**ELOISE A. MARAIS**

**Department of Geography**  
North West Wing  
University College London  
London, UK  
Tel: +44 2031082481  
Email: e.marais@ucl.ac.uk  
Profile page: tinyurl.com/5n76wd3v  
Lab website: maraisresearchgroup.co.uk

**Major Research Area**

I lead a research group that uses complex models (specifically, GEOS-Chem), process-based information from laboratory experiments, and observations from ground-based and space-based sensors to address long-standing uncertainties about the chemical composition of the atmosphere and determine the influence of humans on the environment, air quality, and climate.

**Education**

| Degree | Institution | Date |
|--------|-------------|------|
| Ph.D. | Earth and Planetary Sciences, Harvard University, Cambridge MA | 2014 |
| M.Sc., distinction | Chemistry, Rhodes University, South Africa | 2008 |
| B.Sc. Hons, cum laude | Chemistry, University of KwaZulu-Natal, South Africa | 2004 |
| B.Sc., summa cum laude | Chemistry, University of Natal, South Africa | 2003 |

**Professional Experience**

| Position | Institution | Years |
|----------|-------------|-------|
| Associate Professor | University College London, London, UK | 2020-present |
| Associate Professor | University of Leicester, Leicester, UK | 2018-2020 |
| Research Fellow | University of Birmingham, Birmingham, UK | 2016-2018 |
| Postdoctoral Research Fellow | Harvard University, Cambridge MA | 2014-2016 |

**Research Support**

**Scholarships, fellowships, and grants awarded to me total £2.5 million.**

| Year | Project Title | Amount |
|------|--------------|--------|
| 2023 | Dynamics of ozone pollution and air pollution layer height in Central London, UCL Research Capital Equipment Fund | (£83,000), PI |
| 2022 | First long-term MAX-DOAS instrument in London, UCL Research Capital Equipment Fund | (£48,000), PI |
| 2021-2024 | Dry deposition processes of oxygenated volatile organic compounds (VOCDep), NERC (£160,000), co-I | |
| 2021-2023 | Health impacts and inequities of fossil fuel extraction in the US, SEI (£79,000), PI | |
| 2020-2022 | Transboundary PM$_{2.5}$ sources in Leicester and Leicestershire, DEFRA (£124,000), PI | |
| 2019-2024 | UpTrop: Fundamental understanding of reactive nitrogen in the upper troposphere, ERC Starting Grant (£1.4 million), PI | |
| 2019-2020 | Applying Earth observations to reduce uncertainties in emission inventories, DEFRA (£75,000), co-I | |
| 2019-2020 | Future EO passive optical missions for small satellites, ESA (£40,000), co-I | |
| 2019-2022 | Copernicus Master’s Accelerator Programme (£10,000), PI | |
| 2018-2021 | Launching urban air quality and green space monitoring into the 21st century, NERC-funded EPSRC Researcher In Residence Award (£50,000), PI | |
| 2017-2019 | A systems approach to air pollution in East Africa, UK Department for International Development (DFID) East Africa Research Fund (£20,000), co-I | |
| 2017-2018 | NASA ATom Science Team Member Travel Award (£6,000) | |
| 2016-2018 | Birmingham Independent Research Fellowship (£27,000), PI | |
2016  *Health effects of current and future fossil fuels*, Wallace Foundation (£8,000), co-I
2014-2015  *New regional inventory of diffuse and inefficient emissions for Africa*, Schlumberger Faculty for the Future Postdoctoral Grant (£59,000), PI
2014-2015  Postdoctoral fellowship for research abroad, South African National Research Foundation (NRF) (£29,000)
2011-2012  Harvard Center for the Environment Graduate Fellowship (£12,000)
2011-2013  Graduate scholarship for study abroad, South African NRF (£16,000)
2008-2011  International Fulbright Science and Technology Award (£134,000)
2004-2007  Numerous BSc Honours and Masters Fellowships, South Africa (£10,000)

**Peer-Reviewed Publications**

**Total citations: 3778, h-index: 28 (Google Scholar). ORCID: 0000-0001-5477-8051**

Students and postdocs I supervise identified as: **UG/MSc, * PhD, § Postdoc

2023

Ryan, R. G. §, E. A. Marais, E. Gershenson-Smith*, R. Ramsay, J.-P. Muller, J.-L. Tirpitz, U. Friess, Measurement Report: MAX-DOAS measurements characterise Central London ozone pollution episodes during 2022 heatwaves, in review, *Atmos. Chem. Phys.*, doi: 10.5194/egusphere-2023-24.

Kelly, J. M. §, E. A. Marais, G. Lu §, J. Obszynska, M. Mace, J. White, R. J. Leigh, Diagnosing domestic and transboundary sources of fine particulate matter (PM$_{2.5}$) in UK cities using GEOS-Chem, *City & Environ. Interac.*, doi:10.1016/j.cacint.2023.100100.

