Lucy Webster

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Profile

Final-year PhD candidate (thesis submission expected January 2027) applying large-scale statistical analysis and spatio-temporal modelling to air pollution, decarbonisation policy and inequalities. Two first-author papers and with a third in review. Experienced in developing open and evidence based tools with government and industry partners, including a placement in UK Government's Air Quality and Industrial Emissions Team. University of Cambridge graduate.

Education

PhD in Atmospheric Chemistry *Oct 2023 – Jan 2027 (expected submission)*

Wolfson Atmospheric Chemistry Laboratories, University of York

- Thesis: *Air Quality Implications from Net Zero Policies and Pathways in the UK*
- Evaluated NO_x emissions from a hydrogen internal combustion engine for non-road machinery in collaboration with J.C. Bamford Excavators Ltd (JCB); initial analysis was submitted to a UK Government consultation and expanded into a peer-reviewed paper.
- Produced an economy-wide review of NO_x emission regulation across UK combustion sectors, converting limits in differing units onto a consistent scale; published and covered by *The Guardian*.
- Modelling the spatiotemporal uptake of heat pumps in England and Wales to quantify changes in NO_x emissions inequality to 2050.

MSci Natural Sciences (Earth Sciences) *Oct 2018 – Jul 2022*

Murray Edwards College, University of Cambridge

- First Class Honours
- Awarded the Rosemary Murray Scholarship prize for academic achievement.
- Independent research project working with the British Antarctic Survey on two sub-Antarctic ice cores, extracting a palaeoclimatic record from chemical, isotopic and physical data.
- Final-year courses included Atmospheric Chemistry, the Earth System & Climate Change, Natural Hazards and Frontiers of Ice Core Science.

Publications

- **Webster L.**, Ballard R., Beamish T., Burnhope T., Humbert J., Lewis A., Piaszyk J. and Moller S. (2025). Evaluating low NO_x hydrogen engines designed for off-road and construction applications. *Environ. Sci.: Processes Impacts*, 27, 486. doi:10.1039/D4EM00448E
- **Webster L.**, Lewis A. and Moller S. (2025). Evaluating the variability and consistency of NO_x emission regulation between sectors. *Environ. Sci.: Atmos.*, 5, 603. doi:10.1039/D4EA00149D
- **Webster L.**, Lewis A. and Moller S. (2026). Heat pump adoption in England and Wales: Implications for air quality disparities. *In review.*

Skills

Programming	R, Python, QGIS, ADMS, D3
Analysis	Geospatial and statistical analysis, scenario modelling, emissions inventories, model quality assurance
Data tools	R Shiny dashboards, interactive visualisation, open and reproducible workflows, GitHub

Professional Experience

PhD Placement, Air Quality and Industrial Emissions Team *6 months, during PhD*
Department for Environment, Food and Rural Affairs (Defra)

- Contributed to data-driven tools and insights supporting evidence-based air quality policy, including work linking health data to emissions.
- Started a 'Coffee and Coding' club to upskill the team in data analysis using R and Python.

Graduate Teaching Assistant *Oct 2024 – July 2026*
Department of Chemistry, University of York

- First-year Mathematics for Chemists: delivered workshops to >100 students, adapted teaching to individual needs and checked exam marking.
- Awarded the Roger J Mawby Demonstrating Prize for outstanding contribution to teaching and learning at York.

Higher Statistical Officer, Quality Assurance *Nov 2022 – Jul 2023*
His Majesty's Revenue and Customs (HMRC)

- Ensured the statistical robustness of departmental outputs through in-depth model reviews; built learning resources for a curated R package and hosted knowledge-sharing sessions.
- Badged Government Statistical Service statistician; member of the Royal Statistical Society.

Conference Talks and Posters

- Chem@York, York, Jun 2026. *Heat pump adoption in England and Wales. Implications for air quality disparities.* Oral.
- Johnson Matthey Poster Competition, York, April 2026. *Heat Pump Adoption in the UK: Implications for Air Quality Disparities.* Poster.
- Science into action: Creating policy relevant air quality insights, London, March 2026. *Heat Pump Adoption in the UK: Implications for Air Quality Disparities.* Oral and poster.
- IGAC ECR Conference, Online, Sep 2025. *Spatiotemporal analysis of heat pump adoption in the UK: implications for air quality inequalities.* Poster.
- UK Atmospheric Chemistry Conference, York, Sep 2025. *Heat pumps and air quality: addressing NO_x pollution inequalities in the transition to Net Zero.* Oral and poster.
- Air Quality in the 21st Century, London, Dec 2024. *Are NO_x emission standards consistent across sectors?* Oral.
- Chem@York, York, Jun 2024. *NO_x emissions from hydrogen internal combustion engines designed for off-road and construction applications.* Poster.

Open Tools, Policy Impact and Engagement

- **Public data tools:** National Atmospheric Emissions Inventory Visualiser (historic trends and projections of UK air pollutants); Automatic Urban and Rural Network data selector (monitoring sites and measured data); Inequalities Modeller (air quality disparities arising from emissions changes).
- **Policy impact:** evidence on hydrogen-engine NO_x emissions submitted to the consultation *Enabling road use of hydrogen-powered non-road mobile machinery*.
- **Mentoring:** mentor to an undergraduate student and a first-year PhD student.
- **Engagement:** invited to the Royal Society's Labs to Riches dinner (innovation at the industry–academia interface); helped run a coding hackathon for government analysts, showcasing R Shiny dashboards and giving hands-on support.