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Thomas Brooks

Education

2016-2020 **PhD Particle Physics**, *University of Sheffield.*

2012–2016 **MPhys Physics**, *University of Manchester*, Grade: 1st Class (84%).
Key Courses: Computational Physics, Advanced Quantum Mechanics, Particle Physics, Complex Variables and Integral Transforms, Electrodynamics, Lagrangian Dynamics.

2010–2012 **A Levels**, *Graveney School*, Physics(A*), Chemistry(A*), Maths(A).
GCSEs: 6 A*, 3 A, 2 B.

Honours & Awards

- **Hatfield-Heginbottom Scholarship** for the best performing third year MPhys student in a class of 240 (2015).
- Nominated for **"Best Placement" Prize** based on my summer research (2015).
- **Graveney School Prize for Physics** selected by teachers out of a class of 100 (2012).
- Voted **Player of the Year** by coaches and players at Battersea Ironsides RUFC(2012).

Research Experience

Thesis Title Charge current muon neutrino cross section measurements in the Short Baseline Near Detector

Supervisor Dr. Matthew Malek

Description Measure the inclusive charged current muon neutrino cross section on argon at $\langle E \rangle = 0.6\ GeV$ with the Short Baseline Neutrino Detector. Develop reconstruction and selection algorithms, create a cross section measurement framework, evaluate detector systematics and assist with the construction and comissioning of the detector.

MPhys Title Multivariate algorithms for neutron-antineutron annihilation pre-selection studies and track shower separation with MicroBooNE

Supervisor Dr. Georgia Karagiorgi.

Description Simulated raw detector output of hypothesised rare neutron-antineutron oscillation events and high energy neutrino beams using the LArSoft framework. Developed algorithms in C++ and Python within the LArLite framework to differentiate between the types of event using advanced statistical techniques. Adapted the algorithms to the problem of separating track-like and shower-like particles using low-level detector data.

Other Professional Experience

Paid

07/2015–09/2015 **Mantid Project Intern**, *ISIS*, Rutherford Appleton Laboratory, Oxford.
Roles: Investigated the use of atomic simulation software with MantidPlot, liaised with instrument scientists and developed MantidPlot software.

Summer 2014 **Events Staff**, *Flair Events*, London.
Roles: Customer services, logistics and managing people within a sporting environment.

Summer 2012/13 **Premises Assistant**, *Belleville Primary School*, London.
Roles: Administration, events organisation and maintenance work.

Voluntary

2011–2012 **Rugby Coach**, *Graveney School*, London.
Roles: Teaching and organising young people, refereeing and building teamwork.

Summer 2010 **Assistant**, *New Scotland Yard*, London.
Roles: Communication with minority organisations and creating outreach media.

Programming/Markup Languages

Python	Intermediate	C/C++	Intermediate
Java	Basic	Bash	Basic
LaTeX	Intermediate	HTML	Basic

Specialist Software

Office	Advanced	MATLAB	Intermediate
ASE and CASTEP	Intermediate	Eclipse for Android	Basic
ROOT	Intermediate	LArSoft/Lite	Intermediate

Other Achievements

2015 **Paid summer placement in particle physics**, *University of Manchester*.
Description: Awarded a research project with the MicroBooNE collaboration based on academic merit and a personal statement.

2011 **Headstart course in materials science**, *Oxford University*.
Description: Selected out of an applicant pool. Designed and constructed a protective case, gave presentations and developed laboratory skills.

Conference Attendance and Presentations

Invited Talk **Towards CC inclusive cross-section measurements**, *SBND Collaboration Meeting*, Febuary 2018.

School **NuSTEC Summer School**, *Fermilab*, November 2017.

School **STFC HEP Summer School**, *Lancaster*, September 2017.

Poster **A comparison of potential electron lifetime measurement in the Short Baseline Near Detector**, *NuPhys, IOP HEPP*, 2016, 2017.

Invited Talk **Electron lifetime calculations**, *SBND Collaboration Meeting*, January 2017.

Invited Talk **Trigger studies for nnbar oscillations**, *MicroBooNE Collaboration Meeting*, July 2015.

Skills

Teamwork and leadership: Working on practical projects on Headstart, academic projects at university and playing rugby for several years has taught me to guide, listen and respond to teams of peers. Experience in coaching and refereeing youth rugby and being a peer mentor has given me an ability to lead both large and small groups of people.

Hands-on aptitude: Good experience in building, setting up and testing apparatus during laboratory work.

Written and oral communication: I often create presentations relating to laboratory work and I aim to take central roles when giving them. I have a lot of experience writing reports on practical and computational work. Coaching, peer mentoring and refereeing taught me to instruct and give orders effectively.

Interests and Other Activities

- I am very interested in computing; I recently undertook an unpaid project to create an android application for my local swimming club and I am always looking to improve my programming skills.
- I am interested in passing on the knowledge I have gained. I was selected as a peer mentor which involved providing guidance and assistance to first year students and organising a group project.
- I have been a keen rugby player for over seven years.
- I visit the gym regularly as a high level of fitness allows me to work to my maximum potential both physically and mentally.