CO(L)LABORATORY

2025 PhD Studentships

Improving health and wellbeing in Nottingham through improved understanding of the link between air pollution and health.

About the Project

The harmful effects of air pollution on health are known, but the improvements in air quality reported UK-wide are leading to better health outcomes as expected. This may well be because although standard measures of air pollution such as fine particulate matter and nitrogen dioxide are declining, the composition of the air we breathe and the timing of peak levels of pollution (episodes) is changing in response to changes in both emissions and climate. In the health sector, emergency respiratory hospital admissions due to ozone are projected to increase, presenting a major concern. There is thus an urgency to improve our understanding of the relationship between air quality and health data, particularly at the local scale, where impacts on individuals, communities and health services will be most evident.

Through a collaboration with Nottingham City Council, a comprehensive local network of air quality monitors allows us to track, in real-time, a number of key air pollutants alongside temperature and traffic levels. Used in conjunction with an air pollution model, this data will be used by this project to assess pollution concentrations across the city in unprecedented detail. Health data from Nottingham University Hospitals Trust will be used to track acute presentations of illness and link this to air pollution data.

This PhD research project will combine air quality and health data, using Nottingham as a case study. This work has the potential to inform new approaches to air quality targets in the UK and beyond and could provide a step change in preventative advice to communities most at risk of acute air pollution-linked health conditions. Ultimately, the outcomes of this research could help reduce morbidity and local health service pressures and have wider economic benefits.

This project has been co-created and is supported by researchers from Nottingham Trent University (NTU), the University of Nottingham (UoN) and partners at Nottingham University Hospitals Trust. The successful candidate for this project will be enrolled at the University of Nottingham.

Project Aims

The overall aims of the project are:

1. To establish a real-time map of air quality across Nottingham by individual pollutants to illustrate overall air quality.
2. To establish a linked, secure, real-time database of acute medical symptoms across age and presentation.
3. To link and assess the air quality and health data and investigate trends between ozone levels and acute medical symptoms.
4. To engage local stakeholders (including the Council, Educational Sector, healthcare professionals, etc.) and wider publics on the findings and implications.

Supervisory Team

1. Lead Academic Supervisor: Dr Charlotte Bolton (UoN)
2. Academic Co-Supervisor(s): Dr Thomas William Johnson (NTU), Prof Sarah Metcalfe (UoN)
3. Community Supervisor: Prof Phil Quinlan (Nottingham University Hospitals Trust)

Key Details

Host University:	University of Nottingham
School / department:	Medicine and Health Sciences
Start date:	01 April 2025
Financial offer:	Tuition fees covered in full (worth approx. £15k across full PhD programme). Monthly stipend based on £19,237 per annum, pro rata, tax free.
Working hours	Full-time (minimum 37.5 hrs per week)

Key Details

Working Style:	Primarily in-person at host university. Flexible working supported. Working pattern to be agreed between successful candidate and lead supervisor.

Competencies

Co(l)laboratory Core Competencies		
Category	**Competency**	**Assessed: Application (A), Interview (I)**
Comprehension and evaluation	Strong understanding of the project and its subject matter.	A / I
	Analytical, researcher mindset with keen attention to detail.	A / I
	Communicate complex concepts with clarity and precision.	A / I
	Able to identify connections, patterns, gaps, and irregularities in information/data.	I
	Able to interpret data/information confidently with logic and empathy to derive meaning.	I
Social and emotional	Demonstrable experience of responding effectively changing contexts, information and demands.	A
	Ability to persevere in the face of challenges/failures and to remain constructive in developing solutions.	A
	Demonstrable passion for learning with clear drive and curiosity to undertake this specific research project.	A / I
	Willingness to immerse oneself in the research subject matter and make a contribute to new knowledge through a PhD.	A / I
	Strong desire to make a positive community impact through the research.	A / I
	Willingness to think deeply about complex concepts and engage with academic ideas and theory.	A / I

