Federico Zerbini

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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., published online 2025:1-36, arXiv:2307.01833
8	**Analogues of hyperlogarithm functions on affine complex curves**, *joint with B. Enriquez*, Publ. Res. Inst. Math. Sci., to appear in Vol. 61 no. 4 (2025), 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

3   **Relating flat connections and polylogarithms on higher genus Riemann surfaces**, *joint with E. D'Hoker, B. Enriquez and O. Schlotterer*, arXiv:2501.07640

2   **Closed-string amplitude recursions from the Deligne associator**, *joint with K. Baune and J. Brödel*, arXiv:2412.17579

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

Grants and awards

2023-2027   **"Proyecto de generación de conocimiento" grant**, *for the project "Riemann surfaces: symmetry, supersymmetry and applications" (team member)*, 62.500€, Spanish ministry of Science, Innovation and Universities

2023-2027   **"Beatriz Galindo junior" grant**, *P.I.*, 200000€, Spanish ministry of Science, Innovation and Universities

2020-2022   **"Marie Curie Individual Fellowship" grant**, *for the project "HIPSAM - Higher genus polylogarithms and scattering amplitudes" (P.I.)*, 184707€, European Union's HORIZON 2020 Programme

2017-2019   **"Prestige" co-financing grant**, *for the project "The mathematical structure of Feynman amplitudes in string theory" (P.I.)*, 30000€, European Union's Seventh Framework Programme

2014   **Master Thesis prize**, 2000€, 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*, 6000€

2008-2011   **INdAM bachelor grant**, *awarded to the top 40 Italian freshmen in mathematics*, 12000€

Organization of scientific events

2020-2024   **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

Spring 2025   **Bachelor course**, *Functions of a complex variable*, UNED

Fall 2024   **Master course**, *Complex analysis*, UNED

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: Communications in Mathematical Physics, Communications in Number Theory and Physics, International Journal of Number Theory, Journal of High Energy Physics, Journal of Integer Sequences

Reviews: MathSciNet, zbMATH Open

Committees

06/2024   Master thesis defense of Pedro Mateu Moyà (UNED)

12/2023   Selection committee for admissions at University of Oxford, St. Peter's College

Invited 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"

Selected 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