

TUAN VAN VU

Senior Air Quality Scientist @Environmental Research Group

School of Public Health, Imperial College London

PERSONAL INFORMATION

- Position: Senior Air Quality Scientist, School of Public Health, Imperial College London
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- Homepage: <https://www.imperial.ac.uk/people/tuan.vu> and <https://tuanvvu.github.io>

CAREER TO DATE

- Senior Air Quality Scientist 2020–present
Environmental Research Group, School of Public Health, Imperial College London, United Kingdom
- Senior Air Quality Scientist 2019–2020
Environmental Research Group, School of Biomedical Science, King's College London, United Kingdom
- Research Fellow 2016–2019
School of Geography, Earth, and Environmental Sciences, University of Birmingham, United Kingdom
- Marie-Curie Early Stage Researcher 2013–2016
School of Geography, Earth, and Environmental Sciences, University of Birmingham, United Kingdom

QUALIFICATIONS

- PhD in Environmental Health, *The University of Birmingham*, United Kingdom 2013–2016
- MSc in Environmental Science, *University of Ulsan*, South Korea 2009–2011
- BSc in Chemistry (honors), *Hanoi University of Science, VNU*, Vietnam 2004–2008

EDUCATION

VISITING LECTURER

School of Geography, Earth, and Environmental Sciences, University of Birmingham, United Kingdom

- Indoor air pollution and Personal exposure, MSc in Causes and Effects of Air Pollution 2019–present

TEACHING ASSISTANT

School of Biomedical Science, King's College London

- Human exposure modelling 2019

School of Geography, Earth, and Environmental Sciences, University of Birmingham, United Kingdom

- Emissions sources/ National emissions inventories 2017–2019
- Indoor air pollution and Personal exposure 2017–2019

ACADEMIC SUPERVISION

School of Public Health, Imperial College London

- co-I of PhD students for our coming projects 2022

School of Geography, Earth, and Environmental Sciences University of Birmingham, United Kingdom

- Mentor of PhD and Msc students 2017–2019

RESEARCH

RESEARCH INTEREST

AIR POLLUTION

- Atmospheric chemical and physical transformations of air pollutants
- Sources, emissions and health effects of air pollution
- Climate change and air quality policies

MODELLING AND DATA SCIENCE

- Human exposure to air pollution modelling
- Satellite data analysis and Machine learning

RESEARCH GRANTS AND PROJECTS

1. NERC, *West London Healthy Home and Environment Study*, £2.9 m, Role: **Research co-I** 2021–2025
2. NERC, *An Air Pollution Exposure model to integrate protection of vulnerable groups into the UK Clean Air Programme*, 1.4 m, Researcher 2019–2022
3. MRC, *Cognitive DeveLopment in the Urban Environment*, £618 k, Researcher 2018–2021
4. ,NERC, *Quantitative attribution of secondary organic aerosol in Beijing to its precursors*, £319 k, **Researcher & Case of Support writer** 2019–2021
5. NERC, *Sources and emissions of air pollutants in Beijing*, £1.4 m, Researcher 2016–2020
6. H2020, *Human exposure to aerosol contaminants in modern microenvironments*, £3.2 m, Researcher 2013–2016

