Dr. Simon Luca Villani

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Working experiences

Ph.D. Researcher in Theoretical Particle Physics
April 2019 - September 2022 / University of Göttingen (DE)

- **Analyzed subatomic scattering processes** in order to test the Standard Model of Particle Physics
- **Improved the theoretical modelling** of subatomic processes that include four detected leptons in LHC experiments
- **Developed 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

Professional Certifications

Google data analytics
April 2022 - September 2022 / Coursera

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: Tableau, Pandas, Matplot, Rivet, Root, Spread Sheets

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

Accomplishments
- Marie-Skłodowska Curie scholarship funded by MCnetITN3
- National IPT (International Physicist Tournament) selection (1st place)
- International phase IPT (10th)