Matthew Ramsay Walker

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EDUCATION

CARDIFF UNIVERSITY

PhD in Physics and Medical Imaging

October 2020 - December 2024

- Inferring the brain tissue conductivity field from non-invasive imaging and machine learning.

CARDIFF UNIVERSITY

4 Year Integrated Masters in Physics (1st Class Honours)

September 2016 - July 2020

- Modules include Statistical Mechanics, Structured Programming, Computational Physics, Quantum Theory of Solids and Modern Quantum Optics.

RESEARCH EXPERIENCE

UNIVERSITY OF CAMBRIDGE | Academic Placement

September 2022 – March 2023

- Built and ran large Message Passing Interface codes that form a benchmark suite for high performance computing systems called SPEChpc.
- Ran SPEChpc on the Cambridge Service for Data-Driven Discovery (CSD3), a heterogeneous high performance computing system at the University of Cambridge.
- Integrated SPEChpc with the Global Extensible Open Power Manager software to dynamically scale CPU core frequencies.

CARDIFF UNIVERSITY | PhD Research Project

October 2020 – Present

- Using a form of machine learning called Reduced Order Modelling to improve the efficiency of Electrical Impedance Tomography – an imaging technique used to estimate tissue conductivities.
- Analysis of multi-parameter estimation improved by the use of Reduced Order Modelling.
- Use of Finite Element Methods to solve complex simulations of electrical current propagation through a realistic head model.

| 4th Year Undergraduate Research Project

October 2019 - July 2020

- Used Monte Carlo Methods for treatment of diffusion in Numerical Phantoms for Magnetic Resonance Imagine simulations.
- Experimenting with the limitations of simulations with large particle numbers.

| 3rd Year Undergraduate Research Project

October 2018 - July 2019

- Simulated the light absorption of high refractive index nanostructures on the surface of silicon solar cells.
- Conducted simulations for multiple light wavelengths and structures.
- Identified light absorption mechanisms involved

SKILLS

PROGRAMMING

Proficient:
Python • MATLAB • UNIX
Familiar:
C/C++ • MySQL • HTML

PARALLELIZATION

Familiar:
MPI

SOFTWARE TOOLS

Proficient:
Git
Familiar:
Docker
Profiling (VTune & μProf)

MATHEMATICAL SKILLS

Matrix Algebra • Functional Analysis
Partial Differential Equations
Reduced Order Modelling
Finite Element Methods

TEACHING

Data Analysis • Intro to Python

AWARDS

2022 Cardiff University Athletic Union President's Award for Outstanding Achievement.
2022 Shortlisted for the Cardiff University Student Union President's Award for Enriching Student Life.

ACTIVITIES

2019 - 2022:
President, Cycling Coordinator and Social Secretary of the Cardiff University Triathlon Club
March 2025 - May 2025:
Sailed Pacific Ocean from Opua, New Zealand to California, USA in 17 m sailboat.