Alina Isobel Hagan
Physicist · Programmer · Scientist · Maker

 aihphysics · aihphysics.github.io · alina-hagan@outlook.com
 +44 7793 450903 · UK

About Me

I am a developer and data scientist with a diverse array of experience and a background in high energy particle physics. I am leaving academia to apply my skills in industry.

Skills

- Competent with multiple programming languages: Rust, C, C++, and python
- Exposure to Java, Javascript, HTML & CSS, Octave & Matlab.
- Experience in Multithreaded development and exposure to asynchronous programming
- Proficient with GitLab and GitHub for version control and collaboration.
- Extensive work producing graphics and data visualisations with Python and C++ libraries.
- Expertise in advanced statistical methods and data analysis techniques, both Frequentist and Bayesian. Extremely familiar with common Python and C++ data analytics tools: Tensorflow, Python Scipy, Numpy, Pandas, Matplotlib, ROOT, Boost.
- Capable and experienced when working with multiple machine learning paradigms. Supervised learning, Graph and Convolutional networks, multivariate discriminiators.
- Experience building web connected applications and making open source contributions
- Very familiar with linux OS's, Daily user
- Intimate knowledge of linear algebra, calculus, group theory, and quantum mechanics
- Exposure to containerization solutions Docker, Docker Compose.
- Experienced in computer modeling, and simulation: Finite differencing, finite element modelling, RK methods

Experience & Employment

ATLAS Collaboration - CERN　　　　Oct 2020 - current
Analysis Lead and Trigger Signature expert.

Developed and maintained tools using C++ and CMake, enhanced efficiency and accuracy of data analysis processes. Oversaw live data collection and coordinated with a large team of international experts, ensured robust data integrity and system performance.

Lancaster University　　　　Jan 2021 - Jun 2024
Post Graduate Teaching Assistant.

Taught in practical and theoretical contexts; programming, simulation, calculus, circuits, Fourier analysis, and particle physics. Communicated complex physics concepts demonstrating excellent communication skills. Managed grading, targeted support to struggling students.

Lancaster and Morecambe Makers　　　　Jun 2024 - current
Director and Board Member.

Coordinating conversion to Community Interest Company. Representing student interests as student liasion. Running public repair cafes and promoting maker ideals. Organising new promotional materials and rebranding.

University of Glasgow　　　　Jun 2019 - Sep 2019
Nuclear and Hadron Physics Research Group Internship

Design of cutting-edge Graph Neural Networks for clustering. Developed pipeline for training and testing experimental networks. Tensorflow, Python Scipy, Numpy, Pandas, Matplotlib.

University of Glasgow　　　　Jun 2020 - Sep 2020
Experimental Particle Physics Internship

Statistical analysis of CERN data. Utilised bayesian methods for unfolding detector effects and correcting for experimental biasing.

Multiple organisations　　　　Jan 2021 - current
Conference Work & Communications

Seasoned presenter, several talks at both national and international conferences such as Beauty 2023 and the Large Hadron Collider Committee. Author of two conference papers. Third publication in progress.

Education

High Energy Particle Physics PhD　　　　Oct 2020 - current
Lancaster University, ATLAS Collaboration, CERN

Led a pioneering analysis on proton structure, demonstrating strong analytical and problem-solving skills. Highly competent in applying advanced statistical methods, data modelling techniques and performant programming design principles to evolving problems. Awaiting viva.

Integrated Msc (Hons), Physics, 1st　　　　Oct 2015 - Oct 2020
University of Glasgow

Modern analysis of b-jet substructure with CERN data. Development of novel physics based methods for data purification.

- Particle Physics: ⋯⋯ A - 100%
- Nuclear Physics: ⋯⋯ A - 100%
- Mathematical Methods: ⋯⋯ A - 100%
- Group Theory: ⋯⋯ A - 95%
- Statistical Mechanics: ⋯⋯ A - 95%
- Computer Systems: ⋯⋯ A - 86%
- Algorithms & Data Structures: ⋯⋯ A - 82%
- Relativistic Quantum Mechanics: ⋯⋯ B - 79%

Extracurricular & Projects

Terminal Renderer
No dependency C++ toy renderer. Ongoing project.

Model Rocketry
Design and construction of high-power model rockets.

Bound Buffer
Implementation of a bounded-buffer solution to the producer-consumer problem.

ISSPanel
TUI statuspanel showing live data from the international space station. Ongoing project.

Wave Equation
Numerical simulations, Rust.

Other
Film and digital photography, cooking, running, climbing, 3D printing, CAD modelling, and lathework.