2022

Ryan, R. G. §, E. A. Marais, E. A., C. J. Balhatchet**, S. D. Eastham, Impact of rocket launch and space debris air pollutant emissions on stratospheric ozone and global climate, *Earth’s Future*, 10, 10, e2021EF002612, doi:10.1029/2021EF002612.

Vohra, K.*, E. A. Marais, et al., 180,000 excess deaths in fast-growing tropical cities from 2005 to 2018 linked to rapid rise in anthropogenic air pollution, *Sci. Adv.*, 8, doi:10.1126/sciadv.abm4435.

M. Panagi et al., including G. Lu†, E. A. Marais, Daily evolution of VOCs in Beijing: Chemistry, emissions, transport, and policy implications, in review, *ACPD*, doi:10.5194/acp-2022-379.

Marais, E. A., O. Akker**, C. Wiedinmyer, Greenhouse gas and air pollutant emissions from power barges (powerships), *RSC Environ. Sci.: Adv.*, 1, 164-169, doi:10.1039/D1VA00049G.

R. Pope, R. Kelly, E. A. Marais, et al., Exploiting satellite measurements to reduce uncertainties in UK bottom-up NO$_x$ emission estimates, *Atmos. Chem. Phys.*, 22, 4323–4338, doi:10.5194/acp-22-4323-2022.

A. Mazzeo et al., including E. A. Marais, Evaluation of WRF-CHIMERE coupled models for the simulation of PM$_{2.5}$ in large East African urban conurbations, *Atmos. Chem. Phys.*, 22, 10677–10701, doi:10.5194/acp-22-10677-2022.

Langford, B. et al. including E. A. Marais, Seasonality of isoprene emissions and oxidation products above the remote Amazon, *Environ. Sci.: Atmos.*, doi:10.1039/D1EA00057H.

2021

Marais, E.A., A. Pandey§, et al., UK ammonia emissions estimated with satellite observations and GEOS-Chem, *J. Geophys. Res.*, 126 (18), doi:10.1029/2021JD035237.

Marais, E. A., J. F. Roberts§, R. G. Ryan§, et al., New observations of upper tropospheric NO$_2$ from TROPOMI, *Atmos. Meas. Tech.*, 14, 2389-2408, doi:10.5194/amt-14-2389-2021.
Vohra, K.*, E. A. Marais, S. Suckra** et al., Long-term trends in air quality in major cities in the UK and India: A view from space, Atmos. Chem. Phys., 21, 6275–6296, doi:10.5194/acp-21-6275-2021, 2021.

Vohra, K.*, A. Vodonos, J. Schwartz, E. A. Marais, et al., Global mortality from outdoor fine particle pollution generated by fossil fuel combustion: Results from GEOS-Chem, Environ. Res., 195, 110754 doi:10.1016/j.envres.2021.110754. Extensive media coverage: https://www.altmetric.com/details/99822433. Amongst Environ. Res’s most downloaded articles: https://www.journals.elsevier.com/environmental-research/most-downloaded-articles, ISI Web of Science Hot and Highly Cited Paper (32 citations)

Potts, D. A., E. A. Marais et al., Diagnosing air quality changes in the UK during the COVID-19 lockdown using TROPOMI and GEOS-Chem, Environ. Res. Lett., 16, 054031, doi:10.1088/1748-9326/abde5d.

Nault, B. et al. including E. A. Marais, Models underestimate the increase of acidity with remoteness biasing radiative impact calculations, Nature Comm Earth & Environ., 2, doi:10.1038/s43247-2021-00164-0.

2020

Bockarie, A.*, E. A. Marais, A. R. MacKenzie, Air pollution and climate forcing of the charcoal industry in Africa, Environ. Sci. & Technol., 54, 13429–13438, doi:10.1021/acs.est.0c03754.

de Souza, P. et al. including E. A. Marais, Combining low-cost, surface-based aerosol monitors with size-resolved satellite data for air quality applications, Atmos. Meas. Techn., 13, 5319–5334, doi:10.5194/amt-13-5319-2020.

McDuffie, E. E. et al., including E. A. Marais, A global anthropogenic emission inventory of atmospheric pollutants from sector- and fuel-specific sources (1970-2017): An application of the Community Emissions Data System (CEDS), Earth Sys. Sci. Data, 12, 3413-3442, doi:10.5194/essd-12-3413-2020.

Zheng, Y. et al. including E. A. Marais, Long-term observational constraints of organic aerosol dependence on inorganic species in the southeast US, Atmos. Chem. Phys., 20, 13091–13107, doi:10.5194/acp-20-13091-2020.

Pai, S. J. et al. including E. A. Marais, An evaluation of global organic aerosol schemes using airborne observations, Atmos. Chem. Phys., doi: 10.5194/acp-20-2637-2020.

