

# Xavier Kervyn

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Born on 18 May 2001. Belgian

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## CURRENT RESEARCH INTERESTS

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

## ACADEMIC RESEARCH EXPERIENCE

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**Max-Planck Institute for Physics** Garching, Germany & remote 09/2024  
Graduate Researcher / Master Thesis, MPI String Theory Group –present

- Research on string amplitudes and flat space holography; twisted intersection theory
- Ongoing. Working title: *Towards a String Worldsheet Description of Flat-Space Holography*
- Advisor: [Prof. Stephan Stieberger](#)
- Funding: Fondation du Domaine de Villette

**Niels Bohr Institute** Copenhagen, Denmark 09/2024  
Visiting Student, Theoretical High-Energy Physics –present

- [Study project](#) on the superconformal bootstrap of  $\mathcal{N} = 4$  Super Yang-Mills with defects
- Ongoing research project on the superconformal bootstrap of ABJM theory with defects
- Project advisors: [Prof. Charlotte Kristjansen](#) and [Dr. Adam Chalabi](#)
- Funding: LMU Erasmus+ Scholarship, Fondation du Domaine de Villette

**Università degli Studi di Padova** Padova, Italy & remote 07/2023  
Visiting Researcher, Theoretical Physics 06/2024

- Research on integrability in string theory and  $\text{AdS}_3/\text{CFT}_2$ : Thermodynamic Bethe Ansatz Project completed; publication of our results pending
- Advisors: [Prof. Alessandro Sfondrini](#) and [Dr. Davide Polvara](#)
- Funding: Fondation du Domaine de Villette

**University of Cambridge** Cambridge, United Kingdom 12/2022  
Part III student, Department of Applied Mathematics and Theoretical Physics 08/2023

- Essay on the *BMS Symmetries of Gravitational Scattering*, expanded into a [review article](#)
- Advisor: [Dr. Prahar Mitra](#)
- Funding: Swiss Study Foundation & Colbianco Stiftung

**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
- Advisor: [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
- Advisors: Dr. Felix Dannert and [Prof. Sascha Quanz](#)
- Funding: Swiss-Mobility Program

## EDUCATION

<b>TU München &amp; Ludwig-Maximilians-Universität</b> Munich, Germany	10/2023
Master of Science in Theoretical and Mathematical Physics	08/2025
<ul style="list-style-type: none"><li>• MSc thesis advisor: <a href="#">Prof. Stephan Stieberger</a> (Max-Planck Institute for Physics)</li><li>• Erasmus+ exchange semester at the <b>University of Copenhagen</b>, Denmark</li><li>• Study project on AdS/CFT under <a href="#">Prof. Niels Obers</a> (Niels Bohr Institute). Grade: 12/12.</li></ul>	
<b>Peterhouse, University of Cambridge</b> Cambridge, United Kingdom	10/2022
Master of Advanced Study (MASt) in Applied Mathematics	06/2023
<ul style="list-style-type: none"><li>• Part III essay: <i>BMS Symmetries of Gravitational Scattering</i> (Distinction)</li><li>• Essay setter: <a href="#">Dr. Prahar Mitra</a></li><li>• Graduated with First Class Honours (Merit). Awarded 3 scholarships and 3 prizes</li></ul>	
<b>Ecole Polytechnique Fédérale de Lausanne</b> Lausanne, Switzerland	09/2019
Bachelor of Science in Physics	08/2022
<ul style="list-style-type: none"><li>• Final year at <b>ETH Zürich</b>, Switzerland (Swiss-Mobility program)</li><li>• Awarded a fellowship from the Swiss Study Foundation and e-fellows.net</li></ul>	

## PUBLICATIONS & PREPRINTS [[Inspire HEP](#) / [Google Scholar](#)]

2. X. Kervyn, *Bootstrapping  $d=4$ ,  $N=4$  Super Yang-Mills in the presence of a 1/2-BPS boundary defect*, Jan., 2025
1. X. Kervyn, *BMS Symmetries of Gravitational Scattering*, Aug., 2023. 10.48550/arXiv.2308.12979

## CONFERENCES, SCHOOLS AND WORKSHOPS ATTENDED (\*scheduled)

*School on asymptotic symmetries and flat holography, Galileo Galilei Inst., Florence, Italy [ <a href="#">link</a> ]	05/2025
*Infrared Surprises of Scattering Amplitudes, CERN, Meyrin, Switzerland [ <a href="#">link</a> ]	05/2025
Physics of Machine Learning & ML for Physics, Nordita, Stockholm, Sweden [ <a href="#">link</a> , <i>online</i> ]	01/2025
Frontiers in Gravity, Niels Bohr Institute, Copenhagen, Denmark [ <a href="#">link</a> ]	09/2024
PhD School: "Towards Gravity", Nordita, Stockholm, Sweden [ <a href="#">link</a> , <i>online</i> ]	08/2024
Celestial Holography Summer School, Perimeter Institute, Waterloo, Canada [ <a href="#">link</a> , <i>online</i> ]	07/2024
Strings 2024, CERN, Meyrin, Switzerland [ <a href="#">link</a> ]	06/2024
Carollian Physics and Holography, ESI, Vienna, Austria [ <a href="#">link</a> ]	04/2024
Workshop [...] in analysis and mathematical physics, LMU, Munich, Germany [ <a href="#">link</a> ]	10/2023
Celestial 2023, University of Warsaw, Warsaw, Poland [ <a href="#">link</a> ]	08/2023
Integrability, Dualities and Deformations 2023, Durham University, Durham, UK [ <a href="#">link</a> ]	07/2023
Young Researchers Integrability School & Workshop, Durham University, Durham, UK [ <a href="#">link</a> ]	07/2023
Eurostrings 2023, Universidad de Oviedo, Gijon, Spain [ <a href="#">link</a> ]	04/2023
Young Physicists Forum 2022, ETH Zürich, Zürich, Switzerland [ <a href="#">link</a> ]	05/2022

