Crew Attic, The King's Buildings
Edinburgh EH9 3FF, UK
feiyao-edinburgh.github.io

Fei Yao

(44) 7422585853
fei.yao@ed.ac.uk
github.com/FeiYao-Edinburgh

Professional Experience

- **April 2023 – March 2025** NCEO Research Scientist in the field of atmospheric modelling to interpret satellite observations of atmospheric composition (gases and aerosol particles), National Centre for Earth Observation (NCEO), The University of Edinburgh
- **March 2022 – March 2023** Postdoctoral Research Associate in Atmospheric Methane Detection Using Satellite Observations, School of GeoSciences, The University of Edinburgh
- **October 2021 – February 2022** Research Consultant in Locust Detection Using Satellite Observations, Edinburgh Innovations Limited, The University of Edinburgh

Education

- **Sep 2018 – Mar 2022** PhD in Atmospheric and Environmental Sciences (Supervisor: Prof. Paul Palmer), School of GeoSciences, The University of Edinburgh. Key research chapters of my thesis "Understanding particulate matter pollution and photovoltaic power output using data and models" are peer-reviewed and published (14 & 10).
- **Aug 2015 – Jul 2018** MSc in Geography: Urban and Regional Planning (Supervisor: Prof. Jiansheng Wu), School of Urban Planning and Design, Peking University. Key research chapters of my thesis "VIIRS-based remote sensing estimation of ground-level $PM_{2.5}$ concentrations in China" are peer-reviewed and published (6 & 5).
- **Sep 2011 – Jul 2015** BSc in Geographical Information System (Supervisor: Prof. Xuepei Han), School of Geography, East China Normal University. Key research chapters of my thesis "VIIRS-based remote sensing estimation of ground-level $PM_{2.5}$ concentrations in Beijing-Tianjin-Hebei" are peer-reviewed and published (2).

Peer-reviewed articles (*: Corresponding author; #: Co-first author)

17. Wang, Y., **Yao, F.***, Wang, H., Wu, J.*, Biljecki, F. and Yuan, C.*, 2023. Narrowing urban-rural disparity in particulate matter pollution linked to its reduced levels in urban areas: China, 2003–2020. In preparation.
16. Marvin, M.R.*, **Yao, F.**, Palmer, P.I., Latif, M.T. and Kahn, M.F., 2023. Uncertainties in biomass burning aerosols undermine model-derived air quality statistics in Southeast Asia. In preparation.
15. Liu, J.#, **Yao, F.#** and Chen, H.*, 2023. Narrower gaps in mutual contributions of $PM_{2.5}$ pollution and associated population exposure among China, South Korea, and Japan from a perspective of consumption than production. Submitted.
14. **Yao, F.*** and Palmer, P.I., 2022. Source sector mitigation of solar energy generation losses attributable to particulate matter pollution. *Environmental Science & Technology*, 56(12), pp.8619–8628. doi: 10.1021/acs.est.2c01175. Slides.
13. Liu, J.*, Li, J. and **Yao, F.**, 2022. Source-Receptor Relationship of Transboundary Particulate Matter Pollution between China, South Korea, and Japan: Approaches, Current Understanding, and Limitations. *Critical Reviews in Environmental Science and Technology*, 52(21), pp.3896-3920. doi: 10.1080/10643389.2021.1964308. WeChat.
12. Mogno, C.*, Palmer, P.I., Knote, C., **Yao, F.** and Wallington, T.J., 2021. Seasonal distribution and drivers of surface fine particulate matter and organic aerosol over the Indo-Gangetic Plain. *Atmospheric Chemistry and Physics*, 21(14), pp.1-39. doi: 10.5194/acp-21-10881-2021.
11. Wu, J.*, Wang, Y., Liang, J. and **Yao, F.**, 2021. Exploring common factors influencing $PM_{2.5}$ and O_3 concentrations in the Pearl River Delta: Tradeoffs and synergies. *Environmental Pollution*, 285, p.117138. doi: 10.1016/j.envpol.2021.117138.
10. **Yao, F.*** and Palmer, P.I., 2021. A model framework to reduce bias in ground-level $PM_{2.5}$ concentrations inferred from satellite-retrieved AOD. *Atmospheric Environment*, 248, p.118217. doi: 10.1016/j.atmosenv.2021.118217. Slides.
9. Guo, H., Zhan, Q., Ho, H.C., **Yao, F.**, Zhou, X., Wu, J. and Li, W.*, 2020. Coupling mobile phone data with machine learning: How misclassification errors in ambient $PM_{2.5}$ exposure estimates are produced?. *Science of The Total Environment*, 745, p.141034. doi: 10.1016/j.scitotenv.2020.141034.
8. Guo, H., Li, W.*, **Yao, F.**, Wu, J., Zhou, X., Yue, Y. and Yeh, A.G., 2020. Who are more exposed to $PM_{2.5}$ pollution: A mobile phone data approach. *Environment international*, 143, p.105821. doi: 10.1016/j.envint.2020.105821.
7. Wu, J., Liang, J., Zhou, L., **Yao, F.** and Peng, J.*, 2019. Impacts of AOD Correction and Spatial Scale on the Correlation between High-Resolution AOD from Gaofen-1 Satellite and In Situ $PM_{2.5}$ Measurements in Shenzhen City, China. *Remote Sensing*, 11(19), p.2223. doi: 10.3390/rs11192223.
6. **Yao, F.**, Wu, J.*, Li, W*. and Peng, J., 2019. A spatially structured adaptive two-stage model for retrieving ground-level $PM_{2.5}$ concentrations from VIIRS AOD in China. *ISPRS Journal of Photogrammetry and Remote Sensing*, 151, pp.263-276. doi: 10.1016/j.isprsjprs.2019.03.011.
5. **Yao, F.**, Wu, J.*, Li, W. and Peng, J., 2019. Estimating daily $PM_{2.5}$ concentrations in Beijing using 750-M VIIRS IP AOD retrievals and a nested spatiotemporal statistical model. *Remote Sensing*, 11(7), p.841. doi: 10.3390/rs11070841.