PRINCIPAL RESEARCH PUBLICATIONS

- [1] Roy M. Harrison, **Tuan, V. Vu**, Hanan Jafar, and Zongbo Shi. “More mileage in reducing urban air pollution from road traffic”. In: *Environment International* 149 (2021), p. 106329.
- [2] Zongbo Shi, Congbo Song, Bowen Liu, Gongda Lu, Jingsha Xu, **Tuan, V. Vu**, Robert J. R. Elliott, Weijun Li, William J. Bloss, and Roy M. Harrison. “Abrupt but smaller than expected changes in surface air quality attributable to COVID-19 lockdowns”. In: *Science Advances* 7 (2021), eabd6696.
- [3] **Tuan, V. Vu**, Zongbo Shi, and Roy M. Harrison. “Estimation of hygroscopic growth properties of source-related sub-micrometre particle types in a mixed urban aerosol”. In: *npj Climate and Atmospheric Science* 4 (2021), p. 21.
- [4] Yangmei Zhang, **Tuan, V. Vu**, Junying Sun, Jianjun He, Xiaojing Shen, Weili Lin, Xiaoye Zhang, Junting Zhong, Wenkang Gao, Yaqiang Wang, Tzung May Fu, Yaping Ma, Weijun Li, and Zongbo Shi. “Significant Changes in Chemistry of Fine Particles in Wintertime Beijing from 2007 to 2017: Impact of Clean Air Actions”. In: *Environmental Science & Technology* 54 (2020), pp. 1344–1352.
- [5] **Tuan, V. Vu**, Z. Shi, J. Cheng, Q. Zhang, K. He, S. Wang, and R. M. Harrison. “Assessing the impact of clean air action on air quality trends in Beijing using a machine learning technique”. In: *Atmos. Chem. Phys.* 19 (2019), pp. 11303–11314.
- [6] **Tuan, V. Vu**, Jakub Ondracek, Vladimir Zdimal, Jaroslav Schwarz, Juana Maria Delgado-Saborit, and Roy M. Harrison. “Physical properties and lung deposition of particles emitted from five major indoor sources”. In: *Air quality, atmosphere & health* 10 (2017), pp. 1–14.

My full list of publications is in APPENDIX.

OTHER RESEARCH OUTPUTS

SORFWARE

- An UK Hybrid Exposure Model @ <https://github.com/tuanvuu> 2020 –present
- An enhanced algorithm for weather normalization trends of air pollutants 2019
- An indoor/outdoor transportation of aerosols model 2016
- An enhanced deposition model of particles in the human respiratory system 2015

DATASETS

- APHH: Chemical composition measurements of PM_{2.5} in Beijing *deposited on CEDA*
- Other data sets on Air Quality *deposited on University of Birmingham Research Portal*

FIELDWORK & LABWORK

- Fieldwork: Organized and conducted air pollution sampling campaigns in UK, Spain, Czech, Italy, South Korea, China, and India using a wide range of instruments: air samplers, particle sizers (SMPS, APS, OPS), T-HDMA, AE-33, Micro-PEM, Impactors and gaseous sensors.
- Lab-work: GC/MS, GCxGC-FID, OC/EC analyser, IC, ICP-MS XRF

INVITED SPEAKER

- Sources and emissions of air pollutants in Beijing, Istanbul University, Turkey 2019

HONORS AND AWARDS

- **Marie Curie early-stage researcher fellowship**, University of Birmingham. 2013–2016
- **Best paper presentation award**, Brain Korea 21 Program, South Korea. 2010
- **Best paper award**, , International Forum on Strategic Technology, Ministry of Education, South Korea. 2010
- **Certificate of excellent students**, Hanoi University of Science, Vietnam. 2004–2008
- **Highest ranked student**, Vietnamese National Exam for High School Students. 2004

ENTERPRISE, ENGAGEMENT AND IMPACT

RECENT ORAL PRESENTATIONS

I have actively presented my work in prestigious conferences such as European Aerosol Conference (EAC, 2014-2021), European Geosciences Union (EGU, 2018-2019), American Geosciences Union (AGU, 2017), UK Research Review Meeting on Outdoor and Indoor Air Pollution Research (2021,2018-2017), etc. Below is the recent venues which I have been attended:

- *European Aerosol Conference, UK and Ireland Aerosol Society, UK*
"Indoor air quality in London homes with child occupants: from measurements to modelling". 2021
- *UK Research Review Meeting on Outdoor and Indoor Air Pollution Research, UK*
"An integrated approach to estimate and predict dynamic infiltration factors of fine particles at London homes" 2021

COLLABORATIVE CONTRIBUTIONS

- I have been collaborating with strong research teams in UK, EU, China, South Korea and Vietnam.

