



Niccolò Laurenti

PH.D. GRADUATE IN PARTICLE PHYSICS · SOFTWARE DEVELOPER

☎ (+39) 3382971956 | ✉ niclaurenti@gmail.com | 🏠 <https://niclaurenti.github.io> | 🌐 niclaurenti | 📄 niccolo-laurenti |
© 0009-0001-0718-0409

Personal Informations

Birth 1997, Rome, Italy
Citizenship Italian
Languages Italian (native language), English (fluent)

Experience

Software Developer

Rome, Italy

SOFTWARE DEVELOPER AT NEXT INGEGNERIA DEI SISTEMI S.p.A.

Oct. 2024 - Current

- Worked as a Consultant Software Developer for Next Ingegneria dei Sistemi S.p.A, fully employed in the Defence sector at the client **MBDA** Italy.
- Analyzed requirements to developed softwares and algorithms in **C++** and **Ada** and then designed and performed testing procedures for them.
- Worked in a large team that cooperated with other companies to deliver the final product.

Technologies: 🐧 C++, 🏗️ Ada, 🍃 Qt Creator, 🐞 Gnat Studio, 🐚 Bash, 📄 XML, 🌐 IBM RTC, 🚪 IMB Doors, 📶 Wireshark, 🐧 Linux, 🪟 Windows, 🏢 Microsoft Office

Ph.D. Researcher

Milan, Italy

RESEARCHER IN THEORETICAL PARTICLE PHYSICS AT THE UNIVERSITY OF MILAN AND INFN

Oct. 2021 - Sept. 2024

- Worked under the supervision of Prof. Stefano Forte in the **NNPDF** collaboration as a developer of the **NNPDF** code 🐞.
- Developed techniques and computational programs that utilize artificial intelligence to investigate the internal structure of the proton analysing experimental data collected at **CERN**.
- Developed programs for solving the so-called DGLAP equations, a linear system of integro-differential equations, with numerical techniques.
- Published research results in various papers and presented them in conferences.

Technologies: 🐍 Python, 📐 Numpy, 📊 Scipy, 📉 Matplotlib, 📦 Keras, 🚀 Tensorflow, 📈 Numba, 📡 Fortran, 🐚 Bash, 📦 Git, 🐙 Github, 🌪️ Slurm, 📺 PBS, 📐 Mathematica, 🐧 Linux, 🍏 MacOS, 📄 VS Code, 🍃 Vim, 📄 LaTeX, 📄 SQLite

Undergraduate Researcher

Rome, Italy

RESEARCHER IN THEORETICAL PARTICLE PHYSICS AT THE UNIVERSITY OF ROME "LA SAPIENZA"

Mar. 2021 - Oct. 2021

- Worked under the supervision of Dr. Marco Bonvini to develop theoretical methods and computational programs for producing high-precision theoretical predictions in particle physics.
- Focused on describing experimental data of electron-proton collisions, collected at the particle accelerators **HERA** and **SLAC**.
- Wrote from zero the **C++** library **Adani** 🐞, with the **Python** bindings available in the PyPI and in conda-forge, resulting in a published paper and presentations at conferences.

Technologies: 🐧 C++, 📺 GSL, 📐 Mathematica, 🐧 Linux, 🐚 Bash, 📄 CMake, 📺 Emacs, 📄 LaTeX

Skills

Programming	C, C++, Python, Ada, Fortran, Bash, XML, CMake
Operating systems	Linux, MacOS, Windows
Code editors	VS Code, Qt Creator, Gnat Studio, Emacs, Vim, Nano
Version control systems	Git, Github, Gitlab, IBM RTC
C++ libraries	STL, GSL, Pybind11, Boost
Python packages	Numpy, Scipy, Matplotlib, Multiprocessing, Numba, Pandas, Keras, Tensorflow, SQLite
Jobs schedulers	Slurm, PBS
Scientific programs	Matlab, Wolfram Mathematica
Writing	Latex, Markdown, Microsoft Office