2019

Marais, E. A., R. F. Silvern, A. Vodonos, E. Dupin**, A. S. Bockarie* et al., Air quality and health impact of future fossil fuel use for electricity generation and transport in Africa, Environ. Sci Technol., 53, 13524-13534, doi:10.1021/acs.est.9b04958.

Worden, H. M. et al. including E. A. Marais, New constraints on biogenic emissions using satellite-based estimates of carbon monoxide fluxes, Atmos. Chem. Phys., 19, 13569-13579, doi:10.5194/acp-19-13569-2019.

Silvern, R. F. et al. including E. A. Marais, Using satellite observations of tropospheric NO2 columns to infer long-term trends in US NOx emissions: the importance of accounting for the free tropospheric NO2 background, Atmos. Chem. Phys., 19, 8863-8878, doi:10.5194/acp-19-8863-2019.

Jo, D. S. et al. including E. A. Marais, A simplified parameterization of isoprene-expoxydiol-derived secondary organic aerosol (IEPOX-SOA) for global chemistry and climate models, Geosci. Model Dev., 12, 2983-3000, doi:10.5194/gmd-12-2983-2019.

Liao, J. et al. including E. A. Marais, Towards a satellite-in situ hybrid estimate for organic aerosol abundance, Atmos. Chem. Phys., 19, 2765–2785, doi:10.5194/acp-19-2765-2019.

2018
Marais, E. A., D. J. Jacob et al., Nitrogen oxides in the global upper troposphere: interpreting cloud-sliced NO₂ observations from the OMI satellite instrument, *Atmos. Chem. Phys.*, 18, 17017-17027, doi:10.5194/acp-18-17017-2018.

Weagle, C. L. et al. including E. A. Marais, Chemical sources of fine particulate matter: interpretation of PM₂.₅ chemical composition observed by SPARTAN using a global chemical transport model, *Environ. Sci. Tech.*, 52, 11670-11681, doi:10.1021/acs.est.8b01658.

2017

Li, C. et al. including E. A. Marais, Trends in chemical composition of global and regional population-weighted fine particulate matter over the recent 25 years, *Environ. Sci. Tech.*, 51, 11185–11195, doi:10.1021/acs.est.7b02530.

Lacey, F. G., E. A. Marais et al., Improving present day and future estimates of anthropogenic sectoral emissions and the resulting air quality impacts in Africa, *Faraday Discuss.*, 200, 397-412, doi:10.1039/C7FD00011A.

Zhu, L. et al. including E. A. Marais, Long-term (2005–2014) trends in formaldehyde (HCHO) columns across North America as seen by the OMI satellite instrument: Evidence of changing emissions of volatile organic compounds, *Geophys. Res. Lett.*, 44, 7079–7086, doi:10.1002/2017GL073859.

Cady-Pereira, K. E. et al. including E. A. Marais, Seasonal and spatial changes in trace gases over megacities from Aura TES observations: two case studies, *Atmos. Chem. Phys.*, 17, 9379-9398, doi:10.5194/acp-17-9379-2017.

Chan Miller, C., D. J. Jacob, E. A. Marais et al., Glyoxal yield from isoprene oxidation and relation to formaldehyde: chemical mechanism, constraints from SENEX aircraft observations, and interpretation of OMI satellite data, *Atmos. Chem. Phys.*, 17, 8725–8738, doi:10.5194/acp-17-8725-2017.

Horowitz, H. M. et al. including E. A. Marais, A new mechanism for atmospheric mercury redox chemistry: implications for the global mercury budget, *Atmos. Chem. Phys.*, 17, 6353-6371, doi:10.5194/acp-17-6353-2017. *ISI Web of Science Hot Paper and Highly Cited Paper (146 citations)*

Marais, E. A., D. J. Jacob et al., Evidence of 1991-2013 decrease of biogenic secondary organic aerosol in response to SO₂ emission controls, *Environ. Res. Lett.*, 12 054018, doi:10.1088/1748-9326/aa69e8.

Silvern, R. F. et al. including E. A. Marais, Inconsistency of ammonium-sulfate aerosol ratios with thermodynamic models in the eastern US: a possible role of organic aerosol, *Atmos. Chem. Phys.*, 17, 5107-5118, doi:10.5194/acp-17-5107-2017.

2016

Marais, E. A., D. J. Jacob et al., Aqueous-phase mechanism for secondary organic aerosol formation from isoprene: application to the Southeast United States and co-benefit of SO₂ emission controls, *Atmos. Chem. Phys.*, 16, 1603-1618, doi:10.5194/acp-16-1603-2016. *ISI Web of Science Highly Cited Paper (153 citations)*

Marais E. A., C. Wiedinmyer, Air Quality Impact of Diffuse and Inefficient Combustion Emissions in Africa (DICE-Africa), *Environ. Sci. Tech.*, 50, 10739-10745, doi:10.1021/acs.est.6b02602.

