

## **Education:**

### **MSt Philosophy of Physics (University of Oxford) (2025–present):**

- In progress.

### **BA Theoretical Physics (Trinity College Dublin) (2021–2025):**

- Grade: 78% (I).
- Thesis Title: Black Hole Entropy and the Information Loss Paradox.
- Thesis Advisor: Dr. Manya Sahni O'Hara

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## **Research Experience:**

### **Black Hole Entropy in the Path Integral Formalism (Hamilton Trust) (May–June 2025):**

- A continuation of the work undertaken for my final year project, supervised by Dr. Manya Sahni O'Hara, funded by the Hamilton Trust.
- Technical research in advanced quantum mechanics including the path integral formalism, and modern methods for finding quantum corrections to black hole entropy, also using knowledge of functional analysis from previous research.
- Foundational research in thermodynamic systems and interpretive aspects of quantum field theory in curved spacetime.

### **Liquid Xenon Student Research Assistant (TRIUMF) (May–August 2024):**

- An applied physics/electronics/simulations project at the TRIUMF particle accelerator laboratory in Vancouver, Canada, supervised by Dr. Chloé Malbrunot.
- Collaborative project which involved working hands-on with electronics to build a purity monitor for liquid xenon, and to perform computer simulations using ROOT and Garfield++ for the prototype, as well as theoretical calculations. I also played an important role in the setup of a data acquisition unit.
- Regular attendance of seminars and talks on up-to-date particle physics research.
- Code and design contributions used upstream in LoLX, nEXO, and DUNE.

### **Investigation Into On-the-fly Optimization of the Hubbard Parameter in DFT+U (Hamilton Trust) (May–July 2023):**

- A theoretical/computational condensed matter physics project at Trinity College, Dublin, supervised by Dr. David D. O'Regan.

- I gained experience with Density Functional Theory and implementing optimization algorithms (such as gradient descent), Python and Fortran and further experience with standard UNIX tools like SSH, Git, and Emacs, and HPC-specific software like the Slurm workload manager.