HARRY COOKE PhD*

Software development | Data analysis

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github.com/Hazza4569

Education

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
**completed PhD programme, graduating summer 2024*

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

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

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, SQL, 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

Experienced with version-control software, see a selection of projects on my GitHub page. Adept in operation of unix-based systems, for both work and personal use. Proficient in writing and typesetting of documents, particularly with LaTeX – created the official University of Birmingham overleaf templates.

References available on request.

Transferable Skills

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 ∼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

Founded the University of Birmingham Benchball Society and served as president and then treasurer over the first 2 years. Played tennis from the age of 11 and earned a Level-2 coaching qualification; spent 3 years coaching weekly sessions at local club. Enjoy working with computers, having built a custom PC for work, gaming, and more.