Travis, K. R. et al. including E. A. Marais, Why do models overestimate surface ozone in the Southeast United States?, *Atmos. Chem. Phys.*, 16, 13561-13577, doi:10.5194/acp-16-13561-2016. *ISI Web of Science Hot Paper and Highly Cited Paper (207 citations)*

Fisher, J. A. et al. including E. A. Marais, Organic nitrate chemistry and its implications for nitrogen budgets in an isoprene- and monoterpane-rich atmosphere: constraints from
aircraft (SEAC4RS) and ground-based (SOAS) observations in the Southeast US, Atmos. Chem. Phys., 16, 5969-5991, doi:10.5194/acp-16-5969-2016.

Yu, K. et al. including E. A. Marais, Sensitivity to grid resolution in the ability of a chemical transport model to simulate observed oxidant chemistry under high-isoprene conditions, Atmos. Chem. Phys., 16, 4369-4378, doi:10.5194/acp-16-4369-2016.

B. Franco, E. A. Marais et al., Diurnal cycle and multi-decadal trend of formaldehyde in the remote atmosphere near 46°N, Atmos. Chem. Phys., 16, 4171-4189, doi:10.5194/acp-16-4171-2016.

2015
Franco, B. et al. including E. A. Marais, Retrievals of formaldehyde from ground-based FTIR and MAX-DOAS observations at the Jungfraujoch station and comparisons with GEOS-Chem and IMAGES model simulations, Atmos. Meas. Tech., 8, 1733-1756, doi:10.5194/amt-8-1733-2015.

Marais, E. A. and K. Chance, A geostationary air quality monitoring platform for Africa, The Clean Air Journal, 25, 40-45, doi:10.17159/2410-972X/2015/v25n1a3.

2014
Marais, E. A., D. J. Jacob et al., Anthropogenic emissions in Nigeria and implications for ozone air quality: a view from space, Atmos. Environ., 99, 32-40, doi:10.1016/j.atmosenv.2014.09.055.

Zhu, L., et al. including E. A. Marais, Anthropogenic emissions of highly reactive volatile organic compounds in eastern Texas from oversampling of satellite (OMI) measurements of HCHO columns, Environ. Res. Lett., 9, 114004, doi:10.1088/1748-9326/9/11/114004.

Nowlan, C. R. et al. including E. A. Marais, Global dry deposition of nitrogen dioxide and sulfur dioxide inferred from space-based measurements, Global Biogeochem. Cy., 28, 1025-1043, doi:10.1002/2014GB004805.

Marais, E. A., D. J. Jacob et al., Improved model of isoprene emissions in Africa using OMI satellite observations of formaldehyde: implications for oxidants and particulate matter, Atmos. Chem. Phys., 14, 7693-7703, doi:10.5194/acp-14-7693-2014.

Wang, Q. et al. including E. A. Marais, Global budget and radiative forcing of black carbon aerosol: constraints from pole-to-pole (HIPPO) observations across the Pacific, J. Geophys. Res., 119, 195-206, doi:10.1002/2013JD020824. ISI Web of Science Highly Cited Paper. (131 citations)

2013
Barkley, M. P. et al. including E. A. Marais, Top-down isoprene emissions over tropical South America inferred from SCIAMACHY and OMI formaldehyde columns, J. Geophys. Res., 118, 6849-6868, doi:10.1002/jgrd.50552.

2012
Marais, E. A., D. J. Jacob et al., Isoprene emissions in Africa inferred from OMI observations of formaldehyde columns, Atmos. Chem. Phys., 12, 6219-6235, doi:10.5194/acp-12-6219-2012.

Invited Talks
Archive of presentation slides: http://maraisresearchgroup.co.uk/presentations.html

2023
International Space Science Institute Workshop on Geostationary Satellites, virtual, Bern, Switzerland.
Workshop for Air Quality in Africa, virtual, Kigali, Rwanda.

2022
University of Edinburgh Global Change Seminar Series, Edinburgh, UK
Harvard Climate Tea Talk Series, Harvard University, Cambridge, MA
UCL Lunch Hour Lecture Series, UCL, London, UK.
Global Air Quality Conversation, virtual, Peking University, China.
Institute of Environmental Sciences webinar, virtual, London, UK.
Royal Society of Chemistry Desktop Seminar, virtual, Royal Society, London, UK.
European Geophysical Union (EGU) Annual General Meeting, Vienna, Austria.
European Research Council HEAL Workshop, U. Mannheim, Mannheim, Germany.
European Geophysical Union (EGU) Annual General Meeting, Vienna, Austria.