TECHNICAL PROGRAM COMMITTEE AND REVIEWERS FOR JOURNALS & CONFERENCES

- Reviewer for Czech Academy of Science funding 2020

Below is the list of some journal which I have been a reviewer:

- Atmospheric Chemistry and Physics
- Environmental Pollution
- npj Climate and Atmospheric Science
- Indoor Air
- Environmental Science: Processes Impacts
- Air Quality, Atmosphere and Health
- Atmospheric Environment

INFLUENCE AND IMPACTS

- Our paper (*Abrupt but smaller than expected changes in surface air quality attributable to COVID-19 lockdowns* published on Science Advanced) has received much attention from researchers and media (Picked up by 51 news outlets, Blogged by 7, Tweeted by 129; Altmetrics: 539).
- My data sets on Beijing air pollution have been used by other researchers. We have published more than 15 papers based on these data sets.
- My scripts on Github have been used by other researcher (20 stars). In addition, I translate my research outcomes into Vietnamese and publish them on my blog.

APPENDIX

Below is my full list of publications:

- [1] William J. Bloss, Louisa Kramer, Leigh R. Crilley, **Tuan, V. Vu**, Roy M. Harrison, Zongbo Shi, James D. Lee, Freya A. Squires, Lisa K. Whalley, Eloise Slater, Robert Woodward-Massey, Chunxiang Ye, Dwayne E. Heard, Shengrui Tong, Siqi Hou, Yele Sun, Jingsha Xu, Lianfang Wei, and Pingqing Fu. “Insights into air pollution chemistry and sulphate formation from nitrous acid (HONO) measurements during haze events in Beijing”. In: *Faraday discussions* 226 (2021), pp. 223–238.
- [2] S. J. Campbell, K. Wolfer, B. Utinger, J. Westwood, Z. H. Zhang, N. Bukowiecki, S. S. Steimer, **Tuan, V. Vu**, J. Xu, N. Straw, S. Thomson, A. Elzein, Y. Sun, D. Liu, L. Li, P. Fu, A. C. Lewis, R. M. Harrison, W. J. Bloss, M. Loh, M. R. Miller, Z. Shi, and M. Kalberer. “Atmospheric conditions and composition that influence PM2.5 oxidative potential in Beijing, China”. In: *Atmos. Chem. Phys.* 21 (2021), pp. 5549–5573.
- [3] Roy M. Harrison, **Tuan, V. Vu**, Hanan Jafar, and Zongbo Shi. “More mileage in reducing urban air pollution from road traffic”. In: *Environment International* 149 (2021), p. 106329.
- [4] S. Hou, D. Liu, J. Xu, **Tuan, V. Vu**, X. Wu, D. Srivastava, P. Fu, L. Li, Y. Sun, A. Vlachou, V. Moschos, G. Salazar, S. Szidat, A. S. H. Prévôt, R. M. Harrison, and Z. Shi. “Source apportionment of carbonaceous aerosols in Beijing with radiocarbon and organic tracers: insight into the differences between urban and rural sites”. In: *Atmos. Chem. Phys.* 21 (2021), pp. 8273–8292.
- [5] Nhung H. Le, Bich-Thuy Ly, Phong K. Thai, Gia-Huy Pham, Ich-Hung Ngo, Van-Nguyet Do, Thuy T. Le, Luan V. Nhu, Ha Dang Son, Yen-Lien T. Nguyen, Duong H. Pham, and **Tuan, V. Vu**. “Assessing the Impact of Traffic Emissions on Fine Particulate Matter and Carbon Monoxide Levels in Hanoi through COVID-19 Social Distancing Periods”. In: *Aerosol and Air Quality Research* 21 (2021), p. 210081.
- [6] Zongbo Shi, Congbo Song, Bowen Liu, Gongda Lu, Jingsha Xu, **Tuan, V. Vu**, Robert J. R. Elliott, Weijun Li, William J. Bloss, and Roy M. Harrison. “Abrupt but smaller than expected changes in surface air quality attributable to COVID-19 lockdowns”. In: *Science Advances* 7 (2021), eabd6696.
- [7] D. Srivastava, **Tuan, V. Vu**, Shengrui Tong, Zongbo Shi, and Roy M. Harrison. “Formation of Secondary organic aerosols from anthropogenic precursors in laboratory studies- A review (just accepted)”. In: *npj Climate and Atmospheric Science* 1.1 (2021), p. 1.
- [8] D. Srivastava, J. Xu, **Tuan, V. Vu**, D. Liu, L. Li, P. Fu, S. Hou, N. Moreno Palmerola, Z. Shi, and R. M. Harrison. “Insight into PM2.5 sources by applying positive matrix factorization (PMF) at urban and rural sites of Beijing”. In: *Atmos. Chem. Phys.* 21 (2021), pp. 14703–14724.
- [9] **Tuan, V. Vu**, Zongbo Shi, and Roy M. Harrison. “Estimation of hygroscopic growth properties of source-related sub-micrometre particle types in a mixed urban aerosol”. In: *npj Climate and Atmospheric Science* 4 (2021), p. 21.
- [10] L. K. Whalley, E. J. Slater, R. Woodward-Massey, C. Ye, J. D. Lee, F. Squires, J. R. Hopkins, R. E. Dunmore, M. Shaw, J. F. Hamilton, A. C. Lewis, A. Mehra, S. D. Worrall, A. Bacak, T. J. Bannan, H. Coe, C. J. Percival, B. Ouyang, R. L. Jones, L. R. Crilley, L. J. Kramer, W. J. Bloss, **Tuan, V. Vu**, S. Kotthaus, S. Grimmond, Y. Sun, W. Xu, S. Yue, L. Ren, W. J. F. Acton, C. N. Hewitt, X. Wang, P. Fu, and D. E. Heard. “Evaluating the sensitivity of radical chemistry and ozone formation to ambient VOCs and NOx in Beijing”. In: *Atmos. Chem. Phys.* 21 (2021), pp. 2125–2147.
- [11] J. Xu, D. Liu, X. Wu, **Tuan, V. Vu**, Y. Zhang, P. Fu, Y. Sun, W. Xu, B. Zheng, R. M. Harrison, and Z. Shi. “Source apportionment of fine organic carbon at an urban site of Beijing using a chemical mass balance model”. In: *Atmos. Chem. Phys.* 21 (2021), pp. 7321–7341.
- [12] J. Xu, D. Srivastava, X. Wu, S. Hou, **Tuan, V. Vu**, D. Liu, Y. Sun, A. Vlachou, V. Moschos, G. Salazar, S. Szidat, A.S.H. Prévôt, P. Fu, R.M. Harrison, and Zongbo Shi. “An evaluation of source apportionment of fine OC and PM2.5 by multiple methods: APHH-Beijing campaigns as a case study”. In: *Faraday discussions* 226 (2021), pp. 290–313.

