David O'Ryan

Department of Physics
Lancaster University
Lancaster
LA1 4YB
United Kingdom

Nationality: British & Irish (Duel)
Mobile: +44 (0)7706017067
GitHub - Twitter - Website
d.oryan@lancaster.ac.uk
ORCiD: 0000-0003-1217-4617

Professional Summary

- Principal interests: galaxy evolution, galaxy interaction, galactic magnetism, star formation in interacting galaxies, automated galaxy classification, citizen science, astronomy with machine learning, data science, climate impact of astronomy and cultural astronomy.
- Expert in numerical simulations with Bayesian statistics.
- Expert in combining citizen science with machine learning.
- Expert at large scale data analysis, particularly using the Pandas Python package.
- Active Collaborations: Galaxy Zoo, Galaxy Zoo: Mergers, LSST, ESDC Machine Learning Group.

Education

University of Lancaster — Oct 2019 – Present
PhD in Physics — *Lancaster, UK*

University of Glasgow — Sept 2014 – Jun 2019
Integrated Masters (MSci) in Physics and Astronomy — *Glasgow, UK*

Research Experience

Archival Researcher — Apr 2022 – Jul 2022
European Space Astronomy Centre (ESAC), European Space Agency — *Madrid, Spain*

Masters Project in Solar Physics — Sept, 2018 – May 2019
University of Glasgow — *Glasgow, United Kingdom*

Summer Research Student in Imaging Concepts — June 2018 – Aug 2018
University of Glasgow — *Glasgow, United Kingdom*

Summer Research Student in Galaxy Evolution — June 2017 – Aug 2017
University of St Andrews — *St Andrews, United Kingdom*

Summer Research Student in Galaxy Evolution — Jul 2016 – Aug 2016
Nicolas Copernicus Astronomy Centre — *Warsaw, Poland*

Other Experience

Data Scientist — Oct 2021 – Jan 2022
1715Labs — *London, United Kingdom*

Presentations, Invited Talks and Seminars

DOR has given multiple talks across at a range of venues and events, ranging from being an invited speaker contributing a talk at conferences or workshops. The primary ones during his PhD were:

Dec 2022: "ESA Datalabs with Pandas - Creating 126 Million Cutouts", ESA Datalabs 2022 Workshop, Invited Speaker, ESAC, Madrid, Spain

Oct 2022: "Creating a Large Intereacting Galaxy Dataset with the ESA Hubble Archive, Galaxy Zoo Labels and Deep Learning", Invited Speaker, University of Lancaster, Lancaster, UK

Aug 2022:	"Creating a Large Intereacting Galaxy Dataset with the ESA Hubble Archive, Galaxy Zoo Labels and Deep Learning", Invited Speaker, ESAC, Madrid, Spain
Aug 2021:	"Exploring Galaxy Merger Histories and Their Parameters Using Low Surface Brightness Structure", National Astronomical Meeting, University of Bath, UK
July 2021:	""Exploring Galaxy Merger Histories and Their Parameters Using Low Surface Brightness Structure"", European Astronomical Society Annual Meeting, Leiden, Netherlands
Jan 2020:	"Painting Galaxies: A Statistical Framework for Quantifying Galaxy Merger Histories", Durham-Edinburgh Extragalactic Workshop, Durham, UK

Outreach

DOR has been involved in multiple outreach projects throughout his PhD and undergraduate degrees. Some examples of permanent outreach positions he has held are:

Jodrell Bank Volunteer — April 2022 – present
Jodrell Bank — *Manchester, UK*

Planetarium Presenter — December 2019 – present
Lancaster University Planetarium — *Lancaster, UK*

Student Open Day Volunteer — Sep 2017 – June 2018
University of Glasgow — *Glasgow, UK*

Examples of specific outreach events that DOR has volunteered for are:

Sep 2022:	"Newtown Science Festival", Newtown, Wales
Aug 2021:	"End of Summer at Jodrell Bank", Jodrell Bank, Manchester, UK

Awards

Archival Researcher Visitor Program Stipend — Mar 2022
European Space Agency — *4,500€*

Vacation Bursary — Jun 2018
Engineering and Physical Science Research Council — *£2,400*

Summer Bursary — May 2017
Royal Astronomical Society — *£1,200*

Summer Grant — Jun 2016
Polish Academy of Sciences — *2,000zł*

Programming Expertise

DOR has experience with multiple different programming languages in a range of contexts. A summary of the languages known are: **Python** (Advanced), **MatLab** (Advanced), **Mathematica** (Advanced), **Git** (Advanced), **FORTRAN** (Intermediate), **C** (Basic).

