

# Federico Zerbini

Universidad UNED, Departamento de Matemáticas

Calle de Juan del Rosal 10

28040 Madrid (Spain)

✉ federico.zerbini@maths.ox.ac.uk

## Personal Information

Birth July 9th, 1989 in Milan, Italy

Nationality Italian

## Employment

- 12/'22-now **Beatriz Galindo tenure track**, UNED, Departamento de Matematicas (Madrid, Spain).
- 09/'22-11/'23 **Postdoctoral fellow**, Mathematical Institute, University of Oxford (UK).
- 10/'22-09/'23 **Stipendiary Lecturer**, St. Peter's College, University of Oxford (UK).
- 09/'20-08/'22 **Marie Skłodowska-Curie Postdoctoral Fellow**, Institut de Physique Théorique (IPhT), CEA-Saclay (Paris, France).
- 10/'19-08/'20 **LabEx IRMIA Postdoctoral Fellow**, Institut de Recherche Mathématique Avancée (IRMA) at Strasbourg University (France).
- 11/'17-09/'19 **LabEx Hadamard Postdoctoral Fellow in “Mathematics and Physics”**, Institut de Physique Théorique (IPhT), CEA-Saclay (Paris, France).

## Education

- 10/2017 **Ph.D. in mathematics**, Bonn University (Germany), thesis: “Elliptic multiple zeta values, modular graph functions and genus 1 superstring scattering amplitudes”, supervised by Prof. Don Zagier (Max Planck Institute for Mathematics).
- 07/2013 **M.Sc. in mathematics**, Double-degree master ALGANT (ALgebra, Geometry And Number Theory), Bordeaux 1 University (France) and Milan University (Italy), thesis: “The dominant root assumption in problems with linear recurrences”, supervised by Prof. Yuri Bilu.
- 07/2011 **B.Sc. in mathematics**, Milan University (Italy), thesis: “On the irrationality of the function zeta at the odd integers”, supervised by Prof. Giuseppe Molteni.

## Articles

### Published

- 12/2022 **Single-valued hyperlogarithms, correlation functions and closed string amplitudes**, joint with P. Vanhove, Adv. Theor. Math. Phys. Vol. 26 no. 2 (2022), arXiv:1812.03018.
- 02/2022 **Building blocks of closed and open string amplitudes**, joint with P. Vanhove, PoS Vol. 383 (2022) MA2019 022, arXiv:2007.08981.
- 03/2020 **Genus-zero and genus-one string amplitudes and special multiple zeta values**, joint with D. Zagier, Commun. Number Theory Phys. Vol. 14 no. 2 (2020) 413–452, arXiv:1906.12339.
- 01/2019 **Modular and holomorphic graph functions from superstring amplitudes**, Conference Proceedings Elliptic Integrals, Elliptic Functions and Modular Forms in Quantum Field Theory (2019), Chap. 18, 459–484, Springer-Verlag Wien, arXiv:1807.04506.
- 01/2019 **From elliptic multiple zeta values to modular graph functions: open and closed strings at one loop**, joint with J. Brödel and O. Schlotterer, J. High Energ. Phys. Vol. 2019 Nr. 01 (2019) 155, arXiv:1803.00527.
- 12/2016 **Single-valued multiple zeta values in genus 1 superstring amplitudes**, Commun. Number Theory Phys. Vol. 10 no. 4 (2016) 703–737, arXiv:1512.05689.
- 04/2016 **Counting invertible potentials**, joint with A. Ros Camacho, Appendix to “Strangely dual orbifold equivalence I” from R. Newton, A. Ros Camacho, Journal of Singularities Vol. 14 (2016) 46–51, arXiv:1509.08069.

### Preprints

- 07/2023 **Elliptic hyperlogarithms**, joint with B. Enriquez, arXiv:2307.01833.
- 12/2022 **Analogues of hyperlogarithm functions on affine complex curves**, joint with B. Enriquez, arXiv:2212.03119.

10/2021 **Construction of Maurer-Cartan elements over configuration spaces of curves**, joint with B. Enriquez, arXiv:2110.09341.

---

## Grants and awards

- 2023-2027 **“Beatriz Galindo junior” grant**.
- 2020-2022 **“Marie Curie Individual Fellowship” grant**, for the project “Higher genus polylogarithms and scattering amplitudes” (HIPSAM), European Union’s HORIZON 2020 Programme.
- 2017-2019 **“Prestige” co-financing grant**, for the project “The mathematical structure of Feynman amplitudes in string theory”, European Union’s Seventh Framework Programme.
- 2014 **Master Thesis prize**, INdAM (Istituto Nazionale di Alta Matematica - National Institute for Advanced Mathematics).
- 2011-2013 **INdAM master grant**, awarded to the top 7 Italian master students in mathematics.
- 2008-2011 **INdAM bachelor grant**, awarded to the top 40 Italian freshmen in mathematics.

---

## Organization of scientific events

- 07/2022 **AMS-SMF-EMS Joint International Meeting** “Special Session on Mathematical Physics of Gravity”, Grenoble University (France)
- 2020-now **Online seminar** “Motives and Period Integrals in Quantum Field Theory and String Theory”
- 2017-2019 **Seminar** “Motives and Feynman integrals”, École Polytechnique (Paris, France)
- 09/2015 **School** “Introductory school to moduli spaces”, Max Planck Institute for Mathematics (Bonn, Germany)

---

## Teaching, mentoring and outreach

- 2022-2023 **College tutorials**, *Metric Spaces and Complex Analysis, Integration, Group Theory, Multidimensional Analysis and Geometry*, University of Oxford (UK).
- Spring 2019 **Exercise classes**, *Sequences, integrals and linear algebra*, Sorbonne University, IMJ (Paris, France).
- 09/2018 **Co-supervision** of the exchange PhD student Ekta Chaubey, in the framework of a joint doctoral school programme between Mainz University and IPHT Paris-Saclay.
- 09/2015 **Graduate level mini-course**, *Modular forms*, MPIM (Bonn, Germany).
- 2010-2011 **Scientific guide** at the *Center for research on communication and informal learning of mathematics “Matematita”* (Milan, Italy).
- 2007-2011 **Private tutoring in mathematics and physics**, *Bachelor students in economics and engineering, high school students*, Milan (Italy).

