Emil Haines

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A highly self-motivated PhD student with over three years experience working for international particle physics experiments. Proficient in software development and data analysis using Python and C++, with experience using modern deep learning techniques and frameworks. Hoping to transfer the skills I have acquired in research to a machine learning role within industry.

Experience

- **ATLAS Experiment, CERN**
  PhD Researcher *May 2021 - present*
  - Qualified author for ATLAS, a leading, international particle physics experiment based at CERN
  - Developing and maintaining an analysis framework (**`C++`** and **`Python`**), version controlled with **`git`**, incorporating signal selection algorithms for the study of exotic decays of the Higgs Boson to long-lived particles
  - Experience analysing petabyte-scale datasets produced via particle collisions at the Large Hadron Collider and interpreting results using advanced statistical techniques
  - Graph neural networks for classification; algorithm development and performance optimisation (**`Pytorch`**)
  - Completed a one year attachment at CERN (Oct. 2021 - Sep. 2022), during which I undertook shifts as an on-call expert and regularly presented research to fellow students and academics
  - Contributions due to be published in high impact physics journals
- **Graphcore**
  Silicon Engineer Intern *July - Sep. 2019*
  - 10 week paid internship in the Silicon Verification team on data analytics and visualisation
  - Presented work to the CEO, CTO and VPs of the company, as well as fellow interns
- **UCL**
  Post Graduate Teaching Assistant *Oct. 2020 - May 2021, Jan. 2024 - present*
  - Responsibilities: running problem classes for ∼20 students; assisting in teaching during demonstration sessions; marking and providing feedback on coursework
  - Courses: (3^{rd} year) Practical Machine Learning for Physicists, Nuclear and Particle Physics, (1^{st} year) Practical Physics and Computing

Education

- **UCL**
  PhD in Particle Physics *Oct. 2020 - present*
  - STFC funded research project working on the detection of new particles as a member of the ATLAS experiment
  - Participated in postgraduate courses in Machine Learning for Big Data, to further my practical understanding of modern machine learning techniques and database technologies, and Statistical Analysis
- **University of Bristol**
  MSci in Physics *Sep. 2016 - June 2020*
  - Graduated with first class honours, with an overall mark of 77%
  - Awarded commendation for master's project entitled 'Deep Learning for event classification at LUX-ZEPLIN', for which I developed a convolutional autoencoder for detecting waveforms in time-series data (**`Tensorflow`**)
  - Consistently achieved high marks in computational and mathematical units, including: 91 in Methods of Theoretical Physics, 84 in Advanced Quantum Physics and 83 in Quantum Information Theory and Computational Physics

Other Experience and Interests

- Undertook part-time roles during my undergraduate degree including: teaching Maths, English and Science to primary, GCSE and A-level students and working in hospitality at the Clifton Pavilion in Bristol Zoo
- Enjoy playing football, running, volunteering at music festivals and am currently teaching myself to play drums