

Fredrik Johannes Olsen Hasselgren



[Oxford Mathematical Institute](#) | [LinkedIn](#)

Research interests

My research interests lie in the transition from high-powered computing to quantum advantage, including topics from both ends like tensor networks and quantum algorithms, simulation, and dynamics.

Education

- Oct. 2025 - 2028** **DPhil Quantum Information, Computation and Cryptography Group, Mathematical Institute, Keble College, University of Oxford**
Funding: Fully-funded by Mathematical Institute with Jane Street Graduate Scholarship
- Oct. 2024 - 2025** **MSc Mathematical and Theoretical Physics, St Hilda's College, University of Oxford**
Distinction.
Quantum algorithms & Tensor Networks: Extended dissertation on *Quantum-Inspired Classical Simulation Through Randomized Time Evolution* supervised by Prof. Balint Koczor with manuscript forthcoming.

Graduate courses include: Quantum Field Theory (and advanced-QFT, topological-QFT), Groups and Representations, Introduction to Quantum Information, Machine Learning for Physicists, Theories of Deep Learning

- Sep. 2020 – 2024** **BSc Honours Physics and Philosophy, University of St Andrews**
First-Class.
Exciton-Polariton Modelling: First class dissertation on modelling the strong coupling of excitons to cavity photons, supervised by Dr Hamid Ohadi.
Class medal: Highest grade average in third year physics.

Publications

- Forthcoming 2025** **Quantum-Inspired Classical Simulation Through Randomized Time Evolution,**
Fredrik Hasselgren & Balint Koczor.
- Forthcoming 2025** **Probabilistic computing optimization of complex spin-glass topologies,**
Fredrik Hasselgren, Max Al-Hasso, Amy Searle, Joseph Tindall, & Marko Von Der Leyen.
A virtually connected probabilistic computer as a solver for higher order, densely connected, or reconfigurable combinatorial optimization problems, Amy Searle, Harry Youel, Fredrik Hasselgren, & Marko Von Der Leyen.

Scholarships and Awards

- 2025 - 2028** **Mathematical Institute Scholarship with Jane Street Graduate Scholarship**
(£150,000)
Awarded competitively by the University of Oxford mathematics department; covers full course fees and an annual stipend.
- 2023** **Medal (Physics Third level) - University of St Andrews**
Awarded for performance in physics, where I attained the highest grade average among third year physics students.
- 2023** **First place in the Computational Physics challenge - University of St Andrews**
For this month-long competition, I wrote a Python program and report on battery optimization relating to renewable energy.
- 2021, 2022, 2023, 2024** **Dean's list award for academic excellence - University of St Andrews**
Awarded for having a credit-weighted mean grade above a First-Class standard.

Work experience

- Summer 2025** **Research summer intern at Quantum Dice, Oxford, UK**
- Probabilistic computing: Worked on photonic probabilistic computing architecture implementing Virtually Connected Boltzmann Machines (PC-VCBM). Two pre-prints to be submitted.
 - Spin-glass and QUBO optimization: Developed PC-VCBM architecture to solve for low energy states of the spin-glass model and solve quadratic unconstrained binary optimization problems faster than classical solvers and quantum annealers.
 - Real-world optimization: Tailored PC-VCBM development towards solving real-world optimization problems for clients.
- Summer 2023** **Full-Stack developer summer intern at DN Bank, Bergen, Norway**
- Front-end: Developed a visualisation tool for the Bank's mainframe jobs using TypeScript and React in Customer and Core Services division.
 - Back-end: Used Python to parse, validate, and analyse a dataset of 30 000 daily mainframe jobs.
 - Data-analysis: Used graph theory to create interactive web of nodes and edges, with functionality to navigate and filter via search as well as generate and download reports on the data.
 - Result: The finished product was immediately put to use by the full-time developers in our division, and is being prepared for online deployment for the company at large.
- Summer 2022, 2024** **Café manager for Togservice on the Bergen-Oslo trainline, Norway**
- May. 2020 - Aug. 2023** **Tutor for IB Companions (online)**

Skills

Programming languages: I have worked professionally with Python, React, and TypeScript, am university-trained in Java, and know some Mathematica, JavaFX, C++, and Swift.

IT-skills: pyQuEST, Qiskit, Quimb, LaTeX, Git, Jupyter, MQLib, Cytoscape, Linux batch-jobs and computing cluster

Languages: Fully fluent in Norwegian and English.

Leadership and volunteering and experience

- 2024 - 2025** *Co-Organizer, University of Oxford Junior MathPhys Journal Club*
- 2021 - 2024** *Captain, Vice-Captain, Health and Safety Officer, University of St Andrews Judo Club*
- 2021-2022** *Representative, Campaign for Affordable Student Housing (C.A.S.H), St Andrews*
- 2019-2020** *Leader, Student Council at Bergen Cathedral School, Norway*
- 2017-2019** *Deputy Mayor, Representative, Youth City Council of Bergen, Norway*

Last updated 15-10-2025