- [13] Bich-Thuy Ly, Yutaka Matsumi, **Tuan, V. Vu**, Kazuhiko Sekiguchi, Thu-Thuy Nguyen, Chau-Thuy Pham, Trung-Dung Nghiem, Ich-Hung Ngo, Yuta Kurotsuchi, Thu-Hien Nguyen, and Tomoki Nakayama. “The effects of meteorological conditions and long-range transport on PM_{2.5} levels in Hanoi revealed from multi-site measurement using compact sensors and machine learning approach”. In: *Journal of Aerosol Science* (2020), p. 105716.
- [14] E. J. Slater, L. K. Whalley, R. Woodward-Massey, C. Ye, J. D. Lee, F. Squires, J. R. Hopkins, R. E. Dunmore, M. Shaw, J. F. Hamilton, A. C. Lewis, L. R. Crilley, L. Kramer, W. Bloss, **Tuan, V. Vu**, Y. Sun, W. Xu, S. Yue, L. Ren, W. J. F. Acton, C. N. Hewitt, X. Wang, P. Fu, and D. E. Heard. “Elevated levels of OH observed in haze events during wintertime in central Beijing”. In: *Atmos. Chem. Phys.* 20 (2020), pp. 14847–14871.
- [15] S. S. Steimer, D. J. Patton, **Tuan, V. Vu**, M. Panagi, P. S. Monks, R. M. Harrison, Z. L. Fleming, Z. Shi, and M. Kalberer. “Differences in the composition of organic aerosols between winter and summer in Beijing: a study by direct-infusion ultrahigh-resolution mass spectrometry”. In: *Atmos. Chem. Phys.* 20 (2020), pp. 13303–13318.
- [16] Xuefang Wu, Chunrong Chen, **Tuan, V. Vu**, D. Liu, Clarissa Baldo, Xiaobao Shen, Qiang Zhang, Kuang Cen, Mei Zheng, Kebin He, Zongbo Shi, and Roy M. Harrison. “Source apportionment of fine organic carbon (OC) using receptor modelling at a rural site of Beijing: Insight into seasonal and diurnal variation of source contributions”. In: *Environmental Pollution* 266 (2020).
- [17] Yangmei Zhang, **Tuan, V. Vu**, Junying Sun, Jianjun He, Xiaojing Shen, Weili Lin, Xiaoye Zhang, Junting Zhong, Wenkang Gao, Yaqiang Wang, Tzung May Fu, Yaping Ma, Weijun Li, and Zongbo Shi. “Significant Changes in Chemistry of Fine Particles in Wintertime Beijing from 2007 to 2017: Impact of Clean Air Actions”. In: *Environmental Science and Technology* 54 (2020), pp. 1344–1352.
- [18] R. Lyu, Z. Shi, M. S. Alam, X. Wu, D. Liu, **Tuan, V. Vu**, C. Stark, P. Fu, Y. Feng, and R. M. Harrison. “Insight into the composition of organic compounds (thinsp;C₆) in PM_{2.5} in wintertime in Beijing, China”. In: *Atmos. Chem. Phys.* 19 (2019), pp. 10865–10881.
- [19] Ruihe Lyu, Zongbo Shi, Mohammed Salim Alam, Xuefang Wu, Di Liu, **Tuan, V. Vu**, Christopher Stark, Ruixin Xu, Pingqing Fu, Yinchang Feng, and Roy M. Harrison. “Alkanes and aliphatic carbonyl compounds in wintertime PM_{2.5} in Beijing, China”. In: *Atmospheric Environment* 202 (2019), pp. 244–255.
- [20] Xiaoyao Ma, Zhenghui Xiao, Lizhi He, Zongbo Shi, Yunjiang Cao, Zhe Tian, **Tuan, V. Vu**, and Jisong Liu. “Chemical Composition and Source Apportionment of PM_{2.5} in Urban Areas of Xiangtan, Central South China”. In: *International Journal of Environmental Research and Public Health* 16 (2019).