Python:	Used in the context of galactic simulations, Markov-Chain Monte Carlo (`EMCEE`, `Zeus`, `Dynesty`), large dataset exploration (`Pandas`, `Numpy`), geospatial data examination (`Shapely`, `GeoPandas`), Bayesian statistics (`corner`, `scipy`, `scikit-learn`), simulation based inference (`sbi`) and machine learning (`TensorFlow`).
MatLab:	Was taught in DORs undergraduate degree at the University of Glasgow. Used in the context of solar physics modelling solar prominences and flux distributions.
Mathematica:	Self-taught. Used for data analysis of results from large, hydrodynamic simulations of galaxies in isolation.

Git:	Used for all code backup and version control. Taught at numerous levels of academic career, and used on a daily basis. Also used in an industry contexy when working for 1715Labs.
FORTRAN:	Used in the context of galaxy simulations and solar prominence modelling. Simulation code often translated from FORTRAN to Python for later use in career by DOR.
C:	Self-taught. Used in the context of numerical simulations.

Teaching

DOR has been a teaching assistant for multiple courses at the University of Lancaster. These include:

- 1st year tutorials for **Waves & Oscillations** course
- 2nd year **laboratory experiments** focused on stellar types and properties.
- 3rd year tutorials for **Quantum Mechanics** course.
- 3rd year workshops for **Computational Methods and Python Programming** course.

Scientific Publications

Publications as Lead Author *Note: candidate name in bold*

2. "Harnessing the Hubble Space Telescope Archives: A Catalogue of 21,926 Interacting Galaxies", **D. O'Ryan**, et al. (16 authors), 2023, ApJ, 948, pp 40 – 68
1. "Advanced PySPAM: Constraining Galaxy Interaction in a Statistical Manner", **D. O'Ryan** & B. D. Simmons, In Prep., Link to In Prep Manuscript: Link

Publications as Major Contributing Author

1. "Origin of the Local Group Satellite Planes", I. Banik, **D. O'Ryan**, H. Zhao, 2018, MNRAS, 477, pp 4768–4791

Publications as Associate Author

5. "Galaxy and Mass Assembly: Galaxy Morphology in the Green Valley, Prominent Rings, and Looser Spiral Arms", D. Smith *et al.* (**O'Ryan**: 17th of 18 authors), 2022, MNRAS, 517, pp. 4575–4589
4. "Preparing for Low Surface Brightness Science with the Vera C. Rubin Observatory: Characterization of Tidal Features from Mock Images", G. Martin *et al.* (**O'Ryan**: 20th of 52 authors), 2022, MNRAS, 513, pp. 1459–1487
3. "Gems of the Galaxy Zoos-A Wide-ranging Hubble Space Telescope Gal-filler Program", W. Keel *et al.* (**O'Ryan**: 16th of 16 authors), 2022, AJ, 163, pp. 150
2. "Quantifying the Poor Purity and Completeness of Morphological Samples Selected by Galaxy Colour", R. J. Smethurst *et al.* (**O'Ryan**: 9th) of 10 authors), 2022, MNRAS, 510, pp. 4126–4133
1. "The Most Luminous, Merger-Free AGN Show Only Marginal Correlation with Bar Presence", I. L. Garland *et al.* (**O'Ryan**: 14th) of 16 authors), 2023, MNRAS, 522, pp. 211–225

Other Publications

1. "A Light in the Dark", AstroBites, Publication Date: TBC
2. "The Complicated Relationship Between Free Text and Data Science", Medium Post, 1715Labs, Publication Date: 03/02/2022
3. Multiple Articles, Qmunicate, Publication Dates: 2016 - 2019