2021
Investigation of Air Pollution Standing Conference (IAPSC), virtual, Birmingham, UK.
Harvard Atmospheric and Environmental Chemistry Seminar, virtual, Cambridge, MA.
DEFRA EO Centre of Excellence workshop, virtual, London, UK.
Great Ormond Street Hospital (GOSH) lunchtime seminar, virtual, London, UK.
Joint EIONET/TFEIP meeting, virtual, Slovakia.
University of Birmingham Air Pollution and Atmospheric Chemistry seminar series, virtual, Birmingham, UK.
MIT Program in Atmospheres, Oceans and Climate seminar series, virtual, MIT, Cambridge, MA.
Town hall meeting on African greenhouse gas emissions and air quality, virtual, Manchester Environmental Research Institute, UK.
NCAR workshop on Advancing Air Quality and Carbon Science in Africa, virtual, Boulder, CO.
University of Leeds Institute for Climate & Atmospheric Science, virtual, Leeds, UK.

2020
University of Cambridge Centre for Atmospheric Science, virtual, Cambridge, UK.
Oxford Air Quality Meeting, Keble College, Oxford, UK.

2019
Royal Netherlands Meteorological Institute (KNMI), De Bilt, The Netherlands.
Connected Places Catapult, London, UK.
Webinar on Understanding the Sources of Outdoor Air Pollution in Sub-Saharan Africa, hosted by the Health Effects Institute (HEI).
Royal Meteorological Society National Meeting on Air Pollution in Megacities, University of Leeds, Leeds, UK.

2018
Harvard University, Environmental Science and Engineering, Cambridge, MA.
Air Pollution Extremes Workshop, Columbia University, New York, NY.
Council for Scientific and Industrial Research (CSIR), Pretoria, South Africa.
University of Cambridge, Department of Chemistry, Cambridge, UK, 2017.

2017
University of St Andrews, School of Earth and Environmental Sciences, St Andrews, UK.
Centre for Ecology & Hydrology, Edinburgh, UK.
University of Edinburgh, School of Geosciences, Edinburgh, UK.

2016
University of Birmingham, School of Geography, Earth, and Environmental Sciences, Birmingham, UK.
MIT, Department of Earth, Atmospheric, and Planetary Sciences, Cambridge, MA.
Texas A&M, Atmospheric Sciences, College Station, TX.

2015
Rhodes University, Department of Chemistry, Grahamstown, South Africa.
Georgia Institute of Technology, School of Civil and Environmental Engineering, Atlanta, GA.
University of East Anglia, School of Environmental Sciences, East Anglia, UK.
University of York, Department of Chemistry and National Centre for Atmospheric Science, York, UK.
University of Leeds, School of Chemistry, Leeds, UK.
University of Manchester, School of Earth, Atmospheric and Environmental Sciences, Manchester, UK.
Colorado University, Cooperative Institute for Research in the Environmental Sciences (CIRES), Boulder, CO.
National Center for Atmospheric Research, Atmospheric Chemistry Observations and Modeling, Boulder, CO.

2014
North-West University, Unit of Environmental Sciences and Management, Potchefstroom, South Africa.
West Africa Air Quality Workshop, Abuja, Nigeria.

Research Supervision

Professional Development
2022  Advancing Principal Investigators, research team leadership training, UCL, http://www.ucl.ac.uk/human-resources/learning-development/learning-academy/researcher-development/advancing-principal-investigators.

Current Supervision
2023- Connor Barker (postdoc) Influence of megaconstellations on climate and air quality; dry deposition of oxygenated VOCs, funded by the ERC and NERC.
2022- Gongda Lu (postdoc) Improved understanding of reactive nitrogen in the global upper troposphere, funded by the ERC.
2022- Eleanor Smith (PhD) Near-term regional climate impact of tropospheric NOx, funded by the ERC.
2022- Terrence Sepuru (PhD), Quantifying air pollutant emissions over the industrial highveld region in South Africa, funded by the South African NRF.
2021- Karn Vohra (postdoc) Health impacts and inequities of fossil fuel extraction, funded by the Stockholm Environment Institute (SEI).
2021- Rebekah Horner (PhD) Reactive nitrogen in the global upper troposphere, funded by the ERC.
2019- Nana Wei (PhD) Improved understanding of reactive nitrogen in the global upper troposphere using NASA aircraft observations and the GEOS-Chem model, funded by the ERC and University of Leicester studentship.

Past Supervision
2018-2022 Gongda Lu (PhD) Interpreting changes in anthropogenic emissions underlying abrupt changes in observed air quality using surface and satellite observations and a chemical transport model, funded by the Chinese Scholarship Council
2020-2022 Robert Ryan (postdoc) Rockets and lightning influence on atmospheric composition, ERC Research Fellow.
2021-2022 Jamie Kelly (postdoc) Sources of PM2.5 pollution in UK cities determined with GEOS-Chem, Defra Air Quality Grant.
2021-2022  Kavitha Mottungan (postdoc) Air pollutants and precursors over India: A Satellite and Modeling Perspective, Royal Society Newton International Fellow.

