Matthew Evans

✉ me388@cam.ac.uk
🖥 www.tcm.phy.cam.ac.uk/~me388
🌐 ml-evs

ab initio calculations • energy storage applications
crystal structure databases • software development

Education

2016–2019 **PhD Physics**, University of Cambridge.

2015–2016 **MPhil Scientific Computing**, University of Cambridge, *Distinction*.

2011–2015 **MPhys Physics with Theoretical Physics**, University of Manchester, *First Class (Hons)*.

Research interests & Experience

PhD **Crystal structure prediction for energy storage applications**

with Dr Andrew Morris

Discovery and computational characterisation of novel high-capacity anode materials for Li and Na-ion batteries, using *ab initio* random structure searching (AIRSS).

MPhil **High-throughput *ab initio* materials discovery**

with Dr Andrew Morris

Database approaches to materials design; wrote a software package, MATADOR, to aggregate and analyse the results of first-principles calculations.

MPhys **Electronic structure of defects of graphene superlattices**

with Prof Francisco Guinea

Nearly-free electron model of graphene/h-BN superlattices with arbitrary defects included via Green's function methods. Awarded Tessella Prize for development of a high-performance Python code to perform the computation and analysis.

UG **Interactions of quantised vortices in superfluid helium**

with Dr Paul Walmsley & Prof Andrei Golov *(University of Manchester)*

Spent two summers developing vfmcpp, a C++/OpenMP implementation of the vortex filament model of superfluid helium, to study microscopic vortex dynamics and reconnection events [1].

UG **Hard sphere packing of nanotube-encapsulated fullerenes**

with Dr Ho-Kei Chan & Prof Elena Besley *(University of Nottingham)*

Application of a novel hard sphere packing regime to study CNT-encapsulated C_{60} molecules.

Teaching Experience

2016–2017 Supervisor: Part IB Electromagnetism, Dynamics and Thermodynamics, *(Selwyn College)*.

2016–2017 Demonstrator: Part IB & II Computational Physics (C++), *(Cavendish Laboratory)*.

2016–2017 Volunteer: Key Stage 2 Code Club *(Ridgefield Primary School, Cambridge)*.

2016 Demonstrator: Graduate-level Electronic Structure, *(Cavendish Laboratory)*.

2016 Demonstrator: CASTEP Workshop *(Oxford)*, HPC Autumn Academy *(Cambridge)*.

2012–2015   Tutor: GCSE Maths & Key Stage 2 Programming for The Tutor Trust, *(Manchester)*.
– Provided tuition to small groups and 'looked after children' across 15 schools.
– Helped lead a successful pilot to teach primary school children programming using Scratch.

Computing

Languages	Python, C++, Fortran	Databases	MongoDB, SQL
Computation	CASTEP, Quantum Espresso	Packages	NumPy, spglib, Jupyter
Platforms	Linux, *nix	HPC Facilities	ARCHER (UK), Darwin (Cambridge)
Software	LaTeX, Inkscape, GIMP	Utilities	git, shell scripting, GNU toolchain
Data viz	matplotlib, Bokeh, d3.js	Web	JavaScript, HTML, CSS

Conferences & Presentations

2016   High Performance Computing Autumn Academy, Presenter, University of Cambridge

2016   SMARTER5, Poster Presentation, University of Bayreuth, Germany

2016   CASTEP Workshop, Poster Presentation, University of Oxford

2016   CCP9 Young Researchers Event, Poster Presentation, University of York

2015   High Performance Computing Autumn Academy, Attendee, University of Cambridge

2015   CASTEP Workshop, Attendee, University of Oxford

Publications

[1] T. Zhu, **M. L. Evans**, R. A. Brown, P. M. Walmsley, and A. I. Golov. Interactions between unidirectional quantized vortex rings. *Phys. Rev. Fluids*, 1:044502, Aug 2016.