DOMINIC TAYLOR | CV

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PERSONAL PROFILE STATEMENT

I am a PhD student at Durham University researching in Galaxy Formation and Evolution, specifically on gas dynamics in high-redshift galaxies under the supervision of Prof. Mark Swinbank. I have a strong understanding of Python from data analysis in my internships in X-ray Astronomy at the Leibniz-Institute for Astrophysics Potsdam (AIP) with Dr Mirko Krumpe, and in Milky Way Stellar Populations at the Astrophysics Research Institute (ARI) Liverpool John Moores University (LJMU), under the supervision of Dr Ricardo Schiavon. For my MPhys thesis, supervised by Prof. Rob Crain, I investigated the processes which influence the efficiency of galaxy formation, using cosmological simulations. Moreover, I'm proud to have independently developed an interactive online app for visualising the data behind the COVID-19 pandemic, allowing comparisons of numbers for different countries over time since the crisis began.

EDUCATION

Durham University, UK (Oct 2022 – June 2026)
Astrophysics PhD, STFC funded
Title: Studies of the dynamics and kinematics of young galaxies using observational data and theoretical comparisons
Supervisor: Prof. Mark Swinbank

University of Liverpool, UK (Sept 2017 – June 2021)
Master of Physics Astrophysics (MPhys) with Honours **Grade: Class I**

- First Year *(2017 – 2018)* Grade: 73%
- Second Year *(2018 – 2019)* Grade: 70%
- Third Year *(2019 – 2020)* Grade: 75%
- Fourth Year *(2020 – 2021)* Grade: 74%

St. Benedict's Catholic Sixth Form, Alcester, UK (Sept 2015 – June 2017)
International Baccalaureate (Diploma awarded) **Grade: 34 pts**
Higher Physics (5), Higher Maths (5), Higher Chemistry (5)
By mention of achievement: Mr Patrick O'Mahony (Physics) and Mr Viral Sindroja (Mathematics)

St. Benedict's Catholic High School, Alcester, UK (Sept 2015 – June 2017)
12 GCSEs (A-B) including Maths, Sciences, and English

PUBLICATIONS

First Author

Is Terzan 5 the remnant of a building block of the Galactic bulge? Evidence from APOGEE
Dominic J. Taylor, Andrew C. Mason, Ricardo P. Schiavon, et al., published in MNRAS.

Co-author

Detection by APOGEE of N-rich stars in the tidal tails of Palomar 5
Siân G. Phillips, Ricardo P. Schiavon, J. Ted Mackereth, et al., published in MNRAS.

ACHIEVEMENTS

Projects

Searching for changing-look AGN using XMM and SDSS data at the AIP ***(Nov 2021 – Now)***
Research internship, where I temporarily lived in Potsdam, to combine XMM-Newton overlapping X-ray data with spectroscopic data from the Sloan Digital Sky Survey (SDSS) using Python, to find changing-look AGN.

Terzan 5 ***(May 2020 – Now)***
Project supervised by Prof. Ricardo Schiavon, using SDSS-IV Apache Point Observatory Galactic Evolution Experiment (APOGEE-2) data. In this, I compare the detailed chemical composition of globular cluster-like Terzan 5 with that of bulge field stars, using a random-sampling technique in Python to evaluate whether its progenitor was a building block of the Galactic bulge, and how significant its contribution may have been.

Master of Physics Thesis – 74% (Class I) ***(Sept 2020 – May 2021)***
Investigation into the influences on the efficiency of galaxies to form stars using the Evolution and Assembly of GaLaxies and their Environments (EAGLE) hydrodynamical cosmological simulations. Python was used to analyse the simulation data, and correlations were quantified using the Spearman rank correlation coefficient (link to document).

COVID-19 Interactive Online Data App ***(Jul 2020 – Aug 2020)***
I independently developed an interactive data app, using Python and Streamlit, to observe the daily changes in COVID-19 Tests, Cases and Deaths for different countries across the world, updated daily, including graphs and dynamic maps which can be found here.

Astrophysics field trip to Teide Observatory and project on star formation ***(Sept 2019 – Dec 2019)***
This trip allowed me to use a Celestron telescope and the IAC80 to record image data for stellar clusters, spiral galaxies, and nebulae using several filters. I acquired many practical skills in observational astronomy, such as planning observations, collecting my own data, and working very effectively in a group on a project. We were able to study the regions of star formation in spiral galaxies, utilising Hα as a tracer.

Extra-curricular activities

University of Liverpool Men's Football *(Sept 2018 – June 2020)*
Duke of Edinburgh Bronze and Silver Awards *(Sept 2015 – June 2017)*

SELECTED TALKS

Informal Seminar Talk, *Leibniz-Institut für Astrophysik Potsdam (AIP), June 2022*
Virtually presented my Terzan 5 paper to the Milky Way and Local Group research group (link to PDF slides)

Milky Way Parallel Session, *SDSS Collaboration Meeting, Sept 2021*
Virtually presented my investigation into Terzan 5 to SDSS Collaboration members (link to PDF slides)

SKILLS

Programming
Python: for statistical analysis, modelling and visualisation of observational and simulation data (Pandas, Matplotlib, Numpy, Scipy, Astropy)
C/Bash: for navigating the Linux OS in the ubuntu terminal
MATLAB: for data-driven modelling
Jupyter Notebook: open source web application for hosting and executing Python scripts
TOPCAT: for quick manipulation and visualisation of large datasets
LaTeX: for contextualising research results, producing journal articles and academic documentation
Microsoft Teams/Word/Excel/Powerpoint: for hosting virtual meetings, note-writing, data analysis, and producing academic documentation and project presentations

Languages
Native: English
Intermediate: Spanish
Beginner: French, Italian

Organisational
Project talks: Organised a talk given at a collaboration meeting, and poster presentations of my MPhys thesis
Independent learning: Explore ways to reach an objective using my own intuition and strive to better myself in areas of health, relationships, and careers
Group work: Efficiently communicate and collaborate with peers in research groups, both aiding in their help and offering my own advice.

HOBBIES AND INTERESTS

In my spare time I enjoy exercising to build a healthy lifestyle and playing guitar and piano, and like to relax by listening to podcasts. I also like using Benty Fields to read newly published articles relevant to my scientific interests, and I'm a member of the ARI stellar populations journal club alongside senior staff, post-doctorates, and PhD students, where members give presentations on interesting newly published papers or we have a guest speaker presenting their own findings. This is a delightful way to connect with others in the field and learn in a free-and-easy fashion.

REFEREES

Dr Ricardo Schiavon (Research Internship Supervisor)
Address: ARI, Liverpool John Moores University (LJMU), IC2, Liverpool Science Park, Liverpool, UK, L3 5RF
Email: R.P.Schiavon@ljmu.ac.uk

Prof. Robert Crain (MPhys Thesis Supervisor)
Address: Same as that of Dr Ricardo Schiavon
Email: r.a.crain@ljmu.ac.uk

Prof. Joost Vossebeld (Academic Advisor)
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