

# Mirko Serino



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## 1 Personal

**Date of birth:** 18th April, 1986.

**Place of birth:** San Pietro Vernotico (BR), Italy

**Marital status:** Single

**Nationality:** Italian

## 2 Education

### **Ph.D. in Theoretical Physics**

Dipartimento di Fisica (Università del Salento), Lecce, 15-07-2014

**Dissertation title:** "Conformal anomaly actions and dilaton interactions"

**Supervisor:** Prof. Claudio Corianò

### **Master's degree in Theoretical Physics**

Dipartimento di Fisica (Università del Salento), Lecce, 20-10-2010

**Dissertation title:** "Rottura dell'invarianza di scala e mediazione anomala nel Modello Standard"  
(Broken scale invariance and anomalous interaction in the Standard Model)

**Supervisor:** Prof. Claudio Corianò

**Graduate with** 110/110 cum laude.

### **Bachelor's degree in Physics**

Dipartimento di Fisica (Università del Salento), Lecce, 30-07-2008

**Dissertation title:** "Aspetti introduttivi della teoria di stringa classica e quantistica"  
(Introductory aspects of classical and quantum string theory)

**Supervisor:** Prof. Claudio Corianò

**Graduate with** 110/110 cum laude.

## 3 Dentoni (October 2018-present)

At our family company, I have inherited the position of head of HR and administration. In a world at the opposite side of the academic reality by my father's premature death, I have relied for one year on incumbents and trusted people to understand and stick to the management philosophy which had worked well for him for so long.

After one year spent getting the gist, I embarked on the search for professionals who would fit our needs and help us become a financially more solid reality. I was thorough and fortunate enough to ace both goals: as of the time of writing, we are subject to a much more reasonable level of taxation, which allows to save capital for further investments in our operations, as well as followed by extremely competent consultants.

I have also relentlessly pushed for and achieved extremely increased digitalization, automation and cybersecurity strengthening.

## **4 Physics Employment and awards (May 2011- September 2018)**

Postdoctoral research fellow at the Ben Gurion University of the Negev, Be'Er Sheva, Israel, since 01-10-2017 until 30-09-2018

Awarded a "Kreitman" fellowship for the academic year 2017-2018 from the Ben Gurion University, Be'Er Sheva, Israel

Postdoctoral research fellow at the Institute of Nuclear Physics, Polish Academy of Sciences, Cracow, Poland, since 01-10-2014 until 30-09-2017

Awarded an "Angelo Della Riccia" scholarship for the year 2015 by the Della Riccia Foundation, Italian Institute of Nuclear Physics

Ph.D. student of theoretical physics at the "Department of Mathematics and Physics Ennio De Giorgi", University of Salento, Lecce (Italy), since 24-05-2011 until 23-05-2014

Associated to the Italian Institute of Nuclear Physics, Lecce, from 08-07-2011 to 07-07-2014

## **5 Physics Research Interests**

Green functions in conformal field theories

Scattering amplitudes in quantum gauge field theories

Phenomenology of jets and multi-parton interactions at hadron colliders

Evolution equations in Quantum Chromodynamics

## **6 Computer Skills**

Advanced knowledge of symbolic calculus and programming with *Wolfram Mathematica*

Scientific computing and Machine Learning with Python, intermediate knowledge

Web development with HTML, CSS and JavaScript, intermediate knowledge

Data analysis with Python, intermediate knowledge

## 7 Languages

Italian: native language

English: professional command of spoken and written English

French: intermediate command of spoken and written French

Polish: elementary command of spoken and written Polish

## 8 Personal interests and projects

**DentOrdini:** this is the tip of the digital transformation I have enacted at my family company: it is an app that takes care of recording, routing and recording payments of take away orders, which are in the hundreds per day during the summer. The MVP has been developed in partnership with CashPos s.r.l., the company providing our digital cash registers and automatic cash machines. I have imagined, drafted and followed step by step the development process with the role of Product Owner within the Agile methodology. The app has become a commercial product in the Italian market, but we are still working on refinements and a 2.0 version.

