

## SUMMARY

Enthusiastic about designing, building, and improving software that changes the way people work. Earned a PhD in particle physics, developing software to manipulate and analyse large data sets and to perform simulations of physical systems. Currently applying this experience to design software solutions for clients in the insurance industry as a Technical Business Analyst. Looking to learn and grow in a role utilising existing software, research, and data expertise whilst further expanding this skill set.

## EXPERIENCE

## Technical Business Analyst

May 2024 – Present

*Acturis, Birmingham*

- Working within a team to build and maintain e-trade insurance products for insurers and brokers
  - Convert complex build requirements into technical specifications
  - Leverage continuous integration, unit testing, and acceptance testing to deliver builds accurately and efficiently
- Dedicated product owner for a key client
  - Primary point of contact for queries, defects, and product maintenance
  - Scope, estimate costs, and set timelines for new feature requests
- Built a suite of Python tools to automate common processes e.g. manipulating XML messages or component testing via internal webservice

## Postgraduate Researcher

2019 – 2024

University of Birmingham, Birmingham & CERN, Geneva

- Produced two cutting-edge physics analyses within the ATLAS collaboration, one in a team and one independently
  - Developed bespoke software in C++ and Python to process and analyse high-volume physics data
  - Applied machine-learning discriminants and complex likelihood models to optimise statistical significance of results
- Worked on software and hardware upgrades to the ATLAS detector trigger system
  - Designed and simulated new trigger algorithms in C++
  - Assisted with installation of new trigger hardware
- Taught Python to 3rd-year undergraduate students in computing labs for three years

## EDUCATION

## PhD Particle Physics

2019 – 2024

University of Birmingham

- Thesis on electroweak multiboson interactions with Z bosons, photons, and jets with the ATLAS experiment at the Large Hadron Collider

## MSci Physics with Particle Physics and Cosmology

2015 – 2019

*Class I Cum Laude, University of Birmingham*

- Graduated first in year for experimental physics
- Awarded Bloodworth Prize and Moreton Prize for academic excellence
- Awarded Tessella Prize for most innovative use of software in a Masters project

## A-Levels: Maths, Further Maths, Physics, Computing

2013 – 2015

4 A\*s, Hereford Sixth Form College

## TECHNICAL SKILLS

- Programming languages: C++, Python, JavaScript, SQL, Bash
- Software engineering: designed and used many large software frameworks
- Version control software: Git (GitHub, GitLab), SVN
- GNU/Linux systems: personal computers, remote servers
- Data science: statistical analysis, machine learning, data engineering
- Data visualisation, particularly Python Matplotlib
- Document typesetting, particularly  $\text{\LaTeX}$
- General IT skills: office suite programs, computer hardware

Experience:

11 years

6 years

8 years

8 years

5 years

5 years

9 years

15+ years

## TRANSFERABLE SKILLS

- Communication
  - Presented research at national conferences and meetings including [IOP HEPP conference](#)
  - Delivered technical demonstrations to internal teams at Acturis on new automation tools
- Teamwork
  - Deliver feature builds and product maintenance services within a team of eight people at Acturis
  - Worked in a team of ten people to deliver a [world-leading physics result](#)
  - Collaborate proactively with team members, both offering support and seeking input to overcome technical challenges
- Customer relationship management
  - Communicate regularly with clients to provide updates on ongoing builds or defects, providing prompt fixes or timeline estimates
  - Lead fortnightly meetings with dedicated client to communicate status of current projects and investigations
- Organisation
  - Manage time across many simultaneous projects to meet resource allocation within team at Acturis
  - Schedule time to allow flexibility to react promptly to queries but also block out time to progress projects
- Project Management
  - Planned and independently performed a [2.5-year-long physics analysis](#)
  - Plan multi-month projects to implement new features requested by Acturis clients
- Self-motivated learner
  - Attended postgraduate training courses, including statistical analysis and machine learning methods
  - Attended training sessions at Acturis, including on client communications, version control software, and project management
- Problem solving
  - Excellent academic record, achieving very high grades across a range of assessments requiring advanced problem solving skills
  - Significant experience debugging software defects in research and commercial contexts

## PROJECTS

- Acturis automation tools [Software]
  - Personally designed and built a collection of Python tools to automate a range of testing, deployment, and debugging tasks
  - Received excellent feedback and uptake from colleagues, improving efficiency across the team
- Triboson  $VZ\gamma$  analysis (see [thesis](#), Chapter 6) [Research]
  - Independently performed physics analysis providing world-first measurement of ultra-rare process
- Electroweak analysis framework [Research/Software]
  - Used Python and C++ to create a generic analysis framework, allowing the user to specify complex data manipulation and analysis through simple configuration files
- VBS  $Z\gamma$  analysis (see [thesis](#), Chapter 5) [Research]
  - Contributed reconstruction studies and analysis of systematic uncertainties
- Trigger hardware visualiser (see [thesis](#), Section 3.2) [Research/Software]
  - JavaScript web-app which displays energies read by an ATLAS trigger module, visualising and recreating trigger algorithms used to process these energies
  - Developed based on requirements provided by a colleague involved in firmware debugging
- Personal Website ([hacooke.github.io](https://hacooke.github.io)) [Software]
  - Passion project to develop a modern interactive JavaScript website with no plugins, under construction
- A selection of other software projects can be found on my [GitHub page](#)

## INTERESTS

Hobbies include playing sport, such as tennis and 5-a-side football; watching football, as an avid Luton Town supporter and Fantasy Premier League manager; watching international rugby, supporting Scotland in the six nations and autumn internationals; cooking, particularly Italian and Indian food; coffee, brewing espresso-based drinks at home; and writing code or tinkering with computers for personal projects.