4. **Yao, F.**, Si, M., Li, W.* and Wu, J.*, 2018. A multidimensional comparison between MODIS and VIIRS AOD in estimating ground-level $PM_{2.5}$ concentrations over a heavily polluted region in China. *Science of the Total Environment*, 618, pp.819-828. doi: 10.1016/j.scitotenv.2017.08.209. Slides.
3. Wang, Z., **Yao, F.**, Li, W. and Wu, J.*, 2017. Saturation correction for nighttime lights data based on the relative NDVI. *Remote Sensing*, 9(7), p.759. doi: 10.3390/rs9070759. Slides.
2. Wu, J., **Yao, F.**, Li, W.* and Si, M., 2016. VIIRS-based remote sensing estimation of ground-level $PM_{2.5}$ concentrations in Beijing–Tianjin–Hebei: A spatiotemporal statistical model. *Remote Sensing of Environment*, 184, pp.316-328. doi: 10.1016/j.rse.2016.07.015. Slides.
1. **Yao, F.**, Ye, K. and Zhou, J.*, 2015. Automatic image classification and retrieval by analyzing plant leaf features. *Journal of Zhejiang A&F University*, 32(3), pp.426-433. doi: 10.11833/j.issn.2095-0756.2015.03.015.

Conference presentations (Selected)

5. The 1st (virtual) GEOS-Chem Europe Meeting, 1-2 September, 2020. Poster title: A model framework to reduce bias in ground-level $PM_{2.5}$ concentrations from satellite-retrieved AOD. Slides.
4. The 9th International GEOS-Chem Meeting, Cambridge, US, 6-9 May, 2019. Poster title: $PM_{2.5}$ over China inferred from MAIAC AOD and GEOS-Chem: preliminary results.
3. Regular Palmer Group Meeting, Edinburgh, UK, 15 February, 2019. Presentation title: AWS Cloud for Atmospheric Scientists. Slides.
2. The 3rd regular meeting of the NCEO ATM-BIO group, RAL/Oxfordshire, UK, 1-2 November, 2018. Presentation title: $PM_{2.5}$ over China during 2000-2018 inferred from MAIAC AOD: my PhD project description.
1. The 10th International Association for China Planning Conference, Beijing, China, 30 June - 3 July, 2016. Presentation title: Remote sensing estimation of ground-level $PM_{2.5}$ concentrations in Beijing-Tianjin-Hebei: A spatiotemporal statistical model. Slides. Best Student Paper Award.

