

Stefano Carrazza

Curriculum Vitae

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Research Topics

Machine learning and AI techniques for sciences and beyond.
Parton distribution functions (PDFs) determination and correlated technologies.
Monte Carlo event generators, simulation/computational tools for physics.
Quantum computing and quantum information.
Full-stack solutions for modeling and forecasting applications in industry.

Education

- 2011 – 2015 **PhD in Theoretical Physics**, University of Milan, Milan, Italy.
Parton distribution functions with QED corrections.
- 2009 – 2011 **Master Degree in Physics**, École Normale Supérieure de Lyon, France.
Particle physics and quantum field theory.
- 2006 – 2009 **Bachelor Degree in Physics**, École Normale Supérieure de Lyon, France.
Physics and matter sciences.

Professional Experience

Current Positions

- from 2021 **Associate Professor**, University of Milan, Milan, Italy.
- from 2018 **Associate Researcher**, INFN sezione di Milano, Milan, Italy.

Previous Positions

- 2018 – 2021 **Senior Researcher RTD-B**, University of Milan, Milan, Italy.
- 2015 – 2018 **CERN Senior Research Fellow**, CERN, Geneva, Switzerland.
- 2014 – 2015 **Postdoctoral EIBURS fellow**, University of Milan, Milan, Italy.

Visiting Scientist

- June 2022 **Visiting Professor at Institute of High Performance Computing, IHPC**, Singapore.
- from 2018 **CERN TH**, CERN, Switzerland.
- 2014 **aMC@NLO ERC project**, CERN, Switzerland.

Internships

- 2011 **Strange particle production in the ALICE experiment**, CERN, Switzerland.
- 2010 **ALICE computing group**, CERN, Switzerland.
- 2009 **Non-local fields in CQED**, *Serge Haroche group (Nobel Prize 2012)*, LKB-ENS, Paris.
- 2008 **Nonlinear Optics**, LASIM, Lyon, France.

Prices, Awards and Qualifications

- 2022 **Abilitazione scientifica nazionale per la I fascia, settore concorsuale 02/A2.**
- 2021 **Faculty development for University Teaching**, *University of Milan*, Milan.
- 2017 **Abilitazione scientifica nazionale per la II fascia, settore concorsuale 02/A2.**

- 2017 **Premio Sergio Fubini 2016**, Catania.
INFN CSN4 national price for the best PhD thesis in theoretical particle physics of 2015-2016.
- 2006 **European Union Contest for Young Scientists, Italian section**, Milan.
Participation with the project "Standing Waves" in which an innovative experimental setup was proposed in order to observe and study the propagation of standing waves in the air.

Teaching Activities

UNIMI PhD School

- from 2019 **Introduction to Machine Learning**, *University of Milan*.
[Master degree](#)
- from 2022 **Deep Learning**, *University of Milan*.
- 2019 – 2022 **Introduction to AI for Medical Physics**, *University of Milan*.
[Medical Physics School](#)
- from 2021 **Tecniche di calcolo e sistemi operativi**, *University of Milan*.
- 2020 – 2021 **Tecniche di calcolo e sistemi operativi**, *University of Milan*.
[Bachelor degree](#)
- from 2018 **Computer Sciences**, *University of Milan*.
- 2012 – 2014 **Quantum Mechanics I-II**, *University of Milan*.
- 2013 **Mathematics for Biological Sciences**, *University of Milan*.
[Invited speaker in PhD schools](#)
- September 2021 **VBS advanced school**, Milan.
- June 2020 **MCnet Machine Learning School**, Lund.
- September 2019 **TAE 2019**, Benasque.
- July 2019 **ML lectures UNIMI**, Milan.
- September 2018 **TAE 2018**, Benasque.

Institutional Responsibilities

- from 2021 **Member of the committee for the bachelor in AI**, UNIMI-UNIMIB-UNIPV, Italy.
- from 2021 **Member of the thesis committee**, UNIMI, Italy.

