet
- **Created several exam projects** for the tutored course "Numerical Methods for Physics". Problems were based on **solving differential equations numerically** in order to simulate and study physical phenomena
- The Ph.D. was funded by the European Research Council through the won Marie-Skłodowska Curie scholarship

## Education

### M.Sc. Theoretical Physics *with Honours*

October 2015 - December 2018 / University of Bologna (IT)

- Dissertation: *Comparison Between Two Different Approaches To Resum Large Threshold Logarithms in Drell-Yan Rapidity Distribution*
- Relevant courses: Advanced Mathematical Methods, Models and Numerical Methods for Physics, Statistical Mechanics (very strong foundation on statistics)

### B.Sc. in Physics

October 2015 - December 2018 / University of Bologna (IT)

- Dissertation: *Path Integrals and Weyl Ordering*

## Scientific Output

- **JHEP:** *Higher-order EW corrections in ZZ and ZZj production at the LHC*
- **Les Houches Proceeding:** *A study of loop-induced ZH production with up to one additional jet*

## Scientific Dissemination

The results of my research have been presented in several international meetings:

- 14th Annual Meeting of the Helmholtz Alliance Physics at the Terascale
- 22nd MCnet metting
- Annual Sherpa meeting
- LHC HXS WG1 meeting (LHC Higgs Cross Section Working Group 1)
- 20th MCnet meeting
- 19th MCnet meeting

## Training Events

- **Disseminating Research to the General Public** - MCnet training event
- **Machine Learning School** - MCnet school event
- **Project Management and Communication Skills** - MCnet training event

## Skills

- Programming: C++, C, Python, SQL, R, Html, Css
- Tools: Git, Tensorflow, Pytorch, NumPy, Btwxt, LAPACK
- Data Visualization: Pandas, Matplot, Rivet, Root, Spread Sheets

## Languages

- Italiano - Native
- English - C1 (IELTS 2020)
- Deutsch - B2 (UniGö)

## Competitions

- Doctoral scholarship funded by MCnetITN3
- National IPT (International Physicist Tournament) selection (1st place)
- International phase IPT (10th )