Jamie McGowan

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I am a graduate student from UCL with **research experience** in particle physics and machine learning applications. As demonstrated from my research experience, I have a **flexible set of skills** with extensive experience in modelling and developing bespoke **algorithms in Python**, using packages such as PyTorch and Tensorflow.

INTERESTS

Deep Learning | Mathematics | **Artificial Intelligence** | Physics | **Neuroscience** | Machine Learning

EDUCATION

UNIVERSITY COLLEGE LONDON
PH.D. IN THEORETICAL PHYSICS
Autumn 2022 (Estimated) | London

UNIVERSITY OF LEEDS
MPHYS (HONS) IN THEORETICAL PHYSICS
June 2018 | Leeds
Grade - 1:1

SHREWSBURY SIXTH FORM
A-LEVELS: MATHEMATICS (A*), PHYSICS (A*), BIOLOGY (A)
June 2014 | Shrewsbury

SKILLS

PROGRAMMING
Python • FORTRAN • C++ • Git • LaTeX • Bash • SwiftUI • HTML

LIBRARIES
PyTorch • TensorFlow • Keras • Numpy • Scikit-Learn • Pandas • TensorBoard • And others...

REFEREES

Ph.D. supervisor Prof. Robert Thorne | robert.thorne@ucl.ac.uk
Internship Manager Alberto Bernacchia | alberto.bernacchia@mtkresearch.com
Director of Teaching Dr. Louise Dash | louise.dash@ucl.ac.uk

For more information please scan the QR code!

RESEARCH EXPERIENCE

PH.D. STUDENT | MSHT PARTON DISTRIBUTION FUNCTIONS
Oct 2018 - Present | London

- Computational modelling of a variety of unknown **higher order functions** in perturbation theory, describing quantum interactions within particle collisions.
- Fitting approximate theory to datasets via Hessian methods to gain a handle on the **theoretical uncertainties** present in physical quantities calculated in quantum field theory.
- High impact paper detailing methodology and results expected **early 2022**.

RESEARCH INTERN | MEDIATEK RESEARCH
June 2020 – Sep 2020 | Cambourne, Cambridge

- Meta-Learning project based on an adaptation of the MAML algorithm for **hierarchical learning**. Working with Python and PyTorch.
- Achieved superior performance compared to similar meta-learning algorithms on **NLP tasks** by exploiting prior knowledge of the language tree.
- Co-authored and published the paper **Cross-Lingual Transfer with MAML on Trees**.

RESEARCH COLLABORATOR | THE ALAN TURING INSTITUTE
April 2021 | London

- Two week intensive 'hackathon' working with ML techniques to produce a **podcast recommendation algorithm**.
- Made use of NLP techniques and various **topic modelling** approaches to achieve the desired outcome.
- **Organised and built** the API for the project from scratch.

COMPUTER VISION PROJECT COLLABORATOR | UKAEA
Jan 2019 – May 2019 | Didcot, Oxford

- Proof of concept project to show that the **calibration of images** from 'shaky' cameras inside a **fusion reactor** could be automated.
- Extensive pre-processing of images using libraries such as OpenCV.
- Compared and contrasted custom and 'off-the-shelf' **ML techniques**.

MPHYS STUDENT | UNIFICATION OF THE STANDARD MODEL
Oct 2017 – May 2018 | Leeds

- Explored various **unification group** candidates including $SU(5)$, $SO(10)$ and E_6 with and without supersymmetry.
- Used the **running coupling** results to predict the mass scales in the symmetry breaking chain.
- Modelled the predictions using **minimisation techniques** in Python.

UNDERGRADUATE SUMMER RESEARCH | THEORETICAL & CONDENSED MATTER RESEARCH GROUPS
June 2015 – May 2018 | Leeds

- Two **research projects** undertaken as an undergraduate working on thin film magnets and theoretical phases of matter.
- Made use of various pieces of **lab equipment** to design, build and test carbon based thin-film magnets.
- Computationally modelled **phases of matter** called 'Time Crystals' by manipulating Hamiltonian systems.

FURTHER EXPERIENCE

TEACHING ASSISTANT | University College London

Jan 2019 – Present | London

- Physics mentor for lower years during my undergraduate studies, providing **weekly workshops** to discuss topics in a small group.
- Postgraduate teaching assistant leading and assisting in **workshops for undergraduate modules** in Maths, Physics and Computing; marking coursework and exams; and answering student forum questions online.
- 3+ years experience in teaching **undergraduate Python** and 2+ years experience teaching **Software Carpentry** (mixture of Bash, Git and Python) at a postgraduate level.

STUDENT AMBASSADOR | University of Leeds

Jan 2015 – June 2018 | Leeds

- Student **ambassador for Physics**, representing the course at university events whilst giving **talks and tours**.
- Consulted on changes that would **affect undergraduates** (such as the construction of the new Physics building).
- Meeting and discussing with alumni and donors of the university at **networking events**.

PHYSICS MENTOR | University College London & University of Leeds

Sep 2015 – Present | London & Leeds

- Held **weekly sessions** for lower years to **discuss topics** from their lectures as an undergraduate.
- Involved in weekly workshops for undergraduates taking **specific courses** as a postgraduate.

PHYSICS COMMITTEE MEMBER | University of Leeds

Mar 2016 – May 2017 | Leeds

- Responsible for **organising trips** to Amsterdam and CERN in Geneva.
- **Applied for funding** to make the trips accessible to all students from **all backgrounds**.
- Able to bring the cost down to £5 per person through several grants championing inclusivity in the Physics society.

AWARDS

RESEARCH & LEADERSHIP SCHOLARSHIP | 2015 - 2018

- One of two students selected to receive this scholarship across the faculty of Mathematics and Physical Sciences.
- Included funding for **summer research placements** within two different research groups as an undergraduate.
- Extensive development of **leadership and teamwork skills** through funded training provided by the scholarship.
- Regular opportunities through networking events with alumni and donors of the university to give **talks on my experiences and research**.

DEANS EXCELLENCE SCHOLARSHIP | 2014 - 2018

- Awarded to the **top performing students** in Physics & Astronomy.
- Continued to hold this award **throughout undergraduate** studies.

PUBLICATIONS & NOTABLE WORK

CROSS-LINGUAL TRANSFER WITH MAML ON TREES | EACL Adapt-NLP, 2021

J. Garcia, F. Freddi, F. Liao, J. McGowan, T. Nieradzik, D. Shiu, Y. Tian and A. Bernacchia

MSHT20 N^{3}LO PARTON DISTRIBUTION FUNCTIONS WITH THEORETICAL UNCERTAINTIES | Ph.D. Thesis, Exp. 2022

J. McGowan

RECOMMENDATION SYSTEMS FOR PODCAST DISCOVERY | The Alan Turing Institute, Exp. 2021

CALIBRATION OF DIAGNOSTIC IMAGE DATA IN FUSION EXPERIMENTS | UCL CDT, 2019

C. Gutschow, A. Marignier, J. McGowan, E. Nurse, S. Silburn and S. Van Stroud

UNIFICATION OF THE STANDARD MODEL GAUGE GROUP | MPhys Thesis, 2018

J. McGowan