Competencies

Co(l)laboratory Core Competencies		
Category	**Competency**	**Assessed: Application (A), Interview (I)**
Preparedness and potential for success	Experience of working, collaborating and communicating effectively with different stakeholders.	A
	High level of self-motivation and ability to work with minimal guidance.	A / I
	Strong organisational and time-management skills with the ability to balance and prioritise multiple tasks.	A / I
	Ability to identify potential challenges and complexities and thoughtfully consider possible solutions.	A / I
	Able to identify the technical, personal, or professional skills required for a task and take action to develop these.	A / I
Community Context	Genuine desire to undertake community-engaged research over more traditional approaches to research.	A
	Understand the impact of and need for the inclusion of diverse experiences and points of view in research.	A / I
	Appreciation/understanding of the importance of community insight and experience in the generation of new knowledge.	A / I
	Awareness/understanding of the broader societal context related to the subject matter of the project.	A / I

Project Specific Competencies			
Essential	**Assessed: Application (A), Interview (I)**	**Desirable**	**Assessed: Application (A), Interview (I)**
Experience of handling or working with numerical data/information.	A / I	Professional, academic, or other background in a relevant field (i.e., health, biomedical sector, etc.)	A / I
Strong understanding of air pollution issues.	A / I	Experience working with large, complex data sets.	A / I

Competencies

Project Specific Competencies			
Essential	**Assessed: Application (A), Interview (I)**	**Desirable**	**Assessed: Application (A), Interview (I)**
Ability to communicate effectively and sensitively with a people from diverse cultures and backgrounds.	A / I	Experience with or strong understanding of working with statistics.	A / I

References for Further Reading

- Air Quality Strategy for Nottingham and Nottinghamshire 2020-2030 https://committee.nottinghamcity.gov.uk/documents/s107973/Notts%20AQ%20Strategy%202020%20FINALv1.0.pdf
- COMEAP 2015 Quantification of mortality and hospital admissions associated with ground-level ozone https://assets.publishing.service.gov.uk/media/5a80ea7fe5274a2e87dbc8ab/COMEAP_Ozone_Report_2015__rev1_.pdf
- COMEAP 2022 Cognitive decline, dementia and air pollution https://assets.publishing.service.gov.uk/media/62ceccdc8fa8f50c012d1406/COMEAP-dementia-report-2022.pdf
- DEFRA 2023 Air Quality Strategy Framework for local authority delivery https://assets.publishing.service.gov.uk/media/64e8963d635870000d1dbf9d/Air_Quality_Strategy_Web.pdf
- DEFRA 2023 Air Pollution in the UK 2022 https://uk-air.defra.gov.uk/library/annualreport/viewonline?year=2022_issue_1#report_pdf
- McIntyre et al. 2023 Future impacts of O3 on respiratory hospital admissions in the UK from current emissions policies. Environment International 178, 108046 https://doi.org/10.1016/j.envint.2023.108046
- Eve L. Draper, J. Duncan Whyatt, Richard S. Taylor, Sarah E. Metcalfe. Estimating background concentrations of PM2.5 for urban air quality modelling in a data poor environment. Atmospheric Environment 2023, 314: 120107. https://www.sciencedirect.com/science/article/pii/S1352231023005332
- Air pollution: outdoor air quality and health. NICE guideline [NG70] https://www.nice.org.uk/guidance/ng70
- Public Health England Improving people's health: Applying behavioural and social sciences to improve population health and wellbeing in England https://assets.publishing.service.gov.uk/media/5bb21dd2e5274a3e0d7af9e0/Improving_Peoples_Health_Behavioural_Strategy.pdf
- Xing Z, Yang T, Shi S, Meng X, Chai D, Liu W, Tong Y, Wang Y, Ma Y, Pan M, Cui J, Long H, Sun T, Chen R, Guo Y. Combined effect of ozone and household air pollution on COPD in people aged less than 50 years old. Thorax. 2023 Dec 15;79(1):35-42. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10804043/