Reviewing Activities and Coordination

- from 2020 **Worldwide coordinator for the Qibo project**, <https://qibo.science/>.
- from 2022 **Scientific Advisory Board**, *CSIL*, <http://www.csilmilano.it/>, Milano, Italy.
- from 2021 **Scientific Advisory Board**, *Quarko*, <https://quarko.tech/>, Milano, Italy.
- from 2021 **Scientific Advisory Board**, *Qilimanjaro Quantum Tech*, <https://www.qilimanjaro.tech/>, Barcelona, Spain.
- from 2020 **Project Reviewer**, *Rita Levi Montalcini program*, Milano, Italy.
- from 2020 **Scientific Evaluator**, *National Science Centre*, Poland.
- from 2018 **N3PDF R&D coordinator**.
- from 2017 **Scientific Advisory Board**, *NNPDF ERC Advanced grant N.740006*, Stefano Forte, University of Milan.
- from 2017 **NNPDF R&D coordinator**.
- from 2015 **Reviewer for several international journals**, Phys. Rev. Lett., JHEP, Phys. Rev. D, Nucl. Phys. B, Phys. Lett. B, EPJC, SciPost, Computer Physics Communications, Annals of Public and Cooperative Economics.

Participation in Research Grants

- 2021 – 2022 **PI**, *Automatic Monte Carlo on GPU*, Linea 2A, University of Milan.
- 2019 – 2020 **PI**, *New hardware for HEP*, Linea 2A, University of Milan.
- Since 2015 **Postdoc**, *HICCUP ERC Consolidator grant N.614577*, Giulia Zanderighi, CERN.
- 2013 – 2016 **Postdoc**, *European Investment Bank EIBURS grant, Cost/Benefit Analysis in the Research, Development and Innovation Sector*, University of Milan.
- 2010 – 2011 **PhD student**, *PRIN 2010-2011*, University of Milan.
Italy

Organization of Scientific Conferences

- April 2021 **TH institute organizer**, CERN.
- December 2020 **LHCP2021 convenor for Tools session**, Paris.
- September 2020 **AMLD 2021 organizer AI and Physics**, EPFL.
- January 2020 **AMLD 2020 organizer AI and Physics**, EPFL.
- July 2019 **QCD@LHC19 convenor PDFs/alphas**, University of Buffalo.
- March – April 2018 **IFAE XVII convenor**, University of Milan-Bicocca.

Participation in Conferences and Workshops

- May 2022 **Seeds from Ceeds**, Milano.
- March 2022 **NVIDIA GTC 2022**, Santa Clara (online).
- March 2022 **Supercomputing Asia 2022**, Singapore (online).
- December 2021 **ACAT21**, Daejeon (online).
- October 2021 **RIKEN workshop in Quantum Computing**, Singapore/Japan.
- September 2021 **ECT* workshop**, Online.
- June 2021 **LHCP2021**, Paris (online).
- May 2020 **LHCP2020**, Paris (online).
- July 2019 **BOOST19**, Boston.
- July 2019 **QCD@LHC19**, Buffalo.
- June 2019 **PHOTON19**, Frascati.
- March 2019 **ACAT19**, Saas-Fee.
- February 2019 **FPGA for HEP**, Zurich.
- November 2018 **PDF4LHC**, CERN.
- November 2018 **Quantum computing in HEP**, CERN.
- September 2018 **NNPDF and N3PDF warnup meeting**, Gargnano.
- September 2018 **23rd ETSF workshop on electronic excitations**, Milan.
- June 2018 **Tsinghua Workshop on Machine Learning in Geometry and Physics**, Sanya.
- March 2018 **PDF4LHC**, CERN.
- September 2017 **PDF4LHC**, CERN.
- August 2017 **ACAT17**, Seattle.
- June 2017 **LH 2017**, Les Houches.
- January 2017 **Cracow Epiphany Conference**, Cracow.
- June 2016 **ICML**, New York.
- May 2016 **PP @ LHC 2016**, Pisa.
- April 2016 **PDF4LHC**, CERN.

