

# HARRY COOKE PhD\*

Software development | Data analysis

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## Education

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### University of Birmingham

2019 - 2023 — *PhD Particle Physics*

Searching for rare Standard Model interactions with the ATLAS collaboration

Statistical analysis, machine learning, programming in C++ and Python

*\*thesis completed, awaiting final examination*

### University of Birmingham

2015 - 2019 — *MSci Physics with Particle Physics and Cosmology*

*Class I, Cum Laude*

Graduated first in year for experimental physics

Awarded Bloodworth Prize (Y3) and Moreton Prize (Y4) for academic excellence

and Tessella Prize for most innovative use of software in a Y4 project

### Hereford Sixth Form College

2013 - 2015 — *A-Levels: A\*s in physics, maths, further maths, computing*

## Experience

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### University of Birmingham — Postgraduate Teaching Assistant

OCTOBER 2019 - MARCH 2023

Teaching in undergraduate computing and physics labs

### CERN — Summer Studentship

JUNE - AUGUST 2018

Developing a monitoring system for AMC13 modules in the CMS detector

<http://cdlib.cern.ch/record/2640969>

### University of Birmingham — Maple TA Internship

JULY - AUGUST 2017, DECEMBER 2017

Authoring and testing maths questions for university science faculties

## Technical Skills

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### Software development

10 years of experience and competent in multiple programming languages:

**C++** — Daily use throughout PhD for data analysis and algorithm design, working with large software frameworks. 8 years of experience.

**Python** — Regular use for scripting and data visualisation, used for larger personal projects, taught to Y3 undergraduate students. 7 years of experience.

**JavaScript** (HTML, CSS) — Built monitoring and visualisation tools for use with detector hardware. Some small personal web projects. 6 years of experience.

**Visual Basic** — Used during A-level computing, developed a simulation of Conway's Game of Life. 2 years experience.

Some experience with many more languages, including

Bash, Ruby, Java, Go, Rust, Kotlin, Matlab, Maple, Julia

### Data analysis

Experienced with a number of analysis techniques:

Analysis performed during the PhD required use and understanding of *machine learning techniques, likelihood model building, maximum likelihood estimation, treatment of systematic and statistical uncertainties, hypothesis testing*, and more. Received formal training in statistical methods during undergraduate degree and in a postgraduate course.

### Miscellaneous

Adept in operation of unix-based systems, for both work and personal use. Proficient in writing and typesetting of documents, particularly with  $\text{\LaTeX}$  — I created the official University of Birmingham [overleaf templates](#).

References available on request.

## Transferable Skills

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### Project management

Independently planned and performed a 2.5-year-long physics analysis. Involved long-term planning and prioritisation of tasks to ensure that the analysis was completed within the timeline of the PhD.

### Teamwork and communication

Collaborated on many projects with colleagues at the University of Birmingham and internationally. Worked on an analysis with a team of  $\sim 10$  physicists to attain a world-leading result, meeting weekly to share updates with the team and distribute tasks. During a 1-year placement at CERN during the PhD, joined the L1Calo operations team and took week-long 24/7 on-call shifts to solve problems during data-taking runs.

### Time management

Worked on many simultaneous projects during the PhD and learned to effectively split time between tasks, whilst also scheduling individual work time around meetings and other commitments.

### Leadership

During undergraduate studies, led a group of 14 students for a 3-month project, producing a 90-page document on the design of high-energy particle detectors. Leadership responsibilities included dividing and delegating tasks amongst small teams, setting deadlines, and organising and chairing regular meetings. Also took on leading roles in organising events such as a group Christmas dinner in Birmingham and a BBQ to welcome new arrivals to placement at CERN.

### Problem solving

As a physicist, problem solving is an essential skill, used in deriving solutions to mathematical problems, in implementing code to analyse very large datasets or simulate systems, and in optimising an analysis to best extract a result from data.

## Personal Interests

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I founded the University of Birmingham Benchball Society and was president and then treasurer over the first 2 years. I have played tennis from the age of 11 and have a Level-2 coaching qualification; I worked at my local club coaching weekly sessions for 3 years. I also enjoy working with computers and have built my own PC which I use for gaming, another passion of mine.