

Thomas Brosnan

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Education

University of Cambridge 2025 – Present

MASt in Theoretical Physics, Part III of the Mathematical Tripos.

Coursework: Advanced QFT, Field Theory in Cosmology, Black Holes, Standard Model.

Trinity College Dublin 2021 – 2025

BA (Hons) In Theoretical Physics. Graduated with a First Class Honours (86%).

Coursework: Differential Geometry, Lie Groups, QFT, General Relativity.

St Colmcille's Secondary School - Dublin 2015-2021

Leaving certificate, 613/625 points, H1's in Physics, Maths, Applied Maths, DCG, Chemistry.

Research Experience

Quantum Field Theory on Causal Sets July - August 2025

Dublin Institute for Advanced Studies (DIAS) - School of Theoretical Physics

- Investigated quantum fields on causal sets alongside Dr Yasaman Yazdi. Compared causal set propagators with well known continuum curves in different spacetimes such as de Sitter.
- Showed through simulations that a distinguished vacuum, known as the Sorkin-Johnston (SJ) vacuum is part of the family of continuous de Sitter invariant vacua, known as the α -vacua.
- In the process of writing a paper on the results.

Quantum Aspects of Black Holes in de Sitter Spacetime September 2024 - May 2025

Trinity College Dublin - School of Mathematics

- My Final Year Project under the supervision of Prof. Manuela Kulaxizi involved the exploring aspects of QFT in curved spacetimes, such as the Unruh affect and Hawking Radiation.
- Subsequently used these ideas to analyse Raphael Bousso and Stephen Hawking's "(Anti-)Evaporation of Schwarzschild -de Sitter Black Holes". My thesis can be found [here](#).

Testing Single-Pulse-Search Algorithms June - August 2024

University of California, Berkeley/Irish I-LOFAR Observatory

- Conducted research as part of Breakthrough Listen's Search for Extraterrestrial Intelligence, supervised by Professor Evan Keane.
- Developed a pipeline for evaluating the efficiency of single pulse detection algorithms. Github [here](#).
- Coordinated dual site observations of exoplanets and pulsars using Irish and Swedish I-LOFAR radio telescopes.

Testing Theories of Gravity with Pulsars May - July 2023

Trinity College Dublin - School of Mathematics

- Completed a research project as part of the Hamilton Trust Internship under the supervision of Professor Evan Keane. Used binary pulsars as a medium to test theories of gravity by calculating the predicted change in their orbital parameters.
- Took the initiative to show that corrections predicted by Yukawa-like potentials entered at the same order as the second order corrections from standard General Relativity (GR), hindering their experimental distinction. My work can be found [here](#).

Work Experience

Teaching Assistant 2023 - 2025

Trinity College Dublin - School of Mathematics

- Graded and gave tutorials for first year module "Techniques in Theoretical Physics" and second year module: "Advanced Classical Mechanics"

Applied Maths Teacher 2021-2024

St Colmcille's Secondary school - Dublin

- Actively teaching 5th and 6th year classes of around 15 students

Coding Instructor 2021 - 2022

Olus Education - Dublin

- Involved teaching classes in Java, Python and HTML

Awards & Honors

Gold Medal <i>Trinity College Dublin-Achieved prize for achieving a grade above 80% across my whole degree.</i>	2025
Arthur Lyster Prize <i>Trinity College Dublin -Achieved prize for Junior Fresh mathematics results</i>	2021
Trinity Entrance Award <i>Trinity College Dublin-Achieved prize on the basis Leaving certificate results</i>	2021

Specialized Skills

Programming Languages: Java, Python, Shell scripting (Bash, csh, ect), C++. Git, Mathematica

Linux: Experience with large data management on Linux servers. Currently maintaining home Linux server on a Raspberry pi 5.

I-LOFAR Telescope: Experience creating observing scheduals for the Irish I-LOFAR radio telescope.

LaTeX: I have written detailed notes, lab reports and papers all in LaTeX. I gave an “Introduction to LaTeX” seminar for the TPSA in October 2024.

Other Interests

Treasurer of the Theoretical Physics Student Association (TPSA): As treasurer I developed and managed budgets to support ongoing activities while identifying and securing new funding sources to sustain and expand operations. The TPSA runs weekley seminars where students enter a collaborative space to discuss homework problems or ask physics questions. The association also hosts hackathons, faculty talks as well as workshops to help fellow students.

Captain of the PLANCKS Team: I was captain of the team that represented Trinity at the UK & Ireland preliminary and subsequently Ireland at the international final in 2024. PLANCKS is a exam-based physics competition for bachelor’s and master’s students.

Communication: I am passionate about communicating and sharing my work with others.

- Recently (December 2025) as part of the part III seminar series, I gave a seminar about “Dynamical Dark Energy from Causal Set Theory” to my fellow students. The slides of which can be found [here](#).
- During the Summer of 2025 I created a 6 part lecture series Introducing General Relativity aimed at new students, that is now on the TPSA’s YouTube channel.
- I am also an admirer of the open source philosophy, hence any code I have developed is available on my GitHub page and any notes I have typed up are hosted on my website.

Miscellaneous: In my free time I compete for St John’s college Cambridge basketball team. I also read recreationally, particularly works of Sci-Fi and Fantasy.

References

- Professor Evan Keane: evan.keane@tcd.ie
- Professor Chaolun Wu wuch@tcd.ie
- Professor Manuela Kulaxizi kulaxizm@tcd.ie