- March 2016 **Recontres de Moriond**, La Thuile.
- January 2016 **CMS Workshop**, CERN.
- October 2015 **PDF4LHC**, CERN.
- October 2015 **FCC-hh 100 TeV Workshop**, CERN.
- September 2015 **QCD@LHC**, London.
- April 2015 **PDF4LHC**, CERN.
- February 2015 **Parton Distributions for the LHC**, Benasque.
- January 2015 **PDF4LHC**, CERN.
- November 2014 **PDF4LHC**, CERN.
- June 2014 **XXII Milan European Economy Workshop, EIBURS workshop**, Milan.
- May 2014 **PDF4LHC**, CERN.
- February 2014 **Les Rencontres de Physique de la Vallée d'Aoste**, La Thuile.
- December 2013 **PDF4LHC**, CERN.
- April 2013 **DIS2013**, Marseille.
- April 2013 **EW/PDF4LHC meeting**, CERN.
- March 2013 **Rencontres de Moriond**, La Thuile.
- September 2012 **EW/PDF4LHC meeting**, Durham.
- May 2012 **EW/PDF4LHC meeting**, CERN.
- June 2011 **Quark Matter Annecy 2011**, Annecy.
- August 2006 **London International Youth Science Forum**, London.

Talks

- May 2022 **Seeds from Ceeds**, *Futuro quantistico, tecnologia e società*, Milano.
- March 2022 **NVIDIA GTC 2022**, *Quantum simulation with just-in-time compilation*, Santa Clara.
- March 2022 **Supercomputing Asia 2022**, *Towards a quantum operating system*, Singapore.
- December 2021 **ACAT21**, *Introduction to quantum computing for HEP*, Daejeon.
- October 2021 **Introducing Qibo**, *Seminar*, Dusseldorf.
- October 2021 **Introducing Qibo**, Singapore/Japan.
- September 2021 **Quantum PDFs**, Online.
- March 2021 **Torino Seminar**, *Quantum simulation with hardware acceleration*, Torino.
- September 2020 **QC-CERN**, *Introduction to Quantum Machine Learning*, CERN.
- October 2020 **QC-CERN**, *Introduction to Qibo*, CERN.
- September 2020 **CQT**, *Quantum simulation with hardware acceleration*, Singapore.
- September 2020 **IML**, *Accelerating MC simulation across platforms*, CERN.
- May 2020 **LHCP2020**, *Parton densities with deep learning models*, Paris.
- May 2020 **CSIL**, *The role of big data in the era of COVID-19*, Milan.
- July 2019 **BOOST19**, *Jet grooming with reinforcement learning*, Boston.
- July 2019 **QCD@LHC19**, *Jet grooming with reinforcement learning*, Buffalo.
- 3 June 2019 **PHOTON19**, *PDFs and EW corrections*, Frascati.
- 3 April 2019 **IFT ICTP SAIFR**, *Machine learning applied to theoretical high-energy physics*, Sao Paulo.
- 12 March 2019 **ACAT19**, *Riemann-Theta Boltzmann Machine*, Saas-Fee.
- 18 September 2018 **NNPDF/N3PDF warnup meeting**, *Machine Learning Notes*, Gargnano.
- 10 September 2018 **23rd ETSF workshop on electronic excitations**, *Machine Learning Overview*, Milan.
- 14 June 2018 **Tsinghua Workshop on ML**, *Riemann-Theta Boltzmann Machine*, Sanya.