**freeCodeCamp Coding Curriculum:**

I have started to study on freeCodeCamp in my spare time in early 2022. I am steadily progressing through the curriculum, driven by the interest in challenging myself with learning new and (for me) unusual skills like web development and information security.

**Udacity *Introduction to Machine Learning with Pytorch Nanodegree*:**

Together with my interest in statistics and extreme events, I have come to be really fascinated by the field of Machine Learning. I got this first online certification on Udacity in June 2021.

***Real World Risk workshop by the Real World Risk Institute:***

I got interested in extreme events after reading Nassim Nicholas Taleb's books *Fooled by Randomness*, *The Black Swan* and *Antifragile* and from there I went to attend the *Workshop on Real World Risk (taking)*, held at the Real World Risk Institute in New York, June 2017.

**Translated to Italian the book *When the Body Says No*, by Dr. Gabor Maté:**

I am deeply interested in the subtle mechanisms of human psychology and the mind-body connection. The book "When the Body Says No - The Cost of Hidden Stress" by Dr. Gabor Maté (Vintage Canada 2011) was a revelation for me and I volunteered as a translator to Italian for the editor *Il Leone Verde*, which published it as "Quando il Corpo Dice No" (2019).

## 9 Supervised students

**Carlo Marzo:** Supervised during his master's thesis work at the University of Salento in Lecce, 2012.

## 10 Scientific Publications

M. Serino, The four-point correlation function of the energy-momentum tensor in the free conformal field theory of a scalar field, *Eur.Phys.J. C* 80 (2020) 7, 686 [ arXiv: 2004.08668 [hep-th]]

A. Kovner, M. Lublinsky, M. Serino, Entanglement entropy, entropy production and time evolution in high energy QCD, *Phys.Lett., B* 792 (2019) 4-15 [ arXiv: 1806.01809 [hep-ph]]

