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Dr. Tom Brooks

Professional Experience

09/2020– **Software engineer**, *Applied Blockchain*, London.
- I am the primary developer on the SILENTDATA platform, using cutting edge cryptography and confidential computing to protect sensitive data.
- I work across the entire stack, frontend (TS React), backend (TS Node and C++), smart contracts (Ethereum and Algorand) and DevOps.

05/2020– 09/2020 **Postdoctoral researcher**, *University of Sheffield*, Sheffield.
- Performed statistical sensitivity studies for the WATCHMAN collaboration, using particle physics for nuclear non-proliferation.
- Modelled particle detectors with Geant4 and simulated complex physical processes.

03/2020– **Developer (voluntary)**, *Algal Data Analyser (ADA)*.
- I develop and maintain a Python and Qt based scientific visualisation and analysis package used in leading microalgae biology labs.

04/2018– 09/2019 **Visiting research scholar**, *Fermi National Accelerator Laboratory*, United States.
- Built deep learning image recognition tools.
- Performed statistical data analysis for hypothesis testing.

07/2015– 09/2015 **Software engineer intern**, *Mantid Project*, Rutherford Appleton Laboratory, Oxford.
- Worked on MantidPlot, a framework for high performance computing and materials science data visualisation.
- Liaised with instrument scientists.
- Investigated the integration of atomic simulation Python packages with MantidPlot.

05/2015– 07/2015 **Research intern**, *University of Manchester*, UK.
- Awarded a research project with the MicroBooNE collaboration based on academic merit and a personal statement.
- Designed algorithms for classifying large, complex datasets of particle interaction images.

Software Languages and Tools

Python	■ ■ ■ ■ ■	**C/C++**	■ ■ ■ ■ ■
Java	■ ■ ■ □ □	**Bash**	■ ■ ■ ■ ■
TypeScript	■ ■ ■ ■ □	**SQL**	■ ■ ■ □ □
Git	■ ■ ■ ■ ■	**CMake**	■ ■ ■ ■ □

Education

2016-2020 **PhD Particle Physics**, *University of Sheffield*.
Thesis title: Selecting charged current muon neutrino interactions on argon with the Short-Baseline Near Detector.
- Developed C++ algorithms for topological feature selection.
- Used high performance computing techniques for modelling and simulation.

2012–2016 **MPhys Physics**, *University of Manchester*, **1st Class (84%)**.
Thesis title: Multivariate algorithms for neutron-antineutron annihilation pre-selection studies and track-shower separation with MicroBooNE.
- Developed and compared machine learning algorithms for pattern recognition.

Honours & Awards

Nominated (TBA) **Best Digital Identity Solution**, *Open Banking Expo*, 2021.
As part of the SILENTDATA development team.

Nominated (TBA) **Data Initiative of the Year**, *UK FinTech Awards*, 2021.
As part of the SILENTDATA development team.

Won **Hatfield-Heginbottom Scholarship**, *University of Manchester*, 2015.
Best performing physics student in the third year of study.

Other Training

2018 **STFC data analysis workshop**, *Imperial University*, UK.
- Statistical methods and tools for data analysis with a focus on Bayesian statistics and numerical analysis.

2017 **STFC HEP school**, *University of Lancaster*, UK.
- Two week training course on particle physics theory and data analysis lead by top researchers in the field.

Skills

Release management I was the release manager for a large particle physics experiment for three years, overseeing over 150 software releases. This gave me a strong grasp of version control, continuous integration and code deployment.

Data science I have a wealth of experience in all of the key aspects of data science from processing and visualising complex data to extracting statistically sound insights with scientific methodology.

Problem solving A rigorous education in mathematics and physics has provided me with excellent analytical skills that I continue to hone by employing them in my development work.

Organisation Throughout my PhD research programme I have effectively motivated myself to achieve long term goals and respond to short notice deadlines.

Communication I regularly give presentations and tutorials on complex topics to experts and students. I can disseminate information concisely and accurately through scientific reports.

Teamwork and leadership Working within a large collaborative experiment has taught me to listen and respond to teams of peers as well as leading and delegating work to junior students.

Selected Presentations, Publications and Teaching

Seminar **Neutrino-nucleus cross sections at the Short-Baseline Near Detector**, *HEP Seminar Series*, University of Sheffield, 2020.

Publication **Construction of precision wire readout planes for the Short-Baseline Near Detector**, *JINST*, Volume 15, 2020.

Invited tutor **4th annual LArTPC software analysis workshop**, *University of Manchester*, 2019.

Publication **A novel electrical method to measure wire tensions for time projection chambers**, *Nuclear Instruments and Methods in Physics A*, Vol 915, 2018.

Talk **SBND in 10 minutes**, *New Perspectives*, Fermilab, 2018.