- 14 June 2018 **Tsinghua Workshop on ML**, *ML and PDFs*, Sanya.
- 28 March 2018 **PDF4LHC**, *NNPDF3.1luxQED*, CERN.
- 21 August 2017 **ACAT17**, *NNPDF3.1*, Seattle.
- 21 August 2017 **ACAT17**, *ML in HEP-TH*, Seattle.
- 9 January 2017 **Cracow Epiphany Conference**, *Towards NNPDF3.1*, Cracow.
- 18 May 2016 **PP @ LHC 2016**, *Parton Distribution Functions*, Pisa.
- 24 March 2016 **Recontres de Moriond**, *PDF tools for LHC Run II*, La Thuile.
- 28 January 2016 **CMS Workshop**, *Threshold resummation at highest energies*, CERN.
- 9 October 2015 **FC-hh 100 TeV**, *Large x PDFs at 100 TeV*, CERN.
- 1 September 2015 **QCD@LHC**, *On the impact of lepton PDFs*, London.
- 13 April 2015 **PDF4LHC**, *An unbiased Hessian representation of MC PDFs*, CERN.
- 20 February 2015 **Parton Distributions for the LHC**, *CMC-PDFs*, Benasque.
- 3 November 2014 **PDF4LHC**, *Compression of Monte Carlo PDF replicas*, CERN.
- 24 June 2014 **TASI 2014**, *Neural Network PDFs*, Boulder.
- 24 February 2014 **La Thuile 2014**, *PDFs with QED corrections*, La Thuile.
- 13 December 2013 **EW/PDF4LHC**, *APFEL package and interface*, CERN.
- 19 November 2013 **HERAFitter User's meeting**, *APFEL updates and new features*.
- 24 April 2013 **DIS2013**, *Electroweak corrections to parton distributions*, Marseille.
- 17 April 2013 **EW/PDF4LHC**, *NNPDF updates and EW corrections*, CERN.
- 13 March 2013 **Rencontres de Moriond**, *Electroweak corrections to parton distributions*, La Thuile.
- 31 August 2012 **International School Cargese 2012**, *Parton distributions with LHC data*, Cargese.

Research Outcome

Citation summary: **h-index 32**, *INSPIRE*, 13534 citations from 80 citeable papers, on May 27, 2022.
h-index 32, **i10-index 52**, *Google Scholar*, 21969 citations, on May 27, 2022.

Articles

- [1] V. Morretta, D. Vurchio, S. Carrazza, The socio-economic value of scientific publications: The case of earth observation satellites, *Technological Forecasting and Social Change* 180 (2022) 121730. doi:<https://doi.org/10.1016/j.techfore.2022.121730>. URL <https://www.sciencedirect.com/science/article/pii/S0040162522002566>
- [2] S. Carrazza, S. Efthymiou, M. Lazzarin, A. Pasquale, An open-source modular framework for quantum computing (2 2022). arXiv:2202.07017.
- [3] K. H. Park, Y. S. Yap, Y. P. Tan, C. Hufnagel, L. H. Nguyen, K. H. Lau, S. Efthymiou, S. Carrazza, R. P. Budoyo, R. Dumke, Icarus-q: A scalable rfsoc-based control system for superconducting quantum computers (2021). arXiv:2112.02933.
- [4] S. Carrazza, J. Cruz-Martinez, R. Stegeman, A data-based parametrization of parton distribution functions, *The European Physical Journal C* 82 (2). doi:10.1140/epjc/s10052-022-10136-z. URL <http://dx.doi.org/10.1140/epjc/s10052-022-10136-z>
- [5] T. de Lima Silva, M. M. Taddei, S. Carrazza, L. Aolita, Imaginary-time evolution algorithms for intermediate-scale quantum signal processors (2021). arXiv:2110.13180.
- [6] C. Bravo-Prieto, J. Baglio, M. Cè, A. Francis, D. M. Grabowska, S. Carrazza, Style-based quantum generative adversarial networks for monte carlo events (2021). arXiv:2110.06933.

