Federico Zerbini

Personal Information

Birth July 9th, 1989 in Milan, Italy

Nationality Italian

Employment

- 12/22 pres. Beatriz Galindo tenure track, Departamento de Matemáticas Fundamentales, UNED (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 Sklodowska-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), 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**, Max Planck Institute for Mathematics and Bonn University (Germany), thesis: "Elliptic multiple zeta values, modular graph functions and genus 1 superstring scattering amplitudes", supervised by Prof. Don Zagier)
- 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

- 10 Schottky–Kronecker forms and hyperelliptic polylogarithms, joint with K. Baune, J. Broedel, E. Im and A. Lisitsyn, J. Phys. A: Math. Theor. 57 445202 (2024), arXiv:2406.10051
 - 9 Elliptic hyperlogarithms, joint with B. Enriquez, Canad. J. Math., accepted (2024), arXiv:2307.01833
 - 8 Analogues of hyperlogarithm functions on affine complex curves, joint with B. Enriquez, Publ. Res. Inst. Math. Sci., accepted (2024), arXiv:2212.03119
 - 7 Building blocks of closed and open string amplitudes, joint with P. Vanhove, PoS Vol. 383 (2022) MA2019 022, arXiv:2007.08981
 - 6 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
 - 5 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
 - 4 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
 - 3 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
 - 2 Single-valued multiple zeta values in genus 1 superstring amplitudes, Commun. Number Theory Phys. Vol. 10 no. 4 (2016) 703–737, arXiv:1512.05689
- 1 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

1 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

- 2020-now Online seminar "Motives and Period Integrals in Quantum Field Theory and String Theory"
- 02/2024 Workshop "Jornada sobre Superficies de Riemann", UNED (Madrid, Spain)
- 07/2022 AMS-SMF-EMS Joint International Meeting "Special Session on Mathematical Physics of Gravity", Grenoble University (France)
- 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

Committee One master thesis defense at UNED member for:

Selected talks

Conferences and workshops

- 08/2024 MIAPbP (Munich, Germany), Workshop "Elliptics and beyond '24"
- 05/2024 GGI (Florence, Italy), Programme "Resurgence and Modularity in QFT and String Theory"
- 04/2024 HIM (Bonn, Germany), Follow-up workshop "Periods in Physics, Number Theory and Algebraic Geometry"
- 03/2024 UNIGE (Geneva, Switzerland), Workshop "Multiple zeta values, associators and related topics"
- 09/2023 ETH (Zurich, Switzerland), Workshop "Elliptics and beyond '23"
- 06/2023 Pollica Physics Center (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 **GGI** (Florence, Italy), Programme "Amplitudes in the LHC era"
- 03/2018 HIM (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
- 11/2024 IMJ Sorbonne University (Paris, France), Enumerative geometry seminar
- 07/2024 Nagoya University (Japan), Number theory seminar
- 02/2024 UCM (Madrid, Spain), Mathematical physics and algebraic geometry seminar (MAPHYAG)
- 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 IPhT CEA-Saclay (Paris, France), Mathematical physics seminar
- 03/2018 IMJ Sorbonne University (Paris, France), Number theory seminar
- 12/2017 École polytechnique (Paris, France), Seminar "Motifs et intégrales de Feynman"
- 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
- 11/2016 MPIM (Bonn, Germany), Oberseminar
- 09/2016 Milan University (Italy), Analytic number theory seminar
- 05/2016 ETH (Zurich, Switzerland), Mathematical physics seminar

Scientific visits

- 08/22-09/22 INI (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 **GGI** (Florence, Italy), Programme "Amplitudes in the LHC era"
- 02/18-03/18 HIM (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 IHES (Bures sur Yvette, France)

Languages

Fluent English, Italian, French, Spanish

Intermediate German