# Dr James Maxwell
**Curriculum Vitae**

+44 749-847-9682 | 10james.maxwell@gmail.com | github.com/JamesMax314

Website: ewesfullstudios.com/portfolio

## EDUCATION

**University of Durham** 2021 – 2025

*PhD in theoretical physics*

– Thesis Title: Simulating Fundamental Physics - *Numerical Endeavours in Astronomical and Particle Phenomenology*

– Supervisor: Francesca Chadha-Day

**University of Durham** 2017 – 2021

*MPhys (Theoretical)*

– Graduated with a First Class Masters degree

**Queen Elisabeth School, Kirkby Lonsdale, Cumbria** 2010 – 2017

– A Level: Physics (A\*), Maths (A\*) and Further Maths (A\*) and EPQ (A\*)   2017

– AS: Physics (A), Maths (A), Further Maths (A) and Chemistry (A)   2016

– GCSE/BTEC: 6A\*/Distinction\*, 4A/Distinction and 1B including English Language and Mathematics   2015

## TECHNICAL SKILLS

**Programming Languages 4+ years**: C/C++, Python, Mathematica.
**Additional Programming Languages**: Java, JavaScript, C#, Dart.
**Embedded Systems Programming**: Experience programming micro controllers and designing PCBs for their deployment.
**Data analysis**: Use of NumPy and Matplotlib for data science applications.
**Machine Learning**: Use of Tensorflow with the Keras API to build and train neural networks including production of training data for this purpose.
**GPU APIs**: CUDA, OpenGL, Vulkan.
**High Performance Computing (HPC)**: Three years of experience developing codes for distributed memory architectures including working with the GrChombo collaboration.
**Web/App APIs**: Flutter, Android, Tauri, React.

## AWARDS

- J.A. Chalmers Prize for the strongest research project for Final Honours – *Durham University*   2021

- Durham University Outstanding Achievement Level 3 – *University of Durham*   2020

- Durham University Outstanding Achievement Level 2 – *University of Durham*   2019

- Durhack (Hackathon) Finalist – *University of Durham*   Nov 2019

- Highest A-Level Achievement – *Queen Elizabeth School*   2017

- Ogden Trust School Physicist of the Year – *The Ogden Trust*   2016

- Arkwright Engineering Scholarship   2015 – 2017

## ACADEMIC PUBLICATIONS

*Author lists in particle phenomenology (marked \*) are alphabetical.*

**Publication in Preparation (Lead Programmer)** 2023 – Present

*University of Durham*

**\*A GPU Accelerated Implementation of the Laporta Algorithm**; *Jack Franklyn, Stephen Jones, James Maxwell*; Developed a GPU accelerated multivariate polynomial interpolator capable of reducing the execution time for the computation of real world scattering amplitudes by up to 2 orders of magnitude compared to current state of the art codes.

#### Publication in Preparation
*University of Durham*
2023 – 2025

**Dynamical friction from scalar dark matter in Kerr-Schild coordinates** *James Maxwell, Zipeng Wang, Francesca Chadha-Day, and Katy Clough*; Developed HPC code to compute the Dynamical Friction force experienced by black holes using a fixed metric background with a horizon penetrating gauge.

#### Publication (Lead Programmer)
*University of Durham*
2023

**\*ALP Anarchy**; *Francesca Chadha-Day, James Maxwell, Jessica Turner*. Developed C++ software (currently used by another collaboration) to simulate the evolution of hypothetical *Axion Like Particles* (ALPs) during their propagation from their Blazar source to earth. Performed a statistical marginalisation study on the results of this investigation. arXiv:2311.13658

#### Publication
*University of Durham*
2021

**White light versus discrete wavelengths measurement of Faraday dispersion**; *James L Maxwell, Ifan G Hughes and Charles S Adams*. Investigated the use of Wight Light sources for the rapid determination of Verdet coefficients responsible for magnetically induced Faraday rotation. Carried out both the experiment and the data analysis. James L Maxwell et al 2022 Eur. J. Phys. 43 015302

## ADDITIONAL PROJECTS

#### Real Time Fluid Simulation
Jul 2025 – Sep 2025

Developed a real time 3D fluid simulation for the visualisation of air flow over geographical terrain with ray traced volumetric rendering using the Vulkan API.

#### Simulated Cloud Chamber
Oct 2023 – Present

Developing a virtual cloud chamber for physics outreach. This has involved the creation of a custom ray marching engine for volumetric rendering that is web compatible using OpenGL ES.

#### Android Application
July 2020 – Sep 2020

Creation of an android application which uses a custom convolutional neural network based on the MobileNetV2 architecture to identify breeds of sheep from images. This app, "*Ewe Spotter*", was available on the Google Play Store. An updated cross-platform version of this app ("*Newe Spotter*") is currently under development.

#### Assistive Technology Computer mouse
Sep 2015 – June 2016

Design and fabrication an assistive technology gyroscopic mouse designed to be worn on a user's head. The mouse utilised radio frequency wireless communication contained within a 3D printed housing. The hardware was based on the ATmega328P chip and used a custom PCB.

## PREVIOUS EMPLOYMENT

#### Durham University
Sep 2022 – Mar 2025

Undergraduate level theoretical physics tutor.

#### Odin Events
Jun 2018 – Sep 2018

Outdoor activities operator managing portable climbing walls and fibreglass cave activities at public events across the country.

## ADDITIONAL EXPERIENCE

#### Treasurer of Durham University Gymnastics Club
Sep 2019 – June 2020

#### BAE Systems Summer School
July 2016

Summer school centered around systems engineering in which we were tasked with composing a proposal for an aeronautical fleet according to a design brief and budget.

#### Lancaster Engineering Summer School
July 2016

Aeronautical calculations applied as a member of the winning team of 3 in a competition to design, 3D print and test for efficiency a turbine blade.

## HOBBIES

- Computer programming, paragliding, climbing, fell running, skiing.