

CURRICULUM VITAE

GIUSEPPE DE LAURENTIS

GENERAL INFORMATION

- *Academic Email* giuseppe.delarentis@ed.ac.uk
- *Personal Website* gdelaurentis.github.io
- *Nationality* Italian ◦ *Place of Birth* Milan, Italy ◦ *Date of Birth* 16th July 1993
- *Publications I refereed* 3 ◦ *H-Index/Published Papers* 10/15 ◦ *Database* inspirehep.net

EMPLOYMENT

- **PostDoc - Higgs Centre for Theoretical Physics - University of Edinburgh** 01/10/2023 -
Supervisors: Einan Gardi and Mao Zeng
- **PostDoc - Paul Scherrer Institut (PSI)** 01/10/2022 - 30/09/2023
Supervisor: Harald Ita - LTP Theory Group
- **PostDoc - Physikalisches Institut - Albert-Ludwigs-Universität Freiburg** 01/09/2020 - 30/09/2022
Supervisor: Harald Ita - Theoretische Teilchenphysik

HIGHER EDUCATION

- **PhD - Institute for Particle Physics Phenomenology - Durham Uni.** 01/09/2016 - 31/08/2020
STFC Scholarship - Supervisor: Daniel Maître - Viva: 15th July 2020 - Awarded: 7th Jan. 2021
- **Master Degree in Physics (MPhys) - University of Oxford** 01/10/2012 - 01/06/2016
Theoretical and Particle Physics - First Class - Winton Capital Prize for Best 2016 MPhys Thesis
- **Selected Courses at Harvard University & Stanford University** Summer Terms 2010 - 2011
Classical Physics (Mark: A), Calculus (Mark: A+), Introduction to Statistics (Mark: A)

ADDITIONAL EDUCATION & EXAMS

- **GREs:** General - Percentile: 95^o (in 2 of 3 sections); Physics - Percentile 87^o 19/09/2015 & 01/10/2015
- **SATs** - Maths 2 and Physics - Both Full Marks: 800/800 2011
- **SUMaC** - Stanford University Mathematics Camp Summer 2009
- Earlier info available upon request

THESES

- **Numerical techniques for analytical high-multiplicity scattering amplitudes** 14/09/2020
Giuseppe De Laurentis - Supervisor: Daniel Maître - PhD Thesis - etheses.dur.ac.uk/13705
- **The CHY formalism for massless scattering** - [CHYReview.pdf](#) 12/04/2016
GDL - Supervisor: Yang-Hui He - Master's Thesis - Best 2016 MPhys Thesis at Oxford (See Awards)

AWARDS

- **MSCA Seal of Excellence** 2025
- **Government of Ireland Postdoctoral Fellowship** (declined) value €105,604 2023
- **Nick Brown Memorial Award at Durham University** (travel grant) 2019
- **Winton Capital Prize for the best MPhys Research Project at Oxford University** 2016