2017-2021  Karn Vohra (PhD) A new tool to monitor air pollution in rapidly urbanizing cities, funded by the University of Birmingham Global Challenges Fund.

2020  Alok Pandey (postdoc) Satellite-derived emissions of ammonia in the UK.

2017-2021  Alfred Bockarie (PhD) Air quality and climate impacts of charcoal production in Africa, funded by the Islamic Development Bank.

2020  Chloé Balhatche (UG at U. Cambridge) summer student, Emission inventory of reactive gases and aerosols from rocket launches and space junk re-entry in 2019, now a PhD student at University of Cambridge.

2019  Junju Ng (MSc at UCL) external supervisor, Satellite sensing of NO\textsubscript{2} pollution in a large city: a case study using TROPOMI over London, now Senior Executive at the Singapore National Environment Agency.

2018  Shannen Suckra (MSc) Trends and variability in PM\textsubscript{2.5} in Birmingham, now at the National Environment and Planning Agency in Jamaica.

2018  Isobel Ward (MSc) The influence of meteorological conditions on ground-level ozone in the UK, now at AECOM.

2017  Gongda Lu (MSc) Validation of satellite-derived PM\textsubscript{2.5} in Chinese megacities, now a PhD student in my group.

**PhD Examiner**

**External**

2023  R. Abeed, Laboratoire Atmosphères, Observations Spatiales (LATMOS), France.

2022  C. Mogno, University of Edinburgh, UK.

2022  I. Riádigos Sánchez, University of Santiago de Compostela, Spain.

2022  Y. Liu, University of Helsinki, Finland.

2021  C. K. Segakweng, North-West University, South Africa.

2020  A. de Lange, University of Pretoria, South Africa.

2019  L. Gonzalez Alonso, University of Sheffield, UK.

**Internal**

2021  Damian Oyarzun, Department of Geography, UCL.

**Awards**

2023  Wiley’s *J. Geophys. Res: Atmospheres* most downloaded paper in 2022

2018  ESA Copernicus Masters Competition Finalist, Leicester, UK.

2012  Commendable oral presentation, American Meteorological Society’s 1st Conference on Atmospheric Biogeosciences, Boston, MA.

2012  Outstanding student poster award, Atmospheric Sciences Division of the European Geophysical Union, Vienna, Austria.

2005  South African Chemical Society Medal awarded to top BSc Chemistry Honours student, University of KwaZulu-Natal, South Africa.

2004  Merck, SASOL and Perkin-Elmer Medals awarded to top 3rd year Chemistry Undergraduate student, University of KwaZulu-Natal, South Africa.

2002-2004  Dean’s commendations for outstanding achievement in Undergraduate and Postgraduate courses, University of Natal/KwaZulu-Natal, South Africa.

**Leadership**
UCL  
2023-2024  Department of Geography Graduate Tutor

International and National Committees
2023-2024  UCL Department of Geography Graduate Tutor
2023  Organizing committee, Health Effects Institute Workshop on Air Quality in East Africa
2022-2023  UK Air Quality Experts Group (AQEG)
2021-2022  UK Research and Innovation Future Leader Fellowship Peer Review College
2020-2023  Health Effects Institute Global Health Oversight Committee
2017-  International GEOS-Chem Model Steering Committee, Co-Chair of the Emissions and Deposition Working Group
2020  Co-organizer, 1st GEOS-Chem Europe User’s Meeting, online due to COVID-19
2018  HEI Working Group, Contribution of Household Air Pollution to Ambient Air Pollution in Ghana

Chair of Conferences and Seminar Series
2023  Session co-chair, Health Effects Institute Workshop on Air Quality in East Africa
2022  Session co-chair, Health Effects Institute, Virtual Workshop on Health Applications for Satellite-Derived Air Quality
2022  Session chair, 10th International GEOS-Chem User’s Meeting, Washington University in St Louis, MO.
2021  Session co-chair, Health Effects Institute Annual Conference, online due to COVID-19
2020  Session co-chair, American Geophysical Union (AGU) Annual General Meeting, online due to COVID-19
2019  Session chair, 9th International GEOS-Chem User’s Meeting, Harvard, Cambridge, MA
2018  Session co-chair, UK National Centre for Earth Observations Conference, Birmingham, UK
2018  Session co-chair, AGU Annual General Meeting, Washington, DC
2017  Chair, Air Pollution and Atmospheric Chemistry seminar series, University of Birmingham, Birmingham, UK
2017  Session co-chair, AGU Annual General Meeting, New Orleans, LA
2015  Chair, Atmospheric Chemistry seminar series, Harvard, Cambridge, MA

