
Simone Zoia

Theoretical Physicist

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Born in Mariano Comense (Italy), April 21st 1992

📍 Geneva, Switzerland

🗨 Italian: mother tongue – English: fluent



My goal is to push forward our understanding of fundamental particle physics. To achieve it, I conduct research on precision calculations in quantum field theory. I develop and use cutting-edge techniques for computing scattering amplitudes, study their mathematical structure, and employ them in the phenomenology of high-energy particle colliders.

EXPERIENCE

2023 – NOW Research fellow @ European Organization for Nuclear Research (**CERN**), Meyrin, CH
Marie Skłodowska-Curie postdoctoral fellowship, project “*TopJAm*”

2020 – 2023 Postdoctoral researcher @ University of **Torino & INFN**, Torino, ITA
In the ERC-funded project “*JetDynamics*”

EDUCATION

- 2017 – 2020 Ph.D. in natural sciences @ Ludwig-Maximilians-Universität, Munich, DE
- Degree awarded **summa cum laude** on 28.09.2021.
 - Research conducted at the University of **Mainz** until 09.2018, then at the **Max Planck Institute for Physics**. Supervisor: Prof. Dr. Johannes M. Henn. In the ERC-funded project “*Novel Structures for Scattering Amplitudes*.”
- 2014 – 2017 Master of Science in Physics @ Università degli Studi, Milano, ITA
Grade: 110/110 **cum laude**. Thesis: “*High Energy Resummation with Coloured Final States*”. Supervisor: Prof. Stefano Forte.
- 2011 – 2014 Bachelor of Science in Physics @ Università degli Studi, Milano, ITA
Grade: 110/110 **cum laude**. Thesis: “*Weak Lensing of the Cosmic Microwave Background: Convergence Estimates through a Modified Wiener Filter*”. Supervisor: Prof. M. Lombardi.
- 2006 – 2011 High School Diploma in Classical Studies @ Liceo Marie Curie, Meda, ITA

GRANTS AND AWARDS

- **Ambizione grant**, Swiss National Science Foundation (550'621 CHF). Project: “*Pushing the frontier of precision physics for massive multi-particle processes with differential equations and finite fields.*” Host: University of Zurich. Period: 01.09.2024 – 31.08.2028. More info: <https://data.snf.ch/grants/grant/215960>.
- **Marie Skłodowska-Curie fellowship**, European Commission (210'789 €). Project: “*Two-loop scattering amplitudes for top-pair production in association with a jet at hadron colliders.*” Host: CERN. Period: 01.10.2023 – 30.09.2024. More info: <https://cordis.europa.eu/project/id/101105486>.
- **Springer Thesis Award**: thesis “*Modern Analytic Methods for Scattering Amplitudes*” published in the *Springer Theses* series (DOI 10.1007/978-3-031-01945-6). More info: <https://link.springer.com/book/10.1007/978-3-031-01945-6>.

PUBLICATIONS

- I published 20 articles in peer-reviewed journals (5 in **Physical Review Letters**, 1 in *Physical Review D*, 1 in *Letters in Mathematical Physics*, 13 in the *Journal of High Energy Physics*). One more is under review. See <https://inspirehep.net/author/profile/Simone.Zoia.1> for an updated list.
- “*Scattering Amplitudes in Quantum Field Theory*,” Badger, Henn, Plefka, Zoia – **Lect. Notes Phys.** 1021 (2024). **Textbook** bridging the gap between introductory quantum field theory courses and state-of-the-art research in scattering amplitudes. DOI 10.1007/978-3-031-46987-9.
- “*Modern Analytic Methods for Scattering Amplitudes*,” Zoia – **Springer Theses**, 2022, a “selection of the very best Ph.D. theses from around the world and across the physical sciences” (open access at <https://edoc.ub.uni-muenchen.de/28684/>, DOI: 10.1007/978-3-031-01945-6).
- Bibliometrics: h-index 15, average citations/paper 42.8 (from INSPIRE HEP as of 11.07.2024).

COLLABORATORS

I collaborated with many world-leading experts, including (in alphabetical order):

- [Samuel Abreu](#), CERN;
- [Simon D. Badger](#), University of Turin;
- [Simon Caron-Huot](#), McGill University;
- [Dmitry Chicherin](#), Laboratoire d'Annecy-le-Vieux de Physique Théorique (LAPTH);
- [Michał Czakon](#), Rheinisch-Westfälische Technische Hochschule (RWTH) Aachen;
- [Thomas Gehrmann](#), University of Zurich;
- [Gudrun Heinrich](#), Karlsruher Institut für Technologie (KIT);
- [Johannes M. Henn](#), Max Planck Institute for Physics;
- [Harald Ita](#), Paul Scherrer Institut (PSI) and University of Zurich;
- [Ben Page](#), University of Gent;
- [Tiziano Peraro](#), University of Bologna;
- [Anna-Laura Sattelmayer](#), Max Planck Institute for Mathematics in the Sciences;
- [Yang Zhang](#), University of Science and Technology of China.