PUBLICATIONS

- **An analytic result for the $0 \rightarrow ggHHH$ amplitude**
John M. Campbell, Giuseppe De Laurentis, R. Keith Ellis 25/07/2025
 Journal: to be submitted - Preprint: [arXiv:2507.19313](https://arxiv.org/abs/2507.19313) - Citations: 2 - Results at [antares-results/HHH](#)
- **Analytic reconstruction with massive particles: one-loop amplitudes for $q\bar{q} \rightarrow t\bar{t}H$**
John M. Campbell, Giuseppe De Laurentis, R. Keith Ellis 28/04/2025
 Journal: [JHEP07\(2025\)147](https://doi.org/10.1007/JHEP07(2025)147) - Preprint: [arXiv:2504.19909](https://arxiv.org/abs/2504.19909) - Citations: 1 - Results at [antares-results/ttH](#)
- **Compact Two-Loop QCD Corrections for V_{jj} Production in Proton Collisions**
Giuseppe De Laurentis, Harald Ita, Ben Page, Vasily Sotnikov 13/03/2025
 Journal: [JHEP06\(2025\)093](https://doi.org/10.1007/JHEP06(2025)093) - Preprint: [arXiv:2503.10595](https://arxiv.org/abs/2503.10595) - Citations: 10 - Results at [antares-results/Vjj](#)
- **Accelerating Berends-Giele recursion for gluons in arbitrary dimensions over finite fields**
Juan Cruz-Martinez, Giuseppe De Laurentis, Mathieu Pellen 10/02/2025
 Journal: [EPJC-10052-025-14318-3](https://doi.org/10.1007/EPJC-10052-025-14318-3) - Preprint: [arXiv:2502.07060](https://arxiv.org/abs/2502.07060) - Citations: 2
- **The Two-Loop Lipatov Vertex in QCD**
S. Abreu, G. De Laurentis, G. Falcioni, E. Gardi, C. Milloy, L. Vernazza 29/12/2024
 Journal: [JHEP04\(2025\)161](https://doi.org/10.1007/JHEP04(2025)161) - Preprint: [arXiv:2412.20578](https://arxiv.org/abs/2412.20578) - Citations: 7
- **Analytic amplitudes for a pair of Higgs bosons in association with three partons**
John M. Campbell, Giuseppe De Laurentis, R. Keith Ellis 22/08/2024
 Journal: [JHEP10\(2024\)230](https://doi.org/10.1007/JHEP10(2024)230) - Preprint: [arXiv:2408.12686](https://arxiv.org/abs/2408.12686) - Citations: 11
- **Double-virtual NNLO QCD corrections for five-parton scattering. II. The quark channels**
Giuseppe De Laurentis, Harald Ita, Vasily Sotnikov 30/11/2023
 Journal: [PhysRevD.109.094024](https://doi.org/10.1103/PhysRevD.109.094024) - Preprint: [arXiv:2311.18752](https://arxiv.org/abs/2311.18752) - Citations: 41
- **Double-virtual NNLO QCD corrections for five-parton scattering. I. The gluon channel**
Giuseppe De Laurentis, Harald Ita, Maximillian Klinkert, Vasily Sotnikov 16/11/2023
 Journal: [PhysRevD.109.094023](https://doi.org/10.1103/PhysRevD.109.094023) - Preprint: [arXiv:2311.10086](https://arxiv.org/abs/2311.10086) - Citations: 44
- **Two-loop QCD corrections for three-photon production at hadron colliders**
Samuel Abreu, GDL, Harald Ita, Maximillian Klinkert, Ben Page, Vasily Sotnikov 26/05/2023
 Journal: [SciPostPhys.15.4.157](https://doi.org/10.21468/SciPostPhys.15.4.157) - Preprint: [arXiv:2305.17056](https://arxiv.org/abs/2305.17056) - Citations: 34
- **Vector boson pair production at one loop: analytic results for the process $q\bar{q}\ell\ell\bar{\ell}'\bar{\ell}'g$**
John M. Campbell, Giuseppe De Laurentis, R. Keith Ellis 31/03/2022
 Journal: [JHEP07\(2022\)096](https://doi.org/10.1007/JHEP07(2022)096) - Preprint: [arXiv:2203.17170](https://arxiv.org/abs/2203.17170) - Citations: 15
- **Ansätze for Scattering Amplitudes from p -adic Numbers and Algebraic Geometry**
Giuseppe De Laurentis, Ben Page 08/03/2022
 Journal: [JHEP12\(2022\)140](https://doi.org/10.1007/JHEP12(2022)140) - Preprint: [arXiv:2203.04269](https://arxiv.org/abs/2203.04269) - Citations: 47
- **The $pp \rightarrow W(\rightarrow l\nu) + \gamma$ process at next-to-next-to-leading order**
John M. Campbell, Giuseppe De Laurentis, R. Keith Ellis, Satyajit Seth 03/05/2021
 Journal: [JHEP07\(2021\)079](https://doi.org/10.1007/JHEP07(2021)079) - Preprint: [arXiv:2105.00954](https://arxiv.org/abs/2105.00954) - Citations: 13
- **Two-Loop Five-Parton Leading-Colour Finite Remainders in the Spinor-Helicity Formalism**
Giuseppe De Laurentis, Daniel Maître 27/10/2020
 Journal: [JHEP02\(2021\)016](https://doi.org/10.1007/JHEP02(2021)016) - Preprint: [arXiv:2010.14525](https://arxiv.org/abs/2010.14525) - Citations: 30
- **The one-loop amplitudes for Higgs + 4 partons with full mass effects**
Lucy Budge, John M. Campbell, Giuseppe De Laurentis, R. Keith Ellis, Satyajit Seth 10/02/2020
 Journal: [JHEP05\(2020\)079](https://doi.org/10.1007/JHEP05(2020)079) - Preprint: [arXiv:2002.04018](https://arxiv.org/abs/2002.04018) - Citations: 36
- **Analytical amplitudes from numerical solutions of the scattering equations**
Giuseppe De Laurentis 24/10/2019
 Journal: [JHEP02\(2020\)194](https://doi.org/10.1007/JHEP02(2020)194) - Preprint: [arXiv:1910.11355](https://arxiv.org/abs/1910.11355) - Citations: 6
- **Extracting analytical one-loop amplitudes from numerical evaluations**
Giuseppe De Laurentis, Daniel Maître 08/04/2019
 Journal: [JHEP07\(2019\)123](https://doi.org/10.1007/JHEP07(2019)123) - Preprint: [arXiv:1904.04067](https://arxiv.org/abs/1904.04067) - Citations: 47