- [7] G. Zorzi, L. Berta, S. Carrazza, A. Torresin, A framework for quantitative analysis of computed tomography images of viral pneumonitis: radiomic features in covid and non-covid patients (2021). [arXiv:2109.13931](https://arxiv.org/abs/2109.13931).
- [8] R. D. Ball, S. Carrazza, J. Cruz-Martinez, L. D. Debbio, S. Forte, T. Giani, S. Iranipour, Z. Kassabov, J. I. Latorre, E. R. Nocera, R. L. Pearson, J. Rojo, R. Stegeman, C. Schwan, M. Ubiali, C. Voisey, M. Wilson, An open-source machine learning framework for global analyses of parton distributions (2021). [arXiv:2109.02671](https://arxiv.org/abs/2109.02671).
- [9] R. D. Ball, S. Carrazza, J. Cruz-Martinez, L. D. Debbio, S. Forte, T. Giani, S. Iranipour, Z. Kassabov, J. I. Latorre, E. R. Nocera, R. L. Pearson, J. Rojo, R. Stegeman, C. Schwan, M. Ubiali, C. Voisey, M. Wilson, The path to proton structure at one-percent accuracy (2021). [arXiv:2109.02653](https://arxiv.org/abs/2109.02653).
- [10] S. Carrazza, J. Cruz-Martinez, M. Rossi, M. Zaro, MadFlow: automating Monte Carlo simulation on GPU for particle physics processes, *Eur. Phys. J. C* 81 (7) (2021) 656. [arXiv:2106.10279](https://arxiv.org/abs/2106.10279), [doi:10.1140/epjc/s10052-021-09443-8](https://doi.org/10.1140/epjc/s10052-021-09443-8).
- [11] S. Carrazza, J. M. Cruz-Martinez, T. R. Rabemananjara, Compressing PDF sets using generative adversarial networks, *Eur. Phys. J. C* 81 (6) (2021) 530. [arXiv:2104.04535](https://arxiv.org/abs/2104.04535), [doi:10.1140/epjc/s10052-021-09338-8](https://doi.org/10.1140/epjc/s10052-021-09338-8).
- [12] A. Pérez-Salinas, J. Cruz-Martinez, A. A. Alhajri, S. Carrazza, Determining the proton content with a quantum computer, *Phys. Rev. D* 103 (2021) 034027. [arXiv:2011.13934](https://arxiv.org/abs/2011.13934), [doi:10.1103/PhysRevD.103.034027](https://doi.org/10.1103/PhysRevD.103.034027).
- [13] L. Berta, C. De Mattia, F. Rizzetto, S. Carrazza, P. Colombo, R. Fumagalli, T. Langer, D. Lizio, A. Vanzulli, A. Torresin, A patient-specific approach for quantitative and automatic analysis of computed tomography images in lung disease: Application to covid-19 patients, *Physica Medica* 82 (2021) 28–39. [doi:https://doi.org/10.1016/j.ejmp.2021.01.004](https://doi.org/10.1016/j.ejmp.2021.01.004).
- [14] M. Lazzarin, S. Alioli, S. Carrazza, Mcnntunes: Tuning shower monte carlo generators with machine learning, *Computer Physics Communications* 263 (2021) 107908. [doi:https://doi.org/10.1016/j.cpc.2021.107908](https://doi.org/10.1016/j.cpc.2021.107908).
URL <https://www.sciencedirect.com/science/article/pii/S0010465521000448>
- [15] S. Carrazza, J. M. Cruz-Martinez, M. Rossi, PDFFlow: Parton distribution functions on GPU, *Comput. Phys. Commun.* 264 (2021) 107995. [arXiv:2009.06635](https://arxiv.org/abs/2009.06635), [doi:10.1016/j.cpc.2021.107995](https://doi.org/10.1016/j.cpc.2021.107995).
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URL <http://dx.doi.org/10.1088/2058-9565/ac39f5>
- [17] S. Carrazza, E. Nocera, C. Schwan, M. Zaro, PineAPPL: combining EW and QCD corrections for fast evaluation of LHC processes, *JHEP* 12 (2020) 108. [arXiv:2008.12789](https://arxiv.org/abs/2008.12789), [doi:10.1007/JHEP12\(2020\)108](https://doi.org/10.1007/JHEP12(2020)108).
- [18] S. Forte, S. Carrazza, Parton distribution functions (8 2020). [arXiv:2008.12305](https://arxiv.org/abs/2008.12305).
- [19] D. García-Martín, E. Ribas, S. Carrazza, J. Latorre, G. Sierra, The prime state and its quantum relatives, *Quantum* 4 (2020) 371. [doi:10.22331/q-2020-12-11-371](https://doi.org/10.22331/q-2020-12-11-371).
URL <http://dx.doi.org/10.22331/q-2020-12-11-371>

