

MENGXUE YAO

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Profile

I am a PhD candidate specializing in air pollution prediction, urban form characteristic quantification, and vegetation and urban air quality modelling. My research involves handling, processing, analyzing, and visualizing large datasets by integrating multiple data sources, such as remote sensing and ground-level data, to uncover potential connections. These tasks are grounded in machine learning and deep learning methods, using Python libraries like Scikit-learn and frameworks like TensorFlow, along with GIS tools. The goal of my work is to contribute to improved air quality and the creation of livable urban environments through data-driven urban planning and design.

I obtained my MEng in Landscape Architecture from Harbin Institute of Technology and my BEng in Landscape Architecture from Northeast Agricultural University in China. Following my studies, I worked as a landscape architecture designer for one year. I then began my PhD in Architecture at the University of Sheffield.

My research interests include (1) population exposure, human health and well-being, health inequality, (2) the effects of climate change on the built environment, (3) dynamic air quality data analysis and research translation, and (4) applying artificial intelligence to enhance air quality and design livable environments.

I am a Graduate Teaching Assistant at the School of Architecture and Landscape and the School of Geography and Planning. I have assisted with various modules at both undergraduate and master's levels, including urban design skills workshops and software usage for urban planning and design, such as Adobe, SketchUp, and GIS. I am a Fellow of the Higher Education Academy (FHEA), reflecting my commitment to teaching excellence and continuous professional development.

Publication & Project

- **JOURNAL ARTICLE**

Mengxue Yao, Michael Smith, Chengzhi Peng (2025), Modelling the effects of vegetation and urban form on air quality in real urban environments: A systematic review of measurements, methods, and predictions, *Urban Forestry & Urban Greening*, 2025, 128693. DOI: 10.1016/j.ufug.2025.128693.

Li G H, Yao M X, Dong W. (2019). Correlation Between PM_{2.5} Distribution Field and Green Interface Index in Typical Street Canyon of Harbin. *Journal of Human Settlements in West China*, (4), 87-96. DOI: 10.13791/j.cnki.hsfwest.20190401.

- **CONFERENCE PROCEEDINGS PAPER (IN PRINT)**

Mengxue Yao, Michael Smith, Chengzhi Peng. (2023). Modelling the Effects of Vegetation on Urban Air Quality Based on Multiple Environmental Data Sources. *Sustainable Cities: Pioneering Approaches to Green Urbanism and Climate Resilience*. Springer Cham. (forthcoming July 2025)

- **JOURNAL ARTICLES MANUSCRIPT IN PROGRESS**

Mengxue Yao, Michael Smite, Chengzhi Peng. Explainable machine learning for ultrahigh-resolution urban PM_{2.5} concentrations mapping: Leveraging satellite remote sensing and multi-source data fusion. *Environmental Science and Technology* (Planned submission: June, 2025).

Mengxue Yao, Michael Smite, Chengzhi Peng. Clustering Analysis of Non-Vegetation Related Urban Form Characteristics Based on Ensemble Algorithm. *Sustainable Cities and Society or Landscape and Urban Planning* (Planned submission: July, 2025).

Mengxue Yao, Michael Smite, Chengzhi Peng. A Multi-View Index for Measuring Urban Greenery's Effects on Air Quality. *Sustainable Cities and Society or Landscape and Urban Planning* (Planned submission: October, 2025).

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Education Background

PhD in Architecture, the University of Sheffield (TUOS) Passed the Confirmation Review on the first attempt without correction. Expected to submit PhD thesis in March 2025.	Oct 2021 – Now
MEng in Landscape Architecture, Harbin Institute of Technology (HIT) GPA: 83.15/100.	Sep 2016 – Jan 2019
BEng in Landscape Architecture, Northeast Agricultural University (NEAU) GPA: 87.09/100. (Rank: Top 5%)	Sep 2012 - Jun 2016

Scholarships & Awards

- **the PGR Publication Scholarship, the University of Sheffield (2024)**
First and only recipient from the Department of Architecture and Landscape.
- **First Class Scholarship, Harbin Institute of Technology (2016, 2017)**
- **First Class Scholarship for Comprehensive Quality, Merit Student, Excellent Student Cadre Scholarship (Multiple awards, 2012-2015)**

Main Teaching Activities

- **TRP 210 Urban Design and Placemaking (129 students)**
My primary responsibility is to participate in and guide student groups during workshops focused on urban planning discussions.
- **TRP 216 Urban Analytics (105 students)**
My primary responsibility is to help students learning software usage in design, including Adobe, SketchUp, CAD, etc.
- **TRP 6405 and TRP 314 GIS for Built Environment Professionals (160 and 76 students)**
My responsibilities include assisting module leaders in delivering fundamental GIS knowledge and providing support to students in using GIS to create analytical maps.
- **Tutorial and Support**
My responsibilities include providing guidance to students in thesis writing, study techniques, and assignment completion. Additionally, I offer support in using various software tools to help students complete their academic projects.

Internship Experiences

- Landscape Designer, Landscape Department, China Southwest Architecture Design and Research Institute Corp. Ltd, Qingdao, China** **Feb 2019 - Jan 2020**
- Developed and executed landscape design concepts for residential.
 - Conducted site analysis, including assessments of soil, climate, and existing vegetation.
 - Created detailed plans, drawings, and visualizations.
 - Engaged in client meetings to present designs, gather feedback.
- Landscape Designer, Landscape Department, Heilongjiang Provincial Institute of Architecture Design and Research, Harbin, China** **Jul 2017 - Sep 2017**
- Participated in the concept design, plan drawing and visualizations as an associate designer.

Skills & Hobbies

- **Python, e.g., Scikit-learn, Tensorflow. High-performance computing (HPC).**
- Proficient in professional software including CAD, SU, RHINO, GRASSHOPPER, LUMION, Photoshop, Illustrator, ArcGIS.
- Playing the piano (Level 10), delivering speech, reciting, debating, singing chorus-conducting.