- [21] Z. Shi, **Tuan, V. Vu**, S. Kotthaus, R. M. Harrison, S. Grimmond, S. Yue, T. Zhu, J. Lee, Y. Han, M. Demuzere, R. E. Dunmore, L. Ren, D. Liu, Y. Wang, O. Wild, J. Allan, W. J. Acton, J. Barlow, B. Barratt, D. Beddows, W. J. Bloss, G. Calzolari, D. Carruthers, D. C. Carslaw, Q. Chan, L. Chatzidiakou, Y. Chen, L. Crilley, H. Coe, T. Dai, R. Doherty, F. Duan, P. Fu, B. Ge, M. Ge, D. Guan, J. F. Hamilton, K. He, M. Heal, D. Heard, C. N. Hewitt, M. Hollaway, M. Hu, D. Ji, X. Jiang, R. Jones, M. Kalberer, F. J. Kelly, L. Kramer, B. Langford, C. Lin, A. C. Lewis, J. Li, W. Li, H. Liu, J. Liu, M. Loh, K. Lu, F. Lucarelli, G. Mann, G. McFiggans, M. R. Miller, G. Mills, P. Monk, E. Nemitz, F. O’Connor, B. Ouyang, P. I. Palmer, C. Percival, O. Popoola, C. Reeves, A. R. Rickard, L. Shao, G. Shi, D. Spracklen, D. Stevenson, Y. Sun, Z. Sun, S. Tao, S. Tong, Q. Wang, W. Wang, X. Wang, X. Wang, Z. Wang, L. Wei, L. Whalley, X. Wu, Z. Wu, P. Xie, F. Yang, Q. Zhang, Y. Zhang, Y. Zhang, and M. Zheng. “Introduction to the special issue “In-depth study of air pollution sources and processes within Beijing and its surrounding region (APHH-Beijing)””. In: *Atmos. Chem. Phys.* 19 (2019), pp. 7519–7546.
- [22] **Tuan, V. Vu** and Roy M. Harrison. “Chemical and Physical Properties of Indoor Aerosols”. In: *Indoor Air Pollution*. The Royal Society of Chemistry, 2019, pp. 66–96.
- [23] **Tuan, V. Vu**, Z. Shi, J. Cheng, Q. Zhang, K. He, S. Wang, and R. M. Harrison. “Assessing the impact of clean air action on air quality trends in Beijing using a machine learning technique”. In: *Atmos. Chem. Phys.* 19 (2019), pp. 11303–11314.
- [24] **Tuan, V. Vu**, Stefano Zauli-Sajani, Vanes Poluzzi, and Roy M. Harrison. “Factors controlling the lung dose of road traffic-generated sub-micrometre aerosols from outdoor to indoor environments”. In: *Air Quality, Atmosphere and Health* 11 (2018), pp. 615–625.
- [25] Xuefang Wu, **Tuan, V. Vu**, Zongbo Shi, Roy M. Harrison, Di Liu, and Kuang Cen. “Characterization and source apportionment of carbonaceous PM_{2.5} particles in China - A review”. In: *Atmospheric Environment* 189 (2018), pp. 187–212.
- [26] M. Masiol, R. M. Harrison, **Tuan, V. Vu**, and D. C. S. Beddows. “Sources of sub-micrometre particles near a major international airport”. In: *Atmos. Chem. Phys.* 17 (2017), pp. 12379–12403.
- [27] **Tuan, V. Vu**, Jakub Ondracek, Vladimir Zdímal, Jaroslav Schwarz, Juana Maria Delgado-Saborit, and Roy M. Harrison. “Physical properties and lung deposition of particles emitted from five major indoor sources”. In: *Air quality, atmosphere & health* 10 (2017), pp. 1–14.