- M. Deak, A. van Hameren, H. Jung, A. Kusina, K. Kutak, M. Serino, *Calculation of the Z-jet cross section including transverse momenta of the initial partons* [ arXiv:1809.03854 [hep-ph]]
- A. Kovner, M. Lublinsky, M. Serino, *Entanglement entropy, entropy production and time evolution in High Energy QCD* Phys.Lett. B (2018) [arXiv:1806.01089 [hep-ph]]
- M. Bury, H. van Haevermaet, A. van Hameren, P. van Mechelen, K. Kutak, M. Serino, *Single inclusive jet production and the nuclear modification ratio at very forward rapidity in proton-lead collisions with  $\sqrt{s_{NN}} = 5.02$  TeV*, Phys.Lett. B780 (2018) 185-190 [arXiv:1712.08105 [hep-ph]]
- M. Bury, A. van Hameren, H. Jung, K. Kutak, S. Sapeta, M. Serino, *Calculations with off-shell matrix elements, TMD parton densities and TMD parton showers*, Eur.Phys.J. C78 (2018) no.2, 137 [arXiv:1712.05932 [hep-ph]]
- M. Hentschinski, K. Kutak, A. Kusina, M. Serino, *TMD splitting functions in  $k_T$  factorization: the real contribution to the gluon-to-gluon splitting*, Eur.Phys.J. C78 (2018) no.3, 174 [arXiv:1711.04587 [hep-ph]]
- A. van Hameren, K. Kutak, M. Serino *QCD amplitudes with 2 initial spacelike legs via generalised BCFW recursion*, JHEP 1702 (2017) 009 [arXiv: 1611.04380 [hep-ph]]
- A. van Hameren, K. Kutak, R. Maciula, M. Serino, A. Szczurek *Search for optimal conditions for exploring double-parton scattering in four-jet production:  $k_T$ -factorization approach* , Phys.Rev. D94 (2016) no.1, 014019 [arXiv:1605.08240 [hep-ph]]
- A. van Hameren, K. Kutak, R. Maciula, M. Serino, A. Szczurek *Four-jet Production in Single- and Double-Parton Scattering within High-Energy-Factorization*, JHEP 1604 (2016) 175, [arXiv:1602.06814 [hep-ph]]
- P. Kotko, M. Serino, A. M. Staśto, *Off-shell amplitudes as boundary integrals of analytically continued Wilson line slopes*, JHEP 1608 (2016) 026, [arXiv:1601.02953 [hep-th]]
- K. Golec Biernat, E. Lewandowska, M. Serino, Z. Snyder, A. M. Stasto, *Constraining the double gluon distribution via the single gluon distribution*, Phys.Lett. B750 (2015) 559-564, [arXiv:1507.08583 [hep-ph]]
- A. van Hameren, M. Serino, *BCFW recursion for TMD parton scattering*, JHEP, 1507 (2015) 010, [arXiv:1504.00315 [hep-ph]]
- C. Corianò, L. Delle Rose, M. M. Maglio, M. Serino, *Electroweak Corrections to Photon Scattering, Polarization and Lensing in a Gravitational Background and the Near Horizon Limit*, JHEP 1501 (2015) 091, [arXiv:1411.2804 [hep-ph]]
- C. Corianò, A. Costantini, L. Delle Rose, M. Serino, *Superconformal sum rules and the spectral density flow of the composite dilaton (ADD) multiplet in  $N = 1$  theories*, JHEP 1406 (2014) 136, [arXiv:1311.1804 [hep-th]]
- C. Corianò, L. Delle Rose, C. Marzo, M. Serino, *The Dilaton Wess-Zumino Action in 6 Dimensions from Weyl Gauging: Local Anomalies and Trace Relations*, Class.Quant.Grav. 31 (2014) 105009 [arXiv:1311.1804 [hep-th]]
- C. Corianò, L. Delle Rose, C. Marzo, M. Serino, *Conformal trace relations from the dilaton Wess-Zumino action*, Phys.Lett. B726 (2013) 896-905, [ arXiv:1306.4248 [hep-th]]
- C. Corianò, L. Delle Rose, E. Mottola, M. Serino, *Solving the conformal constraints for scalar operators in momentum space and the evaluation of Feynman's master integrals*, JHEP 1307 (2013) 011, [arXiv:1304.6944 [hep-th]]
- C. Corianò, L. Delle Rose, M. Serino, *Three and four point functions of stress energy tensors in  $D=3$  for the analysis of cosmological non-gaussianities* , JHEP 1212 (2012) 090, [ arXiv:1210.0136 [hep-th]]

C. Corianò, L. Delle Rose, C. Marzo, M. Serino, *Higher order dilaton interactions in the nearly conformal limit of the Standard Model*, Phys.Lett. B717 182-187 (2012), [ arXiv:1207.2930 [hep-ph]]

C. Corianò, L. Delle Rose, A. Quintavalle, M. Serino, *Dilaton interactions and the anomalous breaking of scale invariance in the Standard Model*, JHEP 1306 (2013) 077, [arXiv:1206.0590 [hep-ph]]

C. Corianò, L. Delle Rose, E. Mottola, and M. Serino, *Graviton vertices and the mapping of anomalous correlators to momentum space for a general conformal field theory*, JHEP 1208 (2012) 147 [arXiv:1203.1339 [hep-th]]

C. Corianò, L. Delle Rose, and M. Serino, *Gravity and the Neutral Currents: Effective Interactions from the Trace Anomaly*, Phys.Rev., D83 (2011) 125028 [ arXiv:1102.4558 [hep-ph] ]

C. Corianò, L. Delle Rose, A. Quintavalle and M. Serino, *The conformal anomaly and the neutral currents sector of the Standard Model*, Phys.Lett., B700 (2011) 29-38 [ arXiv:1101.1624 [hep-ph]]

## 10.1 Theses

M. Serino, *Conformal anomaly actions and dilaton interactions* (Ph.D. thesis), [arXiv:1407.7113]

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