

David O’Ryan

Department of Astrophysics
Centro de Astrobiología (INTA-CSIC)
Camino Bajo del Castillo, s/n,
28692 Villanueva de la Cañada,
Madrid, Spain

Nationality: British & Irish (Duel)
Mobile: +44 (0)7706017067
[GitHub](#) - [Twitter](#) - [Website](#)
doryan@cab.inta-csic.es
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](#).

Previous Work Experience

| | |
|--|--|
| Postdoctoral Researcher <i>Centro de Astrobiología (INTA-CSIC)</i> | Mar 2024 – Present <i>Madrid, Spain</i> |
|--|--|

Education

| | |
|--|---|
| University of Lancaster <i>PhD in Physics (Title: The Relation Between Galaxy Evolution and Interaction)</i> | Oct 2019 – Feb 2024 <i>Lancaster, UK</i> |
| University of Glasgow <i>Integrated Masters (MSci) in Physics and Astronomy</i> | Sept 2014 – Jun 2019 <i>Glasgow, UK</i> |

Research Experience

| | |
|--|---|
| Archival Researcher <i>European Space Astronomy Centre (ESAC), European Space Agency</i> | Apr 2022 – Jul 2022 <i>Madrid, Spain</i> |
| Masters Project in Solar Physics <i>University of Glasgow</i> | Sept, 2018 – May 2019 <i>Glasgow, United Kingdom</i> |
| Summer Research Student in Imaging Concepts <i>University of Glasgow</i> | June 2018 – Aug 2018 <i>Glasgow, United Kingdom</i> |
| Summer Research Student in Galaxy Evolution <i>University of St Andrews</i> | June 2017 – Aug 2017 <i>St Andrews, United Kingdom</i> |
| Summer Research Student in Galaxy Evolution <i>Nicolas Copernicus Astronomy Centre</i> | Jul 2016 – Aug 2016 <i>Warsaw, Poland</i> |

Other Experience

| | |
|--|--|
| Data Scientist <i>1715Labs</i> | Oct 2021 – Jan 2022 <i>London, United Kingdom</i> |
| Underwriter & Data Entry <i>Royal Bank of Scotland</i> | Sep 2015 – Sep 2017 <i>Greenock, United Kingdom</i> |

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 Interacting 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 Interacting Galaxy Dataset with the ESA Hubble Archive, Galaxy Zoo Labels and Deep Learning", Invited Speaker, ESAC, Madrid, Spain

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 <i>Jodrell Bank</i> | April 2022 – present <i>Manchester, UK</i> |
| Planetarium Presenter <i>Lancaster University Planetarium</i> | December 2019 – present <i>Lancaster, UK</i> |
| Student Open Day Volunteer <i>University of Glasgow</i> | Sep 2017 – June 2018 <i>Glasgow, UK</i> |

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 <i>European Space Agency</i> | Mar 2022 4,500€ |
| Vacation Bursary <i>Engineering and Physical Science Research Council</i> | Jun 2018 £2,400 |
| Summer Bursary <i>Royal Astronomical Society</i> | May 2017 £1,200 |
| Summer Grant <i>Polish Academy of Sciences</i> | Jun 2016 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 context 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

9. "Galaxy Merger Challenge: A Comparison Study Between Machine Learning Methods", B. Margalef-Bentabol *et al.* (**O’Ryan**: 16th) of 16 authors, submitted.
8. "Galaxy Zoo DESI: Large-Scale Bars as a Secular Mechanism for Triggering AGN", I. Garland *et al.* (**O’Ryan**: 12th of 16 authors), submitted.
7. "Galaxy Zoo DESI: Detailed Morphology Measurements for 8.7M Galaxies in the DESI Legacy Imaging Surveys", M. Walmsley *et al.* (**O’Ryan**: 12th of 16 authors) **2023, MNRAS, 526, pp 4768–4786**
6. "Zoobot: Adaptable Deep Learning Models for Galaxy Morphology", M. Walmsley *et al.* (**O’Ryan**: 13th of 17 authors), **2023, JOSS, 5312, pp 85– 89**
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