

THOMAS SOARES MULLEN

GitHub: ThomasMullen

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EDUCATION

University of Manchester	MPhys Physics 1 st Class (Hons) 75.2 Modules (80+): <i>Wave optics, Mathematics of waves and fields, Physics of fluids, Applications of quantum physics, Thermal physics of bose and fermi gases, Intro to quantum mechanics, OOP C++, Intro to Python.</i>	June 2019
Mill Hill County High School	Physics (A*) Maths (A*) Further Maths (A*)	June 2015

Scholarships & Awards

Physics Entrance Scholarship
ESTRO: Best Poster in Physics and Imaging in Radiation Oncology

RESEARCH EXPERIENCE

Neuroscience	<i>Characteristic neural dynamics underlying fear behavoiural</i>	Present -
Champalimaud Fdn.	<i>responses</i>	Oct 2021

Used signal processing techniques to infer neural control signal from tail oscillations. Here, I linearly approximated the non-linear dynamical system using time-embedding and eigenvalue decomposition techniques.

Built a toolbox that can segment neurons from 4D data and extract $\frac{\delta f}{f}$ time series. Presented this pipeline at the Zenith ITN seminar.

Collaborated with labs in Centre de Regulació Genòmica, Spain, and Institut du Cerveau, France.

MPhys Project	<i>Effect of contouring variation on clinical outcome in prostate cancer</i>	June 2019 -
Christie Hospital	<i>patients</i>	Sept 2018

Utilized a deep learning image segmentation technique to compare 232 patients' manually delineated clinical target volumes (CTV) against algorithmically generated CTV.

Quantified the volumetric variation for each clinicians CTV and applied regression analysis alongside non-parametric statistical tests to evaluate local risk map throughout the planned target.

Presented seminars including one hosted at the Manchester Cancer Research Centre (MCRC) to fellow post-graduates and clinicians.

HEP Dept.	<i>Measuring matter-antimatter asymmetries at the LHCb</i>	June 2018 -
Univ. Manchester		March 2018

Developed C++ programs to clean up very large data sets to measure CP asymmetry of a specific decay channel of the $B^{+/-}$ meson. Implemented Dalitz plots to locate local asymmetries.

Optimised fits to the data to measure random/systematic uncertainties.

Nuclear Physics	<i>Angular correlation between coincident gamma rays in the decay of</i>	Jan 2018 -
Univ. Manchester	<i>^{60}Co using two NaI(Tl) detectors</i>	Oct 2017

Encountered numerous problems with the equipment, which vigorously tested my technical skills. Gained knowledge in scintillation detectors, electronics and how to calibrate coincident units.

PUBLICATIONS

T. Soares Mullen, A. Jenkins, C. Johnson-Hart, A. Green, A. McWilliam and M. Aznar and M. van Herk, E. M. Vasquez Osorio. "Novel methodology to assess the effect of contouring variation on treatment outcome". *Medical Physics*. UK. 2021. [10.1002/mp.14865](https://doi.org/10.1002/mp.14865)

CONFERENCE

T. Soares Mullen, A. Jouary, E. Figueiras, A. Laborde, M. Orger. "Head-restrained behavioural assay to capture multi-timescale switches of fear induced states". *International Congress of Neuroethology*. Lisbon, Portugal. 2022.

T. Soares Mullen, A. Jouary, E. Figueiras, A. Laborde, M. Orger. "F.4.c: Head-restrained behavioural assay to capture multi-timescale switches of fear induced states". *Federation of European Neuroscience Society: Internal States and Homeostasis*. Paris, France. 2022.

T. Soares Mullen, A. Jenkins, C. Johnson-Hart, A. Green, A. McWilliam, M. Aznar, M. Herk, E. Vasquez Osorio. "E20-0722: The effect of contouring variation on biochemical recurrence following prostate radiotherapy". *Physics track: Radiobiological and predictive modelling, and radiomics*. Vienna, Austria. 2020.

EMPLOYMENT

Dept. of Transport, Civil Service *Data Scientist* Sept 2021 - March 2021

- Worked in the in-house consultancy team and delivered insightful analysis at pace to cabinet office and other division in the civil service.
- Managed small projects in agile style to deliver high quality outcomes to meet clients expectations.
- Performed equality monitoring analysis across the DVLA human resource dataset to encouraged a more inclusive diverse team at the DfT.

Cazana *Data Scientist* March 2021 - Sept 2020

- Produced analysis reports and evaluated different company aspects for sales and product teams.
- Mentored data analysis trainee in python and R.
- Developed a model to cluster highly dimensional categorical car data to improve predictive car valuation prices for rare cars.

FireTech Summer Camp *Python Coding Teacher* Sept 2019 - June 2019

- Produced weekly a detailed 5-day lesson plan including break time activities to engage the class.
- Summarized pupils feedback forms to improve on future course lessons.
- Hosted end of week presentation and exhibition for their parents to see their progress.

Manchester Physics Outreach *Volunteer* June 2019 - Sept 2016

- Volunteered as a STEM helper to provide an educational platform accessible for all.
- Hosted a stall at Jodrell Bank Observatory during Bluedot festival in 2018 where I engaged the public with my enthusiasm for science.

PASS Mentor *Volunteer* May 2018 - Sept 2016

- Mentored a small group of 1st year physics students. Conducted a weekly session with undergraduates where I presented solutions to tutorial sheets and provided student advice.

TECHNICAL STRENGTHS

Computer Languages	Python, C++, C, Git, R, Lua, Matlab, L ^A T _E X
Databases	MySQL, SQLite
Languages	Portuguese (B1), French (A2)

ACTIVITIES AND ACHIEVEMENTS

Equality, Diversity and Inclusivity Committee *Student Member* June 2019 - Feb 2017

Elected 2nd Year Physics Student Rep *Representative* July 2017 - Sept 2016

Manchester Big Change *Fund raised 450 for homelessness* April 2018