Callum T. Donnan

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Research Interests

First Galaxies, I use observational surveys, primarly with JWST (e.g. PRIMER), to detect and understand the properties of galaxies at $z > 6$.

Cosmic Web, I use observations (e.g. SDSS, DESI) and simuilations (e.g. Illustris TNG) to understand the link between galaxy evolution and the cosmic web.

Education

2021–present **PhD Astrophysics**, *Institute for Astronomy, University of Edinburgh*, Edinburgh, UK.
Thesis: *"Exploring the formation of the first galaxies with VISTA and JWST"*,
Supervisors: Prof. Jim Dunlop, Prof. Ross McLure, Dr. Derek McLeod

2016–2021 **MPhys (Honours) Astrophysics**, *University of St Andrews*, St Andrews, UK.
First Class, Awarded prize for best MPhys Astrophysics thesis.
Thesis: *"The gas content of galaxies in the cosmic web"*,
Supervisor: Dr. Rita Tojeiro

2010–2016 **Monifieth High School**, Monifieth, UK.
Advanced Higher: Physics (A), Mathematics (A) *Higher:* Physics (A), Mathematics (A), Computing Science (A), Chemistry (A), English (B), Geography (A)

Experience

2021 **Research Student**, *University of St Andrews*, St Andrews, UK.
- Exploring the role of the cosmic web in the scatter of the galaxy mass-metallicity relation
- SDSS and Illustris TNG data
Supervisor: Dr. Rita Tojeiro

2020 **Institute of Astronomy Summer Research Programme**, *University of Cambridge*, Cambridge, UK.
- Development of a new technique to calculate the spectroscopic redshift of the first galaxies.
- Analysis of X-Shooter spectra from the VLT.
- Determination of spectroscopic redshift for z>8 galaxies in the Hubble Frontier Fields.
Supervisor: Dr. Nicolas Laporte

2019 **Summer Research Project**, *University of St Andrews*, St Andrews, UK.
- Galaxy clustering in the cosmological hydrodynamical simulation, Illustris TNG using halo occupation distributions.
- Comparison to galaxy clustering observations in SDSS IV, MaNGA.
- Funded by the Cormack Vacation Scholarship from the Royal Society of Edinburgh and the School of Physics & Astronomy Student Staff Council Vacation Award.
Supervisors: Dr. Rita Tojeiro and Dr. Chris Duckworth

Skills

Coding	Python (numpy, scipy, astropy, matplotlib), FORTRAN, SQL, LaTeX
Data Analysis	Experience in Bayesian inference, spectral analysis, photometric catalogue creation, halo occupation distributions, monte carlo radiation transfer, hydrodynamical simulations.
Software	SExtractor, SWarp, ds9, TOPCAT, Jupyter Notebook
Membership	Institute of Physics Associate Member

Awards & Scholarships

Every Year (2016-2020)	Dean's List*
2019	Cormack Vacation Scholarship from the Royal Society of Edinburgh
2019	School of Physics & Astronomy Student Staff Council Vacation Award
2017/18	Medal (Astronomy and Astrophysics Second Level)
2016/17	Medal (Astronomy and Astrophysics First Level)
2016/17	Margaret Stewart Prize (Awarded to the best First Year student in Astronomy and Astrophysics)
2015	Proxima Accessit (Monifieth High School)

**Dean's List is awarded to students who average above 16.5 in all modules across the academic year.*

Talks

2022	Invited talk - CfA Galaxy Cluster Group
2020	Institute of Astronomy Summer Research Symposium
2020	Kavli Institute Extragalactic Astronomy Group - Presentation on summer project
2019	Extragalactic Astronomy Guest Seminar - Presentation on summer project
2019	St Andrews Galaxy Journal Club - Presentation on summer project
2019	Burn Conference - Presentation on probes of cosmic acceleration

Teaching/Outreach

2021/2022	Teaching Assistant: Physics 1A, Discovering Astronomy, Observational Astronomy
2017/18	Assisted with Monifieth High School's Advanced Higher class in doing research projects.

Publications

2022	**Donnan, C.T.**, Tojeiro, R., Kraljic, K., *Nature Astronomy*, "The role of the cosmic web in the scatter of the galaxy stellar mass - gas metallicity relation".