Research Grants (Selected)

6. **Yao, F.**, Oct 2022 – Jan 2024. Harnessing satellite observations of methane to inform climate change mitigation strategies. Google Cloud Research Credits Program and Earth Engine Uplift Program, £4,685.00 and an Uplift for quota up to 500 QPS and 100 Concurrent Queries, which is valued at $1.33 per EECU-hour.
5. **Yao, F.**, Jan 2021 – Jul 2021. Improving solar energy generation by reducing anthropogenic source sector emissions. IT Small Grants of School of GeoSciences at the University of Edinburgh, £650.
4. **Yao, F.**, Si, M., Wang, W. and Shen, N., Jan 2017 – Jun 2017. Estimating ground-level $PM_{2.5}$ concentrations in Beijing-Tianjin-Hebei based on multi-source remote sensing data. Presidential Research Fund of Peking University Shenzhen Graduate School (No. 201607), CNY ¥12,000.
3. **Yao, F.**, Si, M., Cao, Q., Wang, W., Shen, N., Yuan, T. and Xu, L., Jan 2016 – Jun 2016. Estimation of ground-level $PM_{2.5}$ concentrations and corresponding health effects in Beijing-Tianjin-Hebei based on a spatiotemporal statistical model. Presidential Research Fund of Peking University Shenzhen Graduate School (No. 2015017), CNY ¥10,000.
2. Si, M., **Yao, F.** and Shen, N., Jan 2016 – Jun 2016. Spatial equity analysis of urban green space from the perspective of balance between supply and demand: A case study of Futian District, Shenzhen, China. Presidential Research Fund of Peking University Shenzhen Graduate School (No. 2015022), CNY ¥10,000.
1. **Yao, F.**, Yan, Y. and Cai, Z., Oct 2014 – Jun 2015. Automatic image classification and retrieval by analyzing plant leaf features. National Training Program of Innovation and Entrepreneurship for Undergraduates (No. 201410269099), CNY ¥8,000.

Honors & Awards (Selected)

5. China Scholarships Council (CSC)/University of Edinburgh Scholarships, awarded by CSC, Jun 2018.
4. National Scholarship, awarded by Ministry of Education of the People's Republic of China, 2013, 2016, and 2017.
3. Excellent Graduate, awarded by Peking University, Jun 2018.
2. Exceptional Award for Academic Innovation, awarded by Peking University, Dec 2016 and 2017.
1. Excellent Graduate, awarded by Shanghai Municipal Education Commission, May 2015.

Services & Activities

- Tutor & Demonstrator for *Earth's Atmospheric Composition* (Spring 2020, 2021), *Visual Analytics* (Spring 2019), *Welcome Week Computing Induction* (Autumn 2019).
- Reviewer for Academic Journals: *International Journal of Digital Earth* (2022-), *Remote Sensing* (2022-), *Geocarto International* (2022-), *Journal of Cleaner Production* (2022-), *IEEE Transactions on Knowledge and Data Engineering* (2022-), *Remote Sensing Applications: Society and Environment* (2021-), *Journal of the Royal Statistical Society: Series C* (2021-),

Atmospheric Environment (2020-), *Open Geosciences* (2020-), *ISPRS Journal of Photogrammetry and Remote Sensing* (2019-), *Aerosol and Air Quality Research* (2018-), *Environmental Science & Technology* (2017-), *Remote Sensing of Environment* (2017-).

SKILLS

- **Platform**: Proficient in *Laptop, Desktop, Workstation, High Performance Computing, and Cloud Computing including Amazon Web Service, Google Cloud, and Google Earth Engine*.
- **Programming**: Proficient in *Python and Shell*, Intermediate in *FORTRAN, Latex, Stata, MATLAB, R, and C*, and Basic in *IDL, Perl, C#, JavaScript, VB, Julia, etc*.
- **Software**: Proficient in *ArcGIS Desktop, ENVI, and Microsoft Office*, Intermediate in *CorelDRAW and Adobe Photoshop*.
- **Models**: Proficient in *3-D model of atmospheric chemistry and transport (e.g. GEOS-Chem), machine and deep learning (e.g. scikit-learn and TensorFlow), and solar photovoltaic performance modelling (e.g. PVLIB-Python)*, Intermediate in *spatiotemporal statistical models (e.g. panel data regression models and (multi-scale) geographically (temporally) weighted regression models)*, and Basic in *Cellular automation and Agent-based models*.
- **Data**: Proficient in *Big data processing and analysis particularly space-borne Earth observations (e.g. MODIS onboard Terra and Aqua, VIIRS onboard Suomi-NPP, MSI onboard Sentinel-2, etc)*.
- **Language**: Mother Tongue of Chinese, and Proficient in English (IELTS: 7).