Louise **Welsh**

Astronomer

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Research Interests

Chemical evolution across cosmic time, the first stars and galaxies, the stellar initial mass function, reionisation quenching, near-pristine absorption line systems, high resolution spectroscopy, and upcoming quasar surveys.

Employment

University of Milano Bicocca — *Milan, Italy*

Postdoctoral Researcher — *Sep. 2021 - PRESENT*

Education

Centre for Extragalactic Astronomy, Durham University — *Durham, UK*

PhD in Astrophysics — *Oct. 2017 - Sep. 2021*

- Thesis: 'A window to the first stars: An investigation of chemically near-pristine environments'
- Advisors: Dr. Ryan Cooke and Prof. Michele Fumagalli

Lancaster University — *Lancaster, UK*

Master of Physics (MPhys): 1st Class (Hons) — *Oct. 2012 - Jul. 2016*

- Thesis: 'Investigating cold dark matter candidates'
- Advisor: Dr. John McDonald

Awards

2021	**Keith Nicholas Prize**, Awarded for outstanding overall performance by a postgraduate student.	*Durham University*
2019	**Durham University Learning and Teaching Award**, Awarded for developing dedicated teaching practices.	*Durham University*
2019	**Martin and Beate Block Award**, Awarded to a promising young physicist at the Aspen winter meeting 'Into the Starlight'.	*Aspen Centre for Physics*
2016	**Azzedine Hammiche Prize**, Awarded for exceptional fourth year project work.	*Lancaster University*

Talks (3 invited, 17 total)

Jan. 2022	**NOAO Friday Lunch Astronomy Seminar Hour (FLASH)**, (invited) TBD	*Virtual*
Oct. 2020	**The Rise of Metals and Dust in Galaxies through Cosmic Time**, The carbon isotopes of the first stars	*Virtual*
Oct. 2020	**SAZERAC - The First Stars**, The chemical enrichment of near-pristine systems	*Virtual*
Oct. 2020	**Cambridge galaxy group discussion**, The chemical enrichment of near-pristine systems	*Virtual*
Sep. 2020	**PGR Induction Event**, (invited) A Postgrad's experience	*Virtual*
Sep. 2020	**MIT BBL Talk**, The chemical enrichment of near-pristine systems	*Virtual*
Jul. 2020	**Isotopes as a Probe of the Growth of Galaxies**, (invited) Cancelled due to COVID-19	*Sesto, Italy*
Jul. 2020	**SAZERAC**, Searching for the carbon isotopes of the first stars	*Virtual*
Jul. 2020	**Caltech Tea Talk**, The carbon isotopes of the first stars	*Virtual*
Jan. 2020	**DEX XVI Workshop**, A bound on the carbon isotope ratio with ESPRESSO	*Durham, UK*
Sep. 2019	**PGR Induction Event**, A Postgrad's experience	*Durham, UK*
Jul. 2019	**Small Galaxies, Cosmic Questions**, A Window to the First Stars	*Durham, UK*
Mar. 2019	**Into the Starlight: The End of the Cosmic Dark Ages**, Modelling chemical enrichment by Pop. III SNe	*Aspen, US*
Mar. 2019	**KIPAC Tea Talk**, A window to the first stars	*Stanford, US*
Mar. 2019	**Cosmo Club**, A window to the first stars	*UC Santa Cruz, US*
Jan. 2019	**DEX XV**, A window to the first stars	*Edinburgh, UK*
Jul. 2018	**Friday Lunch Astronomy Talk**, The multiplicity of the first stars	*Durham, UK*

Proposal History as Principle Investigator

2021	**VLT/UVES**, 18 hours, P108.	*ESO*
2021	**Keck I/HIRES**, 1 night, 2021B.	*NOAO*
2020	**VLT/ESPRESSO 1-UT**, 9 hours, P105.	*ESO*
2020	**VLT/UVES**, 20 hours, P105.	*ESO*
2019	**WHT/ISIS**, 7 nights, 2019B.	*ING*

Teaching

2019 - 2021	**Demonstrator**, Level 2: Stars and Galaxies	*Durham University*
2018 - 2020	**Demonstrator**, Level 1: Further Mathematics for Geoscientists	*Durham University*
2018 - 2019	**Demonstrator**, Level 1: Maths toolkit for Scientists	*Durham University*

Committees

2020 - 2021	**OCW social**, Member of committee responsible for organising department social events.	*Durham University*
Jan. 2020	**DEX XVI**, LOC member for the "2020 Vision: progress and tensions in astronomy" workshop.	*Durham University*
Aug. 2019	**Small Galaxies, Cosmic Questions**, LOC member for the "Small Galaxies, Cosmic Questions" conference.	*Durham University*
2018 - 2019	**Astronomy Journal Club**, Co-convener of a weekly meeting of first year postgraduate students.	*Durham University*

Outreach

Planetarium *North East, UK*

Show provider *Oct. 2018 - Sep. 2020*

Delivered shows on the constellations and planets at events (including multiple science festivals) and local schools using an inflatable planetarium.

Computing Skills

Programming Python, git, LaTeX, Jupyter notebooks, slurm batch systems, RStudio.

Publications

- **L. Welsh**, R. Cooke, & M. Fumagalli (2021) "The stochastic enrichment of Population II stars", MNRAS, 500, 5214
- R. Cooke, **L. Welsh**, M. Fumagalli, & M. Pettini (2020) "A limit on Planck-scale froth with ESPRESSO", MNRAS, 494, 4884
- **L. Welsh**, R. Cooke, M. Fumagalli, & M. Pettini (2020) "A bound on the $^{12}C/^{13}C$ ratio in near-pristine gas with ESPRESSO", MNRAS, 494, 1411
- **L. Welsh**, R. Cooke, & M. Fumagalli (2019) "Modelling the chemical enrichment of Population III supernovae: the origin of the metals in near-pristine gas clouds", MNRAS, 487, 3363