

Matthew Dunne

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EDUCATION

Trinity College Dublin

B.A. Moderatorship in Theoretical Physics

Final Degree Classification: 72% (First Class Honours)

Co. Dublin, Ireland

2021 - 2025

Ashbourne Community School

Leaving Certificate

Achieved 601/625 Points (Upper 4th Percentile Nationally)

Co. Meath, Ireland

2015 - 2021

RELEVANT EXPERIENCE

Hamilton Trust Summer Internship

Summer 2025

Engaged in a research project funded by the Hamilton Trust foundation culminating in a report titled “Solitons in Self-Dual Yang-Mills theory”. Investigated the emergence of soliton solutions in integrable models and compared SDYM solitons with other co-dimension 1 soliton solutions found in lower dimensional systems. Presented ongoing project work at regular seminars along with other students taking part in the programme.

Dissertation: Parisi-Sourlas Quantisation of Constrained Systems

2024 - 2025

Worked under the supervision of Dr. Chaolun Wu (TCD) to develop a method for obtaining covariant phase space path-integrals for constrained Hamiltonian systems. Conducted a literature review and research proposal to define the goals of the project. Applied the formalism to pure Yang-Mills theory, generalising BRST quantisation to systems with both first and second class constraints. Presented results at an end-of-year seminar and produced a poster for an open Q&A session.

Physics and Mathematics Tutor

2020-2021

Provided second-level mathematics and physics tutoring in my local area. Supplemented students’ in-class learning with exam-focused problem-solving sessions using tailored revision material and written exam solutions to past problems. Developed pedagogical skills by delivering explanations of abstract concepts and identifying points of misunderstanding.

ACHIEVEMENTS

- Awarded financial support for the 2025 Hamilton Trust Summer Mathematics programme.
- Received an Award of Excellence for performance in the Leaving Certificate Examinations, Ashbourne Community School Graduating Class of 2021.
- Irish National Chess Community Games Runner-Up 2019
- Junior Golfer of the Year, Ashbourne Golf Club 2020

VOLUNTARY ROLES

Theoretical Physics Student Association

2022-2025

- Contributed to weekly seminars on a voluntary basis, providing assistance to students with previous

course content.

- Created lecture notes for graduate level modules where official materials were limited, helping improve the accessibility of complex topics for TPSA members.

Teaching Digital Literacy to the Elderly

2018-2019

- Hosted digital literacy tutoring sessions for elderly members of the community as part of a local initiative
- Provided guidance on using smartphones, tablets and laptops to communicate with others by email or social media.

FINAL YEAR COURSES

The following is a list of relevant course modules (each taught at graduate level) that were taken in the final year of my undergraduate degree.

- Quantum Field Theory
- The Standard Model
- Lie Groups, Lie Algebras and Physics
- Interacting Quantum Systems
- Differential Geometry
- Quantum Optics and Information

TECHNICAL SKILLS

- Programming: Python, Mathematica
- Typesetting & Academic Writing: LaTeX