- [20] S. Carrazza, J. M. Cruz-Martinez, VegasFlow: accelerating Monte Carlo simulation across multiple hardware platforms, *Computer Physics Communications* 254 (2020) 107376. arXiv:2002.12921, doi:<https://doi.org/10.1016/j.cpc.2020.107376>.
- [21] S. Carrazza, F. A. Dreyer, Lund jet images from generative and cycle-consistent adversarial networks, *Eur. Phys. J. C* 79 (11) (2019) 979. arXiv:1909.01359, doi:[10.1140/epjc/s10052-019-7501-1](https://doi.org/10.1140/epjc/s10052-019-7501-1).
- [22] S. Carrazza, J. Cruz-Martinez, Towards a new generation of parton densities with deep learning models, *Eur. Phys. J. C* 79 (8) (2019) 676. arXiv:1907.05075, doi:[10.1140/epjc/s10052-019-7197-2](https://doi.org/10.1140/epjc/s10052-019-7197-2).
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- [30] D. Krefl, S. Carrazza, B. Haghighat, J. Kahlen, Riemann-Theta Boltzmann Machine, arXiv:1712.07581, doi:[10.1016/j.neucom.2020.01.011](https://doi.org/10.1016/j.neucom.2020.01.011).
- [31] V. Bertone, S. Carrazza, N. P. Hartland, J. Rojo, Illuminating the photon content of the proton within a global PDF analysis, *SciPost Phys.* 5 (2018) 008. arXiv:1712.07053, doi:[10.21468/SciPostPhys.5.1.008](https://doi.org/10.21468/SciPostPhys.5.1.008).
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- [33] R. D. Ball, et al., Parton distributions from high-precision collider data, *Eur. Phys. J. C* 77 (10) (2017) 663. arXiv:1706.00428, doi:[10.1140/epjc/s10052-017-5199-5](https://doi.org/10.1140/epjc/s10052-017-5199-5).
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URL <http://inspirehep.net/record/1391315/files/arXiv:1509.00209.pdf>
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URL <http://hrscomputing.sourceforge.net>

Participation in Summer Schools as PhD student

- June 2014 **TASI 2014**, Boulder.
- October 2013 **School of Analytic Computing in Theoretical HEP**, Atrani.
- August 2013 **2013 CERN-Fermilab HCP Summer School**, CERN.
- August 2012 **International School Cargese 2012**, Cargese.
- January 2012 **LHCPhenonet Winter School**, Ascona.

Supervision of Students

PhD Students

- 2021 **Andrea Pasquale**, *Quantum Computing*, Milan.
2019 **Marco Rossi**, *Investigating Anomaly Effects in HEP with GANs*, Milan.

Master Students

- 2022 **Matteo Robbiati**, *Quantum Machine Learning optimization*, Master thesis, Milan.
2022 **Edoardo Pedicillo**, *Transfer learning for quantum machine learning*, Master thesis, Milan.
2022 **Gabriele Palazzo**, *Accelerating MC simulation with GPUs*, Master thesis, Milan.
2022 **Andrea Sala**, *A full-stack solution for predictive DL models*, Master thesis, Milan.
2021 **Giulia Zorzi**, *AI models for COVID classification*, Master thesis, Milan.
2021 **Francesca Marchesi**, *AI models for clinical applications*, Master thesis, Milan.
2021 **Luigi Favaro**, *Generative models applied to HEP*, Master thesis, Milan.
2021 **Andrea Pasquale**, *Monte Carlo integration techniques*, Master thesis, Milan.
2021 **Sara Gelmini**, *A framework for COVID-19 patients analysis with radiomics and AI tools*, Master thesis, Milan.
2020 **Nicola Lambri**, *Optimization of PDF uncertainties*, Master thesis, Milan.
2020 **Luca Colombo Gomez**, *Deep learning for pediatric predictions*, Master thesis, Milan.
2020 **Raffaella Cabini**, *DL approach to MR Fingerprinting*, Master thesis co-supervisor, Milan.
2019 **Emilio Villa**, *Investigating GPU hardware for fast PDF convolutions*, Master thesis, Milan.
2019 **Marco Rossi**, *Investigating Anomaly Effects in HEP with GANs*, Master thesis, Milan.
2019 **Andrea Papaluca**, *Infinite state machine*, Master thesis, Milan.
2019 **Luca Talon**, Master thesis co-supervisor, Milan.