## CONTRIBUTED TALKS & SEMINARS

Individual Study Project, <b>Niels Bohr Institute</b> Bootstrapping $d = 4$ , $\mathcal{N} = 4$ Super Yang-Mills with a $\frac{1}{2}$ -BPS boundary defect	01/2025
Seminar on Scattering Amplitudes, <b>LMU Munich</b> Spinor-Helicity Formalism, Twistor Theory and Scattering Amplitudes	05/2024
Seminar on Generalized Symmetries in QFT, <b>LMU Munich</b> Gauging of Discrete Higher Form Symmetries in non-Abelian Yang-Mills theory	12/2023
DAMTP Part III Seminar Series, <b>University of Cambridge</b> Gravitational Scattering and Covariant Phase Space methods in Gravity	03/2023
DAMTP Part III Seminar Series, <b>University of Cambridge</b> Holography and Twistor methods in $\text{AdS}_5$	12/2022
Group Seminar, <b>ETH Zürich HEP group &amp; CERN CMS collaboration</b> Towards an automatized analysis framework for the upcoming HL-LHC CMS ECAL upgrade	07/2022
LIFEsim Seminar, <b>ETH Zürich Exoplanets and Habitability Group</b> Characterisation of the impact of non-perfect nulls on the detectable planet population by LIFE	12/2021

## OUTREACH

Online Seminar, <b>Swiss Study Foundation</b> Organisator, peer event – “The future of CERN and High-Energy Physics”	05/2024
Online Seminar, <b>Swiss Study Foundation</b> Organisator & speaker, peer event – “The role of Symmetries in Physics”	12/2023
Website, <b>online</b> Built a <a href="#">website</a> to share online learning resources in mathematics and physics with like-minded students	2022–...
Classroom Presentation, <b>Lycée Dominique Villars</b> Presenting my curriculum and advertising STEM university studies to high-school students	2019–...

## TEACHING EXPERIENCE

<b>Volunteer Tutor</b> remote	06/2022
It Takes a Village / Village Book Builders <ul style="list-style-type: none"><li>1:1 weekly online tutoring sessions with a 13yo. child in Mukono, Uganda (10 months)</li></ul>	03/2023

## INDUSTRY & NON-ACADEMIC EXPERIENCE

<b>Research Analyst</b> Munich, Germany	11/2023
180 Degrees Consulting Munich <ul style="list-style-type: none"><li>Team manager. Carrying out research and market analysis; punctual support to consulting teams</li><li>Blueprint for the transition of fashion companies to a circular economy in the DACH region</li></ul>	02/2024

## 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 Excel (elementary)  
**Scientific work:**  $\text{\LaTeX}$  (Overleaf), Mathematica, scientific writing, funding search and application

## SELECTED AWARDS, GRANTS & SCHOLARSHIPS

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<b>Research Grant</b> – Fondation du Domaine de Villette CHF 5'000. Supporting graduate research in Munich and Copenhagen in 2024/2025	10/2024
<b>Erasmus+ Scholarship</b> – Ludwig-Maximilians-Universität Munich €600/month, 5 months. Awarded to support an exchange semester at the University of Copenhagen	05/2024
<b>College Prize in Applied Mathematics</b> – Peterhouse, University of Cambridge £300. Awarded in recognition of my academic achievements	12/2023
<b>Retrospective Scholarship in Mathematics</b> – Peterhouse, University of Cambridge £125. Awarded in recognition of my academic achievements	12/2023
<b>Research Grant</b> – Fondation du Domaine de Villette CHF 5'000. Supporting research and attendance to conferences in the summer 2023	06/2023
<b>Greta Burkill Fund award</b> – Peterhouse, University of Cambridge £300. Supporting attendance to conferences	03/2023
<b>Bruckmann Fund award</b> – Peterhouse, University of Cambridge £300. Supporting extracurricular travels	03/2023
<b>Annual Scholarship</b> – Swiss Study Foundation CHF 20'000. Financial support for master studies at the University of Cambridge	11/2022
<b>Excellence Scholarship</b> – Colbianco Stiftung CHF 2'000. Financial support for master studies at the University of Cambridge	08/2022
<b>Swiss Mobility Program grant</b> – Ecole Polytechnique Fédérale de Lausanne CHF 1'500. Supporting an exchange year at ETH Zurich	09/2021
<b>Baccalaureate Merit Award</b> – Région Provence-Alpes Côte d'Azur Awarded for achieving the highest distinction at the French Baccalaureate	07/2019

## ACADEMIC REFERENCES

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- **Prof. Stephan Stieberger** (*MPP master thesis advisor*)  
Email: [stephan.stieberger@mpp.mpg.de](mailto:stephan.stieberger@mpp.mpg.de)
- **Dr. Adam Chalabi** (*NBI project advisor*)  
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- **Prof. Niels Obers** (*Copenhagen examiner*)  
Email: [obers@nbi.ku.dk](mailto:obers@nbi.ku.dk)
- **Prof. Alessandro Sfondrini** (*Padova project advisor*)  
Email: [alessandro.sfondrini@unipd.it](mailto:alessandro.sfondrini@unipd.it)
- **Dr. Prahar Mitra** (*Cambridge Part III essay setter*)  
Email: [p.mitra@uva.nl](mailto:p.mitra@uva.nl)

Last updated on Wed 15<sup>th</sup> Jan, 2025. Certificates, references and transcripts available upon request.