# Alina Isobel Hagan

Physicist · Programmer · Scientist · Maker

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## Summary


Highly analytical developer & data analyst with a Particle Physics background. Experienced in statistical analysis, data modelling, & machine learning. Proficient in C++, Rust, & Python, with a strong foundation developing high-performance software. Skilled in creating impactful visualisations & managing large-scale projects. Excellent communicator with proven ability to collaborate across teams & explain technical concepts to non-experts. Passionate about leveraging data & development skills to deliver results.


## Experience, Employment, & Education

**ATLAS Collaboration: Analysis Lead and Trigger Signature expert.** 2020-now
- Oversaw live data collection & coordination with international experts
- Updating ATLAS Validation tools for evolved frameworks in C++ & CMake
- Lead a worlds-first analysis exploring gluon structure in the proton

**PhD: Lancaster University, ATLAS Experiment, & CERN** 10/2020-now
- High-Energy Particle Physics, Supervised by Vato Kartvelishvili.
- Analysis lead, measurement of gluon structure in proton-proton collisions.

**MSc (Hons), Physics, 1st: University of Glasgow** 10/2015-07/2020
- Measurements of $b$-jet substructure & exploration of novel overlap removal methods & data purification.

**Lancaster And Morecambe Makers: Director & Board Member** 06/2024-now
- Coordinating conversion to Community Interest Community
- Representing student interests as student liasion
- Running public repair cafes & promoting maker ideals
- Organising new promotional materials & rebranding

**Lancaster University: Post Graduate Teaching Assistant** 10/2020-now
- Assisting students in practical & theoretical contexts
- Communication & teaching of complex physics ideas
- Taught multiple fields; programming & simulation, calculus, circuits, fourier analysis, & particle physics.
- Administrative efforts in grading, identiying & aiding struggling students

**University of Glasgow Nuclear & Hadron Physics Research Group Internship** 06-09/2019
- Design of Novel Graph Neural Networks for the Crystal Ball detector
- Developed training & testing framework in tensorflow & python

## Key Skills

- C++ & CMake
- Multithreaded development
- GitLab & GitHub
- International Project Management
- LaTeX, Python, Rust & Linux
- Adaptability & Learning Agility
- Strong foundation in algorithmics
- High throughput grid computing
- Computer modelling & simulation
- Adcanced statistical methods for data analysis
- Make & Ninja
- TB scale data analytics
- Data visualisation
- BDT & Neural Network design
- ROOT Data Analysis Framework
- Intimate knowledge of linear algebra and calculus
- Insightful data interpretation

## Communications, Papers & Conferences

I am an excellent communicator & I have been selected on multiple occasions to represent my analysis team & my subgroup at international conferences & collaboration meetings.

**2023** LHCC, $B$-Hadron reconstruction in early ATLAS Run 3 data
**2023** ATLAS Week, Early Career Scientist Session, Gluon TMDs at ATLAS
**2023** Beauty 2023, New Heavy Flavour states in ATLAS & $B$-Hadron reconstruction in early ATLAS Run 3 data
**2023** Quarkonia as Tools 2023, Inclusive quarkonium production.
**2022** ATLAS UK Annual Meeting 2022, Precision physics with quarkonia.
**2022** Quarkonia as Tools 2022, Quarkonium & TMDs in $pp$.

## Independent Projects

Along with my continuing involvement in physics & community projects I am passionate about broadening my horizons in a multitude of ways. I'm always looking to gain additional skills that I can apply to other areas in my life.

**Terminal Renderer**
A toy renderer with no dependencies, written in C++. Designed originally to render primitive polyhedrons using a surface element model. Under refactor to render .stl and simplified .obj files.

**Model Rocketry**
Design & construction of high-power model rockets.

**Other:** Film & digital photography, cooking, running, climbing, 3D printing, CAD modelling, & lathework.