Xavier Kervyn

Max-Planck-Institut für Physik, Office A.3.31, Boltzmannstr. 8, 85748 Garching, Germany
Born in May 2001. Belgian | xavier.kervyn@mpp.mpg.de | xavierkervyn.github.io/

Current Research Interests

String theory, (flat space) holography, scattering amplitudes, conformal bootstrap, twistor theory.

Academic Employment

Max Planck Institute for Physics Garching, Germany & remote — 09/2024
Graduate Researcher, MPI/MPP String Theory Group — –present

– Master's thesis, advised by Dr. Stephan Stieberger

Education

Ludwig-Maximilians- & Technische Universität München Munich, Germany — 10/2023
Master of Science in Theoretical and Mathematical Physics — –present

Peterhouse, University of Cambridge Cambridge, United Kingdom — 10/2022
Master of Advanced Study in Applied Mathematics — 06/2023

Ecole Polytechnique Fédérale de Lausanne Lausanne, Switzerland — 09/2019
Bachelor of Science in Physics — 08/2022

Selected Awards, Grants & Scholarships

Research Grant – Fondation du Domaine de Villette — 2023/25
2 × CHF 5'000. Supporting graduate research in Padova, Munich and Copenhagen from 2023-2025

Erasmus+ Scholarship – Ludwig-Maximilians-Universität Munich — 05/2024
5 × €600. Awarded to support an exchange semester at the University of Copenhagen

College Prize in Applied Mathematics – Peterhouse, University of Cambridge — 12/2023
£300. Awarded in recognition of my academic achievements

Retrospective Scholarship in Mathematics – Peterhouse, University of Cambridge — 12/2023
£125. Awarded in recognition of my academic achievements

Greta Burkill Fund award, Bruckmann Fund award – Peterhouse, University of Cambridge — 03/2023
2 × £300. Supporting attendance to conferences

Annual Scholarship – Swiss Study Foundation — 11/2022
CHF 20'000. Financial support for master studies at the University of Cambridge

Excellence Scholarship – Colbianco Stiftung — 08/2022
CHF 2'000. Financial support for master studies at the University of Cambridge

Fellowship – Swiss Study Foundation & e-fellows.net — 05/2022
Awarded for exceptional academic achievements and leadership potential

Swiss Mobility Program grant – Ecole Polytechnique Fédérale de Lausanne — 09/2021
CHF 1'500. Supporting an exchange year at ETH Zurich

Baccalaureate Merit Award – Région Provence-Alpes Côte d'Azur — 07/2019
€400. Awarded for achieving the highest distinction at the French Baccalaureate

Publications & Preprints [Inspire HEP / Google Scholar; *=under review] (author ordering is alphabetical in hep-th)

[1] X. Kervyn and S. Stieberger, *High Energy String Theory and the Celestial Sphere* (to appear).

[2] *X. Kervyn, D. Polvara and A. Sfondrini, *Thermodynamics of Integrable $\mathcal{N}=2$ Theories, Squared*, 2502.10356.

[3] *X. Kervyn, *BMS Symmetries of Gravitational Scattering*, 2308.12979.

Theses & Study Projects

5. X. Kervyn, *Bootstrapping $d = 4$, $\mathcal{N} = 4$ Super Yang-Mills in the presence of a $\frac{1}{2}$-BPS boundary defect*
   Individual Study Project, University of Copenhagen, Jan., 2025. Grade: 12/12.
4. X. Kervyn, *Gauge-Gravity Duality*
   Individual Study Project, University of Copenhagen, Nov., 2024. Grade: 12/12.
3. X. Kervyn, *BMS Symmetries of Gravitational Scattering*
   Part III essay, University of Cambridge, May, 2023. Grade: 86%, Distinction.
2. X. Kervyn, N. Roux, *Towards an automatized analysis framework for the upcoming HL-LHC CMS ECAL*
   Student Project, ETH Zürich & CERN CMS collaboration, Jul., 2022. Grade: 6/6.
1. X. Kervyn, *Impact of non-perfect nulls on the detectable population by the LIFE space mission*
   Student Project, ETH Zürich, Dec., 2021. Grade: 6/6.