Education

Ph.D. in Physics

UNIVERSITY OF MILAN

Milan, Italy

Oct. 2021 - Nov. 2024

- Field of study: Theoretical Particle Physics, Computational Physics.
- Thesis: *Advancements in PDFs determination: Incorporation of QED effects and new theoretical improvements in a modern deep learning fitting framework.* [link](#)

M.S. in Physics

UNIVERSITY OF ROME "LA SAPIENZA"

Rome, Italy

Sep. 2019 - Oct. 2021

- Field of study: Theoretical Particle Physics.
- Grade: 110/110 (cum laude).
- Thesis: *Construction of a next-to-next-to-next-to-leading order approximation for heavy flavour production in deep inelastic scattering with quark masses.* [Inspire](#)

B.S. in Physics

UNIVERSITY OF ROME "LA SAPIENZA"

Rome, Italy

Sep. 2016 - Nov. 2019

- Grade: 110/110 (cum laude).
- Thesis: *Particle identification with the time of flight method and applications to the CMS experiment.*

Publications

2024	LO, NLO, and NNLO Parton Distributions for LHC Event Generators , J. Cruz-Martinez, S. Forte, N. Laurenti, T. R. Rabemananjara, J. Rojo, <i>JHEP</i>	Inspire
2024	NNPDF4.0 at N^3 LO PDFs with QED corrections , A. Barontini, N. Laurenti, J. Rojo, <i>Contribution to DIS2024</i>	Inspire
2024	The Path to N^3 LO Parton Distributions , The NNPDF Collaboration, R. D. Ball et al., <i>Eur. Phys. J. C</i>	Inspire
2024	Determination of the theory uncertainties from missing higher orders on NNLO parton distributions with percent accuracy , The NNPDF Collaboration, R. D. Ball et al., <i>Eur. Phys. J. C</i>	Inspire
2024	Photons in the proton: implications for the LHC , The NNPDF Collaboration, R. D. Ball et al., <i>Eur. Phys. J. C</i>	Inspire
2023	Inclusion of QED corrections in PDFs fits , N. Laurenti, <i>Nucl. Part. Phys. Proc.</i>	Inspire
2022	Approximating missing higher-orders in transverse momentum distributions using resummations , N. Laurenti, T. R. Rabemananjara, and R. Stegeman, <i>Contribution to DIS2022</i>	Inspire

Talks

2024	The inclusion of QED corrections in the NNPDF4.0 fitting framework , Prague, Czech Republic	ICHEP2024
2024	The inclusion of QED corrections in the NNPDF4.0 fitting framework , National Laboratory of Frascati, Italy	IRN Terascale@LNF
2023	Evidence of intrinsic charm quarks in the proton , Mainz, Germany	MENU23
2023	Including QED corrections in PDF fits: The NNPDF4.0QED PDF set , Durham, UK	QCD@LHC23
2023	Inclusion of QED corrections in PDFs: The NNPDF4.0QED PDF set , Montpellier, France	QCD23
2021	Construction of a third order approximation for heavy flavour production in deep inelastic scattering , Milan, Italy	MCM 2021

Teaching activity

2024	Co-supervisor of a Bachelor thesis , Thesis title: <i>On the fitting scale dependence of the Parton Distributions</i>	University of Milan
2024	TA for the course of Quantum Physics I , Introduction to Quantum Mechanics	University of Milan
2024	TA for the course of Physics , Basics of Classical Mechanics and Thermodynamics	University of Milan
2024	TA for the course of Quantum Physics II , Advanced course on Quantum Mechanics	University of Milan
2023	TA for the course of Theoretical Physics I , Introduction to Quantum Field Theory	University of Milan
2023	TA for the course of Physics , Basics of Classical Mechanics and Thermodynamics	University of Milan
2023	TA for the course of Quantum Physics II , Advanced course on Quantum Mechanics	University of Milan
2023	Exercise classes for the course of Quantum Physics II , Advanced course on Quantum Mechanics	University of Milan
2022	TA for the course of Quantum Physics I , Introduction to Quantum Mechanics	University of Milan