SELECTED TALKS AND SEMINARS

I developed strong public speaking skills by presenting my work at many conferences and workshops:

1. *Loops and Legs in Quantum Field Theory*, Wittenberg, Germany (16/04/2024);
2. *Rencontres de Moriond – QCD & High Energy Interactions*, La Thuile, Italy (05/04/2024);
3. *Milan Christmas Meeting 2023*, Milan, Italy (20/12/2023);
4. *QCD meets gravity 2023*, CERN, Switzerland (15/12/2023);
5. *MathemAmplitudes 2023*, Padova, Italy (27/09/2023);
6. *Current Topics in Fundamental Physics*, Benediktbeuern, Germany (16/08/2023);
7. *RADCOR 2023*, Crieff, Scotland (30/05/2023);
8. *Milan Christmas Meeting*, Milan, Italy (22/12/2022);
9. *Jumpstarting Elliptic Bootstrap Methods for Scattering Amplitudes*, NBIA Copenhagen, Denmark (27/09/2022);
10. *Amplitudes 2022*, Charles University, Prague, Czech Republic (09/08/2022);
11. *Novel Developments in Scattering Amplitudes*, MIAPbP, Munich, Germany (12/07/2022);
12. *LoopFest XX*, University of Pittsburgh, Pittsburgh (PA), USA (12/05/2022);
13. *Milan Christmas Meeting*, Milan, Italy (22/12/2021);
14. *Paris Winter Workshop: The Infrared in QFT*, Sorbonne University, Paris, France (04/03/2020);
15. *Milan Christmas Meeting*, Milan, Italy (19/12/2019);
16. *LoopFest XVIII*, Fermilab, Batavia (IL), USA (13/08/2019);
17. *Strings, Cosmology, and Gravity Student Conference*, Munich, Germany (02/04/2019);
18. *Rencontres de Moriond – QCD & High Energy Interactions*, La Thuile, Italy (28/03/2019);
19. *Spring Meeting of the German Physical Society*, Munich, Germany (21/03/2019);
20. *Milan Christmas Meeting*, Milan, Italy (21/12/2018);
21. *Loops and Legs in Quantum Field Theory*, St. Goar, Germany (01/05/2018).

I was invited to give seminars at several institutions:

1. **CERN**, Switzerland (27/11/2023);
2. University of Regensburg, Germany (20/01/2023);
3. **University of Bologna**, Italy (22/11/2022);
4. **CERN**, Switzerland (11/02/2022);
5. Laboratoire d'Annecy-le-Vieux de Physique Théorique, France (08/07/2021);
6. **University of Milan**, Italy (13/04/2021);
7. **SLAC** National Accelerator Laboratory, Stanford University, USA (03/03/2021);
8. Institute for Theoretical Physics, University of Heidelberg, Germany (03/12/2019);
9. McGill University, Montréal (QC), Canada (15/08/2019);
10. Niels Bohr Institute, University of Copenhagen, Denmark (06/06/2019).

ORGANISATION OF SCIENTIFIC EVENTS

- *QCD seminar* series at CERN, 10/2024 – now (<https://indico.cern.ch/category/11616/>);
- Workshop “*QCD meets EW*,” 5–9/02/2024, CERN (<https://indico.cern.ch/event/1365512/>).

PEER REVIEWS

Referee for scientific journals:

- Journal of High Energy Physics,
- SciPost,
- Nuclear Physics (section B).

TEACHING EXPERIENCE

- Co-supervision of bachelor and master theses:
 - “*A study of the differential equations method for Feynman integrals in connection with Scientific Machine Learning*”, Francesco Calisto, now Ph.D. student at Caltech, B.Sc. thesis at University of Torino (2022) – led to a [publication](#);
 - “*Conformal symmetry predictions for on-shell scattering amplitudes*”, Bláithín Power, M.Sc. thesis at Ludwig-Maximilians-Universität-München (2020) – led to a [publication](#);
 - “*Conformal properties of all-plus scattering amplitudes*”, Edward Wang, B.Sc. thesis at Ludwig-Maximilians-Universität-München (2019).
- Ongoing co-supervision of a PhD student at the University of Bologna ([Mattia Pozzoli](#)).
- Tutor at the [School of Analytic Computing in Theoretical High-Energy Physics](#), Atrani, Italy (2019).

IT SKILLS

- Proficient use of **Wolfram Mathematica**.
- Good knowledge of **C++**, **Python** and **Bash**. Courses on C++/Bash/Linux at the University of Milan; on Bash/Linux at the Center for Data Processing (ZDV) of the University of Mainz (2018); on Python at the International Max-Planck Research School on Astrophysics in Munich (2019).
- Good experience with **high performance/parallel computing**. Attended a course on parallel computation with the workload manager SLURM at the ZDV of the University of Mainz (2018).
- Creator and maintainer of the website <https://scattering-amplitudes.mpp.mpg.de/scattering-amplitudes-in-qft/>.
- Others: git, LaTeX, Office Suite. Experience with MacOS, Linux, Windows.

ADDITIONAL TRAINING

- *Amplitudes Summer School*, UC Davis (CA), USA (2018).
- Workshop “*Efficiency Skills for Scientists: Get the same done in less time*,” Munich (2018).
- Online course “**Machine Learning**” by Stanford University (2020).

Geneva, 15th July 2024

