David John Ellis

Curriculum Vitae

Personal Details

Date of Birth 15.10.1994

Nationality British

E-mail david.ellis94@gmail.com

Education

Since 01.10.2018 **Astrophyiscs PhD,** Georg-August-Universität Göttingen.

Passed: Magna Cum Laude

2014 – 2018 **Theoretical Physics Masters Degree,** University of Nottingham

Grade: First

2008-2013 **High School,** Bedford Academy.

Grades: AAA (A2 Physics, Maths, Chemistry), AB (AS Further Maths, Biology), 11 GCSEs.

Work Experience

Since Dec 2021 **Analysis & Data Visualisation Officer** Birmingham City Council.

I currently play a leading role within the Birmingham City Council Population Health Management team. The team's primary aim is to apply statistical techniques to NHS data to identify groups with the highest risk of negative health outcomes based on their wider determinants of health. This process involves a continuous open dialogue with a range of stakeholders working within the council and the NHS. In our current projects, focusing on infant mortality and type II diabetes, I use SQL to process large patient-level data sets that I then analyse in either R or Python using techniques such as bootstrapping and logistic regression.

2018-2021 **PhD Student** Georg-August-Universität Göttingen.

My project involved developing our theoretical understanding of dark matter through careful analysis of large ($N = 1028^3$) sets of simulation data using Python. This included both independent and collaborative work resulting in one peer-reviewed publication with another soon to be published. I had a many teaching responsibilities. These included tutoring classes and lab courses, developing content and marking assignments. I also co-authored a textbook that will be published by Princeton University Press next year.

2014 **Research Assistant** Aircraft Research Association.

The ARA is an independent organisation that offers a range of specialist aerospace-related services. My roles included assisting in the writing of technical reports, analysing large data sets and preparing equipment for wind tunnel testing. I also gained practical experience in the use of Microsoft Excel.

Publications

Miniclusters Made Easy. In: Physical Review D. Vol. 103, No. 083525, 2021. arXiv:2006.08637

Structure of Axion Miniclusters. Submitted to publisher. arXiv:2204.13187

PhD Thesis: Axion Miniclusters: Formation, Structure and Observational Signatures eDiss

Introduction to Dark Matter. Contact signed: To be published next year by Princeton University Press.

Conferences

QUARKS 2020. *Presentation: Understanding the formation and observational signatures of Axion Miniclusters and their substructure.*. Date: 26/06/2021. YouTube video.

Sixteenth Marcel Grossman Meeting (MG16). *Presentation: Formation of Axion Miniclusters and their observational signatures* . Date: 09/07/2021. YouTube video.

Cosmo21. *Poster: Understanding the Formation and observational signatures of Axion Miniclusters*. Date: 02/08/2021. Online Poster.

Projects

reg-vis. This is a Python module built to visualise regression results in a way that can be easily interpreted and understood. It uses matplotlib to embed a plot of the regression results with confidence intervals into a table.

ps-toolkit. This is an astrophysics Python module built to estimate the number of galactic objects at each mass, known as the halo mass functions, that will form via gravitational collapse from an initial 1D matter-power spectrum using the Press–Schechter Formalism.

How's My NHS? I have created a website which aims to inform the public about how their local NHS trust has changed over the past decade, specifically the A&E waiting times and the number of overnight beds. This is done by using Python to automatically scrape the official NHS data as well as automatically generate the code to present the data for each NHS Trust on the website. This project has also included the use of social media to publicise the work.

Programming Skills

Python	**Advanced**
R	**Advanced**
HTML	**Intermediate**
LaTeX	**Intermediate**

CSS	**Intermediate**
SQL	**Intermediate**
Excel	**Intermediate**
JavaScript	**Basic/Intermediate**
C++	**Basic**
PowerBI	**Basic**
MATLAB	**Basic**

Languages

English	**Native**
German	**B1**

References

Provided on request.