- [28] **Tuan, V. Vu**, Stefano Zauli-Sajani, Vanes Poluzzi, Juana Maria Delgado-Saborit, and Roy M. Harrison. “Loss processes affecting submicrometer particles in a house heavily affected by road traffic emissions”. In: *Aerosol Science and Technology* 51 (2017), pp. 1201–1211.
- [29] A. S. Fonseca, N. Talbot, J. Schwarz, J. Ondráček, V. Ždímal, J. Kozáková, M. Viana, A. Karanasiou, X. Querol, A. Alastuey, **Tuan, V. Vu**, J. M. Delgado-Saborit, and R. M. Harrison. “Intercomparison of four different cascade impactors for fine and ultrafine particle sampling in two European locations”. In: *Atmos. Chem. Phys. Discuss.* 2016 (2016), pp. 1–27.
- [30] Mauro Masiol, **Tuan, V. Vu**, David C. S. Beddows, and Roy M. Harrison. “Source apportionment of wide range particle size spectra and black carbon collected at the airport of Venice (Italy)”. In: *Atmospheric Environment* 139 (2016), pp. 56–74.
- [31] **Tuan, V. Vu**, David C. S. Beddows, Juana Maria Delgado-Saborit, and Roy M. Harrison. “Source Apportionment of the Lung Dose of Ambient Submicrometre Particulate Matter”. In: *Aerosol and Air Quality Research* 16 (2016), pp. 1548–1557.
- [32] **Tuan, V. Vu**, Juana Maria Delgado-Saborit, and Roy M. Harrison. “A review of hygroscopic growth factors of submicron aerosols from different sources and its implication for calculation of lung deposition efficiency of ambient aerosols”. In: *Air Quality, Atmosphere and Health* 8 (2015), pp. 429–440.
- [33] **Tuan, V. Vu**, Juana Maria Delgado-Saborit, and Roy M. Harrison. “Review: Particle number size distributions from seven major sources and implications for source apportionment studies”. In: *Atmospheric Environment* 122 (2015), pp. 114–132.
- [34] **Tuan, V. Vu**, Byeong-Kyu Lee, Ji-Tae Kim, Chi-Hyeon Lee, and Ick-Hyun Kim. “Assessment of carcinogenic risk due to inhalation of polycyclic aromatic hydrocarbons in PM10 from an industrial city: A Korean case-study”. In: *Journal of Hazardous Materials* 189 (2011), pp. 349–356.
- [35] Lee .B-K. and **Tuan, V. Vu**. “Sources, Distribution and Toxicity of Polyaromatic Hydrocarbons (PAHs) in Particulate Matter”. In: *Air Pollution, Vanda Villanyi, IntechOpen*, (2010).