

Benjamin Colmey

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[Personal Website](#)

Education

University of Cambridge, Queens' College (2024 – Present)

PhD in Computational Physics

Awarded Chan Zuckerberg Initiative Studentship,
Stamps Scholarship, and Rothschild Scholarship

McGill University (2021 – 2023)

Master of Science in Physics: Experimental Condensed Matter

Thesis: Generating Massive Bursts of keV Electrons for Ultrafast Electron Microscopy

McGill University (2015 – 2020)

Bachelor of Science in Physics

Research Experience

Researcher in Computational Cryo-Electron Microscopy (July 2025 – Present)

MRC Laboratory of Molecular Biology, Cambridge | Chan Zuckerberg Initiative

- Designing and implementing a differentiable multi-slice simulator for cryoEM
- Modeling beam–specimen interactions using density functional theory (DFT) methods

Researcher in Computational Physics, Electron Microscopy Group (2024 – Present)

University of Cambridge

- [Developing hybrid physics-ML Bloch-wave simulations for dynamical refinement of 3D electron diffraction data](#)
- Applying information-theoretic optimization to guide experimental design and structure determination

Researcher in Experimental Condensed Matter, Cooke Group (2021 – 2023)

McGill University

- R&D for ultrafast electron microscopy systems
- [Simulated quantum electron wave packet dynamics in Python \(FDTD\)](#)

Research Assistant in Quantum Optics, Fraser Group (2020)

Queen's University

- [Monte Carlo simulations of quantum dot photon statistics and interference experiments](#)

Teaching and Extra Curricular Experience

Volunteer: National Autistic Society, Cambridge Branch (2024 – Present)

- Supporting community engagement and social activities

Teaching Assistant, McGill University (2021–2023)

- Led tutorials and provided individual academic support

Volunteer: Friendship Circle Montreal (2021–2023)

- Mentored students with disabilities and organized activities

Skills

Technical Skills:

- Python (NumPy, Pandas, PyTorch, TensorFlow, Scikit-learn)
- Scientific computing, simulation, machine learning
- Software: Linux, Git, AutoCAD, COMSOL

Languages:

- English, French (bilingual), Spanish (advanced)

Publications

- [The role of absorption in 3D electron diffraction dynamical structure refinement](#)
B. Colmey, S.A. Malik, T.A.S. Doherty, P.A. Midgley
Under review, Acta Crystallographica, 2026
- [Hybrid Physics-Machine Learning Models for Electron Diffraction Refinement](#)
S.A. Malik, T.A.S. Doherty, **B. Colmey**, S.J. Roberts, Y. Gal, P.A. Midgley
Nature Communications, 2026
- [Pseudo-Differential Operators and Fourier Integral Operators in the Gevrey Setting](#)
B. Colmey, R. Lascar
Journal of Pseudo-Differential Operators and Applications, 2025
- [Sub-cycle Nanotip Field-Emission of Electrons Driven by Plasma Generated THz Pulses](#)
B. Colmey, R.T. Paulino, D.G. Cooke
Applied Physics Letters, 2025
- [Spatiotemporal Walk-off and Improved Focusing of Plasma THz Sources](#)
R.T. Paulino, **B. Colmey**, D.G. Cooke
Optics Express, 2024

Last updated: March 30, 2026