Research Stays

Niels Bohr Institute Copenhagen, Denmark — 09/2024
Visiting Student, Theoretical High-Energy Physics — 01/2025

- Research on the superconformal bootstrap of gauge theories with defects
- Supervised by Prof. Charlotte Kristjansen and Dr. Adam Chalabi

Università degli Studi di Padova Padova, Italy — 07/2023
Visitor, Theoretical Physics

- Research on integrability in string theory and AdS/CFT; Thermodynamic Bethe Ansatz
- Supervised by Prof. Alessandro Sfondrini and Dr. Davide Polvara

University of Cambridge Cambridge, United Kingdom — 12/2022
Graduate Student, Department of Applied Mathematics and Theoretical Physics — 08/2023

- Essay on the *BMS Symmetries of Gravitational Scattering*, expanded into a review article
- Supervised by Dr. Prahar Mitra

CERN CMS collaboration Meyrin, Switzerland — 06/2022
Undergraduate Researcher, ETH Zürich High-Energy Physics group — 07/2022

- Research on the new CMS electrocalorimeter for the High-Luminosity phase of the LHC
- Supervised by Dr. Simone Pigazzini (ETHZ/CERN)
- Funding: ETH Zürich, Department of Physics

ETH Zürich Zürich, Switzerland — 09/2021
Undergraduate Researcher, Exoplanets and Habitability group — 12/2021

- Research on the LIFE space mission (LIFEsim software), characterizing imperfect nulling
- Supervised by Dr. Felix Dannert and Prof. Sascha Quanz

Conferences, Schools and Workshops attended (*scheduled)

*School on asymptotic symmetries and flat holography, G. Galilei Inst., Florence, Italy [link]	05/2025
*Infrared Surprises of Scattering Amplitudes, CERN, Meyrin, Switzerland [link, *online*]	05/2025
Physics of Machine Learning & ML for Physics, Nordita, Stockholm, Sweden [link, *online*]	01/2025
Frontiers in Gravity, Niels Bohr Institute, Copenhagen, Denmark [link]	09/2024
PhD School: “Towards Gravity", Nordita, Stockholm, Sweden [link, *online*]	08/2024
Celestial Holography Summer School, Perimeter Institute, Waterloo, Canada [link, *online*]	07/2024
Strings 2024, CERN, Meyrin, Switzerland [link]	06/2024
Carollian Physics and Holography, ESI, Vienna, Austria [link]	04/2024
Workshop [...] in analysis and mathematical physics, LMU, Munich, Germany [link]	10/2023

Celestial 2023, University of Warsaw, Warsaw, Poland [link] 08/2023

Integrability, Dualities and Deformations 2023, Durham University, Durham, UK [link] 07/2023

Young Researchers Integrability School & Workshop, Durham University, Durham, UK [link] 07/2023

Eurostrings 2023, Universidad de Oviedo, Gijon, Spain [link] 04/2023

Young Physicists Forum 2022, ETH Zürich, Zürich, Switzerland [link] 05/2022

Contributed Talks & Seminars

Seminar on Scattering Amplitudes, **LMU Munich** 05/2024
Spinor-Helicity Formalism, Twistor Theory and Scattering Amplitudes

Seminar on Generalized Symmetries in QFT, **LMU Munich** 12/2023
Gauging of Discrete Higher Form Symmetries in non-Abelian Yang-Mills theory

DAMTP Part III Seminar Series, **University of Cambridge** 03/2023
Gravitational Scattering and Covariant Phase Space methods in Gravity

DAMTP Part III Seminar Series, **University of Cambridge** 12/2022
Holography and Twistor methods in AdS_5

Outreach

Online Seminar, **Swiss Study Foundation** 05/2024
Organisator, peer event – "The future of CERN and High-Energy Physics"

Volunteer Tutor, **Village Book Builders** 2022/23
1:1 weekly online tutoring sessions with a 13yo. child in Mukono, Uganda (10 months)

Online Seminar, **Swiss Study Foundation** 12/2023
Organisator & speaker, peer event – "The role of Symmetries in Physics"

Website, **online** 2022–...
Built a website to share online learning resources in mathematics and physics with like-minded students

Classroom Presentation, **Lycée Dominique Villars** 2019–...
Presenting my curriculum and advertising STEM university studies to high-school students

Industry & Non-Academic Experience

Research Analyst Munich, Germany 11/2023
180 Degrees Consulting Munich 02/2024

- Team manager. Carrying out research and market analysis; punctual support to consulting teams
- Blueprint for the transition of fashion companies to a circular economy in the DACH region

Technical Skills

Languages: French (native); English, German (full work proficiency); Norwegian, Danish (basics)
Programming: C++ (OOP), Python (NumPy, Pandas, Matplotlib, Seaborn, Plotly.express, SciPy)
Data Analysis: Python (advanced), MATLAB (intermediate), Microsoft Word/Excel/PPT (basics)
Scientific work: LaTeX (GitHub/Overleaf), `Mathematica`, scientific writing, funding application

Academic References

- **Dr. Stephan Stieberger** (Max-Planck Institute for Physics): stephan.stieberger@mpp.mpg.de
- **Prof. Alessandro Sfondrini** (University of Padova): alessandro.sfondrini@unipd.it
- **Dr. Prahar Mitra** (University of Amsterdam): p.mitra@uva.nl

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