Bachelor Students

- 2022 **Carlo Arpini**, *Deep learning models for multidimensional integration*, Bachelor thesis, Milan.
2022 **Alessandro Giorgi**, *DL models for cancer treatment predictions*, Bachelor thesis, Milan.
2022 **Marta Privitera**, *Monte Carlo integration using ML techniques*, Bachelor thesis, Milan.
2021 **Maria Teresa Mendicino**, *AI models for COVID classification*, Bachelor thesis, Milan.
2021 **Nicole Zattarin**, *Quantum machine learning*, Bachelor thesis, Milan.
2021 **Lorenzo Confalonieri**, *Quantum machine learning*, Bachelor thesis, Milan.
2019 **Marco Zanchi**, *Machine learning for sports*, Bachelor thesis, Milan.
2019 **Marco Lazzarin**, *Monte Carlo tune using ML*, Bachelor thesis, Milan.
2019 **Elisa Radaelli**, *Charm determination using NNPDF*, Bachelor thesis co-supervisor, Milan.
2018 **Alexa Martin**, *NNPDF*, MIT visiting student, Milan.
2017 **Omar Pastafiglia**, *Web application for Feynman diagrams*, Bachelor thesis in CS, Milan.
2016 **Francesco d'Ambrosio**, *PDF fits with inconsistent data*, Bachelor thesis in physics, Milan.
2014 **Fabrizio Cimaglia**, *PDF reweighting*, Bachelor thesis in physics, Milan.
2014 **Daniele Palazzo**, *APFEL Web interface to PDFs*, Bachelor thesis in CS, Milan.

Interdisciplinary Activities

- 2013 – 2016 **Cost/Benefit Analysis in the Research, Development and Innovation Sector**, Milan.
The research project “Cost/Benefit Analysis in the Research, Development and Innovation Sector” aims at developing and testing a model for evaluating Big Science. The developed model will enable funding agencies to assess the potential future net social benefits generated by a research infrastructure and the uncertainty and risks associated to it.

- 2013 **Startup & Business Planning**, *SDA Bocconi School of Management*, Milan.
Lectures held by Prof. Cinzia Parolini organized by Start Cup Milano Lombardia 2013 for the finalists of the competition.
- 2009 **Business management: Evolution and Dynamics**, *École Normale Supérieure Lettres et Sciences Humaines*, Lyon.
Special lectures focused in econo-physics techniques to describe and predict the evolution and dynamics of business models, identifying the quality and measuring the efficiency of new business proposals and strategies.

Patents

- 2009 **SHAPE project**, *Participation in WO/2009/125148 for HRS Computing*, Lyon.
HRS Computing is a scientific software that simulates the "Hyper Rayleigh Scattering" (HRS), which is a nonlinear optics phenomenon. It allows the visualization of simulated polar graphics generated by HRS, giving different theoretical coefficients that can be useful to determine the microscopic structure of composites, molecules.

Media and Press

- 2015 **Aragon TV**, *Link to the video (minute 25)*.
Interview during the PDF for LHC workshop in Benasque.
- 2006 **Corriere della Sera**, *Article in an Italian newspaper*.
Interview during the final selection of the competition "I Giovanni e le Scienze".

Computer skills

- GitHub: <https://github.com/scarrazza>
- Operating Systems: Linux, Windows, MacOS.
- Languages: C/C++, Fortran, Java, Python, PHP/HTML, BASH, L^AT_EX.
- Libraries: ROOT, Qt, OpenGL, OpenMP, VTK, GTK+, .Net Framework.
- Hardware: OpenCL, CUDA, Xilinx FPGA.
- Software: Mathematica, Matlab, Labview, Scilab, Maxima, Sage, Blender.

Languages

- Fluent in English, Italian, French, Spanish and Portuguese.

General information

- *Last update: May 27, 2022*