CONFERENCE PROCEEDINGS

- **Two-Loop Five-Point One-Mass Amplitudes in the Spinor-Helicity Formalism** 2024
Giuseppe De Laurentis
Journal: PoS ICHEP2024 (2025) 786 - Preprint: [arXiv:2409.15996](https://arxiv.org/abs/2409.15996) - 42nd ICHEP 2024
- **Non-Planar Two-Loop Amplitudes for Five-Parton Scattering** 2024
Giuseppe De Laurentis
Journal PoS LL2024 (2024) 006 - Preprint: [arXiv:2406.18374](https://arxiv.org/abs/2406.18374) - Loops and Legs in QFT 2024
- **Lips: p -adic and singular phase space** 2023
Giuseppe De Laurentis
Journal: J.Phys.Conf.Ser. 2438 (2023) 1 - Preprint: [arXiv:2305.14075](https://arxiv.org/abs/2305.14075) - ACAT 2022
- **Constructing Compact Ansätze for Scattering Amplitudes** 2022
Giuseppe De Laurentis, Ben Page
Journal: PoS LL2022 (2022) 038 - Preprint: [arXiv:2207.10125](https://arxiv.org/abs/2207.10125) - Loops and Legs in QFT 2022
- **Algebraic geometry and p -adic numbers for scattering amplitude ansätze** 2022
Giuseppe De Laurentis
Journal: J.Phys.Conf.Ser. 2438 (2023) - ACAT 2021

CONFERENCE TALKS

- **PyHEP** - CERN, CH (online talk) - [indico link](#) 10/2025
Scattering Amplitude Reconstruction in Python
- **Resummation, Evolution, Factorization** - Milan, IT - [indico link](#) 10/2025
Towards the complete one-loop two-gluon central emission vertex in QCD
- **HHH Workshop** - Dubrovnik, HR - [indico link](#) 10/2025
An analytic result for the $pp \rightarrow HHH$ amplitude
- **LoopFest** - Edmonton, CA - [indico link](#) 05/2025
Analytic Structure and Reconstruction in QCD: Two-Loop $pp \rightarrow Vjj$ and One-Loop $q\bar{q} \rightarrow t\bar{t}H$
- **SM@LHC** - Durham, UK - [indico link](#) 04/2025
Compact Two-Loop QCD Corrections for Vjj Production in Proton Collisions
- **ICHEP** - Prague, CZ - [indico link](#) 07/2024
Two-Loop Five-Point Amplitudes in the Spinor Helicity Formalism
- **Loops and Legs in QFT** - Wittenberg, DE - [indico link](#) 04/2024
Non-Planar Two-Loop Amplitudes for Five-Parton Scattering
- **QCD Meets EW** - CERN, CH - [indico link](#) 02/2024
Calculation of multileg QCD amplitudes
- **MathemAmplitudes** - Padova, IT - [indico link](#) 09/2023
Mathematical and Physical Structures of Rational Functions in Scattering Amplitudes
- **Loopfest** - SLAC, USA - [indico link](#) 06/2023
Non-planar two-loop QCD corrections to $q\bar{q} \rightarrow \gamma\gamma\gamma$: finite remainders in the spinor-helicity formalism
- **ACAT** - Bari, IT - [indico link](#) 10/2022
Singular and p -adic phase space: a phase space generator for theory computations
- **High Precision for Hard Processes** - Newcastle, UK - [indico link](#) 09/2022
Non-planar two-loop corrections to $q\bar{q} \rightarrow \gamma\gamma\gamma$: finite remainders in the spinor-helicity formalism
- **Loops and Legs in QFT 2022** - Ettal, DE - [indico link](#) 05/2022
Scattering amplitude ansätze from algebraic geometry and p -adic numbers
- **ACAT 2021** - Daejeon, SK (remote) - [indico link](#) 11/2021
Algebraic geometry and p -adic Nnmbers for amplitude ansätze