Author: International Reports
2021  Chapter Author, Chapter 2 in Sustainable Development, Air Pollution and Climate Change in Africa: An Integrated Assessment
2019  Household Air Pollution Working Group, Contribution of Household Air Pollution to Ambient Air Pollution in Ghana: Using Available Evidence to Prioritize Future Action, HEI, Communication 19, https://www.healtheffects.org/system/files/Comm19-HAP-Ghana.pdf.
2016  Contributing Author, Air Quality in Tropical and Subtropical Megacities, Submitted to 2017-2027 USA National Research Council Decadal Survey for Earth Observations from Space Request for Information (RFI-2)

Peer Review

Grant Agencies
2022  Belgian Science Policy Office (BELSPO) BRAIN-be 2.0 Research Programme review panel
2022  UK Engineering and Physical Sciences Research Council (EPSRC) review panel
2020  Canada Foundation for Innovation’s (CFI) Innovation Fund review panel
2020 UK National Environmental Research Council (NERC) review panel
2020 BELSPO BRAIN-be 2.0 Research Programme review panel
2019 US EPA STAR Grant reviewer and review panel
2019 Irish Research Council Government of Ireland Postdoctoral Fellowship Scheme reviewer
2017 UK NERC reviewer
2017 National Oceanic and Atmospheric Association (NOAA) Atmospheric Chemistry, Carbon Cycle and Climate (AC4) Program reviewer
2016 European Research Council (ERC) Advanced Grant reviewer
2015 NOAA AC4 Program reviewer
2015 BELSPO STEREO Research Programme reviewer
2013 NASA Research Opportunities in Earth and Space Science (ROSES) Carbon Cycle Science reviewer

Journals
Frequent reviewer for numerous prestigious scientific journals:
Proceedings of the National Academy of Sciences, Nature Communications, Scientific Reports, Environmental Science & Technology, Atmospheric Environment, Atmospheric Chemistry and Physics, Atmospheric Measurement Techniques, Journal of Air & Waste Management, Environmental Science & Technology Letters, Geoscientific Model Development, Journal of Geophysical Research, Aerosol & Air Quality Research, Environment International, Science of the Total Environment, GeoHealth, NPJ Climate & Atmos Sci.

International Assessment Reports
2022 European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT) Atmospheric Composition Monitoring Satellite Application Facilities (AC SAF) IASI instrument data products
2018 International Global Atmospheric Chemistry (IGAC) project Tropospheric Ozone Assessment Report

Teaching
Training and Accreditation
2020 Fellow of the Higher Education Academy (FHEA)
2010 Harvard Bok Center Teacher Training, Harvard University, Cambridge, MA
2009 Scientists Teaching Science, graduate course on effective science teaching, Harvard-Smithsonian Center for Astrophysics, Cambridge, MA

Experience
2022 Convener, GEOG0170: Environmental Consequences of Human Activity, Physical Geography 3rd Year Module, UCL, London, UK
2022 Lecturer, GEOG0151: Thinking Geographically I, Physical Geography 1st Year Module, UCL, London, UK
2021-2022 Lecturer, GEOG0012: Thinking Geographically II, Physical Geography 1st Year Modules, UCL, London, UK
2021-2022 Supervisor, GEOG0105: Master’s Research Project and Dissertation, Geography Master’s Module, UCL, London, UK
2020-2022 Lecturer, GEOG0005: Understanding Our Planet, Physical Geography 1st Year Module, UCL, London, UK
2020-2021 Supervisor, GEOG0042: Independent Study, Geography 3rd Year Module, UCL, London, UK
2019-2020 Lecturer, *Waves and Quanta*, Physics 1st Year Module, University of Leicester, Leicester, UK

2019 Course Developer, *Masters in Satellite Data Science*, University of Leicester, Leicester, UK

2018-2019 Supervisor, Physics 3rd and 4th Year project students, University of Leicester, Leicester, UK

2017 Lecturer, *Environmental Protection*, Environmental Science 3rd Year Module, University of Birmingham, Birmingham, UK

2013 Teaching Assistant, *Energy Technology*, Harvard University, Cambridge, MA

2010 Teaching Assistant, *Introduction to Environmental Science*, Harvard University, Cambridge, MA

2009 Teaching Assistant, *Environmental Science and Technology*, Harvard University, Cambridge, MA

2009 Teaching Assistant, *Atmospheric Chemistry*, Harvard, Cambridge, MA

2006 Tutor and Laboratory Demonstrator, *Introductory Chemistry*, Rhodes University, South Africa

2005 Tutor, *Introduction to Chemistry*, University of KwaZulu-Natal, South Africa

**Media Engagement**

Expertise sought on air pollution and public health:
- New Scientist, [https://institutions.newscientist.com/article/2320777-pollution-killed-9-million-people-worldwide-in-2019-alone/](https://institutions.newscientist.com/article/2320777-pollution-killed-9-million-people-worldwide-in-2019-alone/)

