Louise Amber Welsh

Curriculum Vitæ

Centre for Extragalactic Astronomy
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Employment & voluntary work

Vocational

2020 **Data Scientist**, *Department for Education*, London, UK.
3 month secondment with the British Civil Service. I developed machine learning techniques to detect anomalous student pathways.

Education

2017–2021 **PhD**, *Centre for Extragalactic Astronomy*, Durham, UK.
Supervisors: Dr. Ryan Cooke and Prof. Michele Fumagalli.
In progress. So far, I have:
- Developed a stochastic chemical enrichment model to investigate both Population III and Population II enriched systems.
- Utilised this model to investigate the chemical enrichment of the most metal-poor DLAs.
- Provided the first bound on the carbon isotope ratio of a near-pristine gaseous system using VLT+ESPRESSO Science Verification data.
- Conducted a search for chemically near-pristine gas using the William Herschel Telescope. I'm planning further observations of the most promising systems using a high resolution instrument.

2012–2016 **BSc MPhys**, *University of Lancaster*, Lancaster, UK, *1st Class (Hons)*.
Masters project: Investigating potential cold dark matter candidates.

Awards and Fellowships

2019 **Associate Fellow**, Higher Education Academy, London, UK.

2019 **Durham University Learning and Teaching Award**, Durham University, Durham, UK.
Awarded for developing dedicated teaching practices.

2019 **Martin and Beate Block Award**, Aspen Centre for Physics, Colorado, US.
Awarded to a promising young physicist at the Aspen winter meeting 'Into the Starlight'.

2017–2021 **Royal Society Studentship**, Durham University, Durham, UK.

2016 **Azzedine Hammiche Prize**, Lancaster University, Lancaster, UK.
Awarded for exceptional fourth year project work.

Talks and Seminars

Invited talks

July 2020 **Isotopes as a Probe of the Growth of Galaxies**, Sesto, Italy.
(Cancelled due to COVID-19)

Contributed talks

Oct 2020 **The Rise of Metals and Dust in Galaxies through Cosmic Time**, Virtual.
The carbon isotopes of the first stars

Oct 2020 **SAZERAC - The First Stars**, Virtual.
The chemical enrichment of near-pristine systems

Oct 2020 **Cambridge galaxy group discussion**, Virtual.
The chemical enrichment of near-pristine systems: possible evidence of quenching following reionization

Sep 2020 **PGR Induction Event**, Virtual.
A Postgrad's experience

Sep 2020 **MIT BBL Talk**, Virtual.
The chemical enrichment of near-pristine systems

July 2020 **SAZERAC**, Virtual.
Searching for the carbon isotopes of the first stars

July 2020 **Caltech Tea Talk**, Virtual.
The carbon isotopes of the first stars

Jan 2020 **DEX XVI Workshop**, Durham, UK.
A bound on the carbon isotope ratio with ESPRESSO

Sep 2019 **PGR Induction Event**, Durham, UK.
A Postgrad's experience

July 2019 **Small Galaxies, Cosmic Questions**, Durham, UK.
A Window to the First Stars

Mar 2019 **Into the Starlight: The End of the Cosmic Dark Ages**, Aspen, US.
Modelling the chemical enrichment by Population III supernovae

Mar 2019 **KIPAC Tea Talk**, Stanford, US.
A window to the first stars

Mar 2019 **Cosmo Club**, UC Santa Cruz, US.
A window to the first stars

Jan 2019 **DEX XV**, Edinburgh, UK.
A window to the first stars

Jul 2018 **Friday Lunch Astronomy Talk**, Durham, UK.
The multiplicity of the first stars

Successful Telescope Proposals (Principle Investigator)

2020 **ESPRESSO**, VLT, ESO. Allocation – 9 hours.
The isotopes of the first stars

2020 **UVES**, VLT, ESO. Allocation – 20 hours.
Uncovering the chemical fingerprint of the first stars with the most metal-poor DLAs

2019 **ISIS**, WHT, ING. Allocation – 7 nights.
Uncovering the signatures of the first stars in the most metal-poor DLAs

Teaching

2019–2021 Demonstrator for level 2 Stars and Galaxies module.

2018–2020 Demonstrator for level 1 Further Mathematics for Geoscientists module.

2018–2019 Demonstrator for level 1 Maths toolkit for Scientists.

Committees

2020–2021 **OCW social committee**, *Member*, Durham, UK.
Member of the committee responsible for organising social events for the Durham astronomy group.

2020 **DEX XVI LOC**, *Member*, Durham, UK.
Member of the Local Organising Committee for the "2020 Vision: progress and tensions in astronomy" workshop held in January 2020.

2019 **Small Galaxies, Cosmic Questions LOC**, *Member*, Durham, UK.
Member of the Local Organising Committee for the "Small Galaxies, Cosmic Questions" conference held in August 2019.

2018–2019 **First Year Astronomy Journal Club**, *Co-convener*, Durham, UK.
Coordinated a weekly meeting of first year postgraduate students to discuss recent papers and share knowledge.

Outreach

2018–2020 **Planetarium**, North East, UK.
Part of the Durham team that takes our inflatable planetarium to local schools and delivers shows on the constellations and planets.

Other Events

Oct 2019 **Celebrate Science**, Durham, UK.
Planetarium

Oct 2018 **Celebrate Science**, Durham, UK.
Planetarium

Apr 2018 **Schools Science Festival**, Durham, UK.
Galaxy Makers

Computer skills

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

Interests

Hiking

Exploring

Running

Publications

2020 **Louise Welsh**, Ryan Cooke, and Michele Fumagalli. arXiv e-prints, arXiv:2010.10532. The stochastic enrichment of Population II stars. (October, 2020).

Ryan Cooke, **Louise Welsh**, Michele Fumagalli, et al. MNRAS, 494, 4884-4890. A limit on Planck-scale froth with ESPRESSO. (May, 2020).

Louise Welsh, Ryan Cooke, Michele Fumagalli, et al. MNRAS, 494, 1411-1423. A bound on the $^{12}C/^{13}C$ ratio in near-pristine gas with ESPRESSO. (March, 2020).

2019 **Louise Welsh**, Ryan Cooke, and Michele Fumagalli. MNRAS, 487, 3363-3376. Modelling the chemical enrichment of Population III supernovae: the origin of the metals in near-pristine gas clouds. (August, 2019).