- **QCD@LHC 2019** - Buffalo, NY - [indico link](#) 07/2019
Analytical amplitudes from numerical evaluations
- **YETI 2019** - Durham, UK - [indico link](#) 01/2019
Numerical to analytical amplitudes

TEACHING EXPERIENCE

- **Master's project supervision** 2025 -
University of Edinburgh - Higgs Centre for Theoretical Physics
- **Senior Teaching Assistant - Theoretische Physik I & II, Advanced QM, QFT I** 2020 - 2022
Albert-Ludwigs-Universität Freiburg - Physikalisches Institut
- **Teaching Assistant - Mathematical Workshop & Foundations of Physics 3A** 2016 - 2020
Durham University - Department of Physics

ORGANISATIONAL EXPERIENCE

- **PPT Seminars** - Edinburgh, UK - organizer - weekly - [calendar link](#) 09/2023 -
- **QCD meets Gravity** - Zurich, CH - local organisation - conference - [indico link](#) 12/2022
- **YTF 11 & YTF 12** - organising committee - conferences - [indico link 1](#) and [link 2](#) 2019 & 2020
- **Computing club** - Durham, UK - organiser - weekly informal seminars 2017 - 2020

PHYSICS SCHOOLS ATTENDED

- **QCD Master Class** 06/2019
Saint-Jacut-de-la-Mer - France
- **MITP 2018 Summer School** 07/2018 - 08/2018
Mainz Institute for Theoretical Physics - Germany
- **BUSSTEPP** - 47th British Universities Summer School in Theoretical Elementary Particle Physics 08/2017 - 09/2017
University College London - United Kingdom
- **Amplitudes 2017 Summer School** 07/2017
University of Edinburgh - Higgs Centre for Theoretical Physics - United Kingdom

INDUSTRY EXPERIENCE

- **Programmer for hepdata.net** Spring 2020
I worked on the hepdata.net API, entry submission and its interface to arxiv.org.
- **Internship at Mecaer Aviation Group** Summer 2013
I assisted a senior engineer to modify a valve and I wrote reports on experiments made to assess the durability and reliability of a servo-control model (it transmits the cloche signal to the helicopter blades).

OPEN SOURCE SOFTWARE

The following software is freely available at github.com/GDeLaurentis and at pypi.org.

- **lips** PyPI downloads 1.2k/month - phase-space generation w/ complex numbers, finite fields, p -adic numbers; singular-limit manipulation; spinor-helicity computation facilities; algebro-geometric tools (ideals and varieties);
- **pyadic** PyPI downloads 3.4k/month - a Python implementation of p -adic numbers, finite fields and related algorithms, such as rational number reconstruction, and Newton polynomial and Thiele rational interpolation;

- [syngular](#)  - an object-oriented Python interface and extension of the algebraic geometry code [Singular](#), with a solver for arbitrary systems of polynomials equations, including over quotient rings, and a test for primality of ideals;
- [seampy](#)  - arbitrary-precision numerical solutions of the scattering equations in the CHY formalism and computation of tree-level amplitudes in a variety of theories.
- [antares](#)  - Automated Numerical To Analytical Reconstruction Software; partially still private, with the tools needed by [antares-results](#) to load and evaluate the analytic expressions public;
- [antares-results](#)  - A list of computed amplitudes in both human and computer readable format, currently available: $pp \rightarrow Vjj$, $pp \rightarrow jjj$ at two loop and $0 \rightarrow 6g$ at one loop.

The following software is still private, but I will make it publicly available in the near future.

- [linac](#) - Linear Algebra w/ CUDA, a high-performance library for general-purpose graphics-processing units, for instance it can solve a linear system of 100k equations in 100k unknowns in 45 minutes on an A100.

SKILLS

- **Python, C/C++, CUDA, L^AT_EX, Mathematica, Office, Origin, TurboPascal, AutoIt**
- **Driving licence** - Patente B - Cars and small motorbikes
- **Italian** - Mother tongue ○ **English** - Bilingual ○ **French & German** - Elementary

ACADEMIC INTERESTS

- Fixed order scattering amplitude computations, especially via on-shell methods;
- Mathematical structure of scattering amplitudes (zeros, poles, branch cuts, etc.);
- Number-theoretic and algebro-geometric methods for quantum field theory computations;
- Precision Standard Model phenomenological prediction;
- Hardware acceleration for precision particle physics;
- Machine learning applications to theoretical particle physics and mathematics.