Expertise sought on climate impact of the space industry:
- Physics World, [https://physicsworld.com/a/uk-spaceports-the-good-the-bad-and-the-ugly/](https://physicsworld.com/a/uk-spaceports-the-good-the-bad-and-the-ugly/)
- Al Jazeera, [https://www.aljazeera.com/features/2022/10/23/the-battle-over-space-emissions-in-cornwall](https://www.aljazeera.com/features/2022/10/23/the-battle-over-space-emissions-in-cornwall)
- France24, [https://www.france24.com/en/environment/20230207-rise-in-space-tourism-rocket-launches-poses-new-threat-to-ozone-layer-researchers-warn](https://www.france24.com/en/environment/20230207-rise-in-space-tourism-rocket-launches-poses-new-threat-to-ozone-layer-researchers-warn)
- Wall Street Journal, [https://www.wsj.com/articles/rocket-launches-emissions-concerns-11675445394](https://www.wsj.com/articles/rocket-launches-emissions-concerns-11675445394)
- The Big Issue, [https://www.bigissue.com/news/environment/the-uk-launched-its-first-orbital-space-rocket-but-how-much-is-this-historic-moment-polluting-the-atmosphere/](https://www.bigissue.com/news/environment/the-uk-launched-its-first-orbital-space-rocket-but-how-much-is-this-historic-moment-polluting-the-atmosphere/)

Media coverage of Kelly et al. (2023), doi:10.1016/j.cacint.2023.100100 on source contributors to PM$_{2.5}$ in UK cities:
- The Guardian, [https://www.theguardian.com/environment/2023/mar/24/uk-farming-causes-over-quarter-cities-particle-pollution-study](https://www.theguardian.com/environment/2023/mar/24/uk-farming-causes-over-quarter-cities-particle-pollution-study)
- BBC Radio’s Farming Today, [https://www.bbc.co.uk/programmes/m001kgsb](https://www.bbc.co.uk/programmes/m001kgsb)
- The Independent, [https://www.independent.co.uk/news/uk/home-news/farms-particles-pollution-ucl-environment-b2307616.html](https://www.independent.co.uk/news/uk/home-news/farms-particles-pollution-ucl-environment-b2307616.html)

Media coverage of Vohra et al. (2022), doi:10.1126/sciadv.abm4435 on premature deaths from rapid rise in air pollution for fast-growing cities in the tropics:
- The New York Times, [https://www.nytimes.com/2022/04/08/climate/air-pollution-cities-tropics.html](https://www.nytimes.com/2022/04/08/climate/air-pollution-cities-tropics.html)
- World Economic Forum, [https://www.weforum.org/agenda/2022/04/air-pollution-cars-remote-sensing-air-quality-improvement/](https://www.weforum.org/agenda/2022/04/air-pollution-cars-remote-sensing-air-quality-improvement/)
Media coverage of the environmental impact of space tourism and space debris:

BBC, https://www.bbc.com/future/article/20220713-how-to-make-rocket-launches-less-polluting

Time Magazine, https://time.com/6191846/billionaire-space-race-climate/

Forbes, https://www.forbes.com/sites/davidrvetter/2022/07/05/bezos-vs-musk-which-billionaires-rockets-are-worse-for-the-climate/?sh=7fe5425b150c

Sky News, https://news.sky.com/story/space-tourism-from-companies-like-spacex-virgin-atlantic-and-blue-origin-could-undo-work-to-repair-ozone-layer-study-finds-12640296

Scientific American, https://www.scientificamerican.com/article/don’t-fear-china-rsquo-s-falling-rocket-mdash-fear-the-future-it-foretells/

Evening Standard, https://www.standard.co.uk/news/uk/space-tourism/ucl-massachusetts-institute-of-technology-university-of-cambridge-spacex-b1008378.html

Australian Broadcasting Corporation’s Future Tense, https://www.abc.net.au/radio/national/programs/futuretense/space-pollution-stunted-high-rise-and-the-joy-of-missing-out/13736086

Yale Climate Connections, https://yaleclimateconnections.org/2022/09/the-climate-cost-of-space-tourism/

Space.com, https://www.space.com/space-junk-threat-research-reduce-impact

International Business Times, https://www.ibtimes.com/space-debris-polluting-our-atmosphere-researchers-look-ways-reduce-impact-3610800

abc News, https://abcnews.go.com/Technology/experts-climate-impacts-question-mark-space-tourism-takes/story?id=81609878

Sky News, https://www.youtube.com/watch?v=At7D7_LhsyA

Die Zeit, The Dirty War to Mars [German]

Channel 4 News, https://www.channel