---

## Professional service

Referee for: Communications in Mathematical Physics, Communications in Number Theory and Physics, Journal of High Energy Physics, Journal of Integer Sequences, MathSciNet, zbMATH Open

---

## Selected talks

### Conferences and workshops

- 09/2023 **ETH (Zurich, Switzerland)**, Workshop “Elliptics and beyond ’23”.
- 06/2023 **Pollica Physics Center (Pollica, Italy)**, Workshop “New connections between Physics and Number Theory”.
- 03/2023 **Bethe Center for Theoretical Physics (Bonn, Germany)**, Workshop “Geometries and Special Functions for Physics and Mathematics”.
- 11/2022 **IHES (Bures-sur-Yvette, France)**, 10th Itzykson seminar.
- 09/2022 **INI (Cambridge, UK)**, Programme “New Connections in Number Theory and Physics”.
- 07/2022 **Grenoble University (France)**, AMS-EMS-SMF Joint International Meeting.
- 05/2022 **Nice University (France)**, Fifth International Workshop on Zeta Functions in Algebra and Geometry, Talk cancelled due to Covid positivity.
- 05/2021 **ENS Lyon (France)**, Conference “Rendez-vous on Special Values and Periods” (RSVP).
- 09/2020 **MITP (Mainz, Germany)**, Conference “Elliptics and beyond 2020”.
- 02/2020 **Sirius Mathematics Center (Sochi, Russia)**, Conference “Integrable systems and automorphic forms”.
- 09/2019 **Montpellier University (France)**, Workshop “Multiple zeta values and deformation quantization”.
- 07/2019 **Trinity College Dublin (Ireland)**, Conference “Amplitudes 2019”.

- 06/2019 **Uppsala University (Sweden)**, Workshop “Supergravity divergences and modular graph forms”.
- 04/2019 **ETH (Zurich, Switzerland)**, Workshop “Modular forms, periods and scattering amplitudes”.
- 11/2018 **Galileo Galilei Institute (Florence, Italy)**, Programme “Amplitudes in the LHC era”.
- 03/2018 **Hausdorff Institute for Mathematics (Bonn, Germany)**, Workshop “Amplitudes and periods”.
- 10/2017 **DESY Zeuthen (Germany)**, Conference “Elliptic Integrals, Elliptic Functions and Modular Forms in Quantum Field Theory”.
- 02/2017 **Humboldt University (Berlin, Germany)**, Conference “KMPB-day 2017”.

### Seminars

- 01/2023 **Strasbourg University (France)**, Algebra and topology seminar.
- 10/2022 **Universidad Nacional de Colombia (Bogotá, Colombia)**, Online algebraic geometry seminar.
- 04/2022 **ETH (Zurich, Switzerland)**, QFT, strings and beyond seminar.
- 03/2022 **Durham University (UK)**, High Energy Physics seminar.
- 02/2022 **Montpellier University (France)**, AGATA seminar.
- 01/2022 **Dijon University (France)**, Mathematical physics seminar.
- 04/2021 **IMPA (Rio de Janeiro, Brasil)**, GADEPs seminar.
- 12/2020 **Nagoya University (Japan)**, Japan Europe number theory exchange seminar (JENTE).
- 11/2020 **Strasbourg University (France)**, Algebraic geometry seminar.
- 04/2019 **Sorbonne University (Paris, France)**, Mathematical physics seminar.
- 02/2019 **École polytechnique (Paris, France)**, Seminar “Motifs et intégrales de Feynman”.
- 11/2018 **Chalmers University (Gothenburg, Sweden)**, Number theory seminar.
- 05/2018 **Montpellier University (France)**, Algebraic geometry seminar.
- 04/2018 **Utrecht University (Netherlands)**, MathPhys seminar.
- 03/2018 **Sorbonne University (Paris, France)**, Number theory seminar.
- 02/2017 **MPIM (Bonn, Germany)**, Seminar on Algebra, Geometry and Physics.
- 11/2016 **ICTP (Trieste, Italy)**, Number theory seminar.
- 11/2016 **Oxford University (UK)**, Relativity seminar.
- 09/2016 **Milan University (Italy)**, Analytic number theory seminar.
- 05/2016 **ETH (Zurich, Switzerland)**, Mathematical physics seminar.

### Scientific visits

- 08/’22-09/’22 **Isaac Newton Institute (Cambridge, UK)**, *Programme “New Connections in Number Theory and Physics”*.
- 06/2022 **University of Oxford (UK)**.
- 02/’22-03/’22 **University of Oxford (UK)**.
- 10/’20-12/’20 **Strasbourg University (France)**.
- 11/2018 **Galileo Galilei Institute (Florence, Italy)**, *Programme “Amplitudes in the LHC era”*.
- 02/’18-03/’18 **Hausdorff Institute for Mathematics (Bonn, Germany)**, *Hausdorff Trimester Programme “Periods in Number Theory, Algebraic Geometry and Physics”*.
- 10/2015 **Max Planck Institute for Gravitational Physics (Potsdam, Germany)**.
- 09/2015 **Institute des Hautes Études Scientifiques (IHES, Bures sur Yvette, France)**.

### Languages

- Fluent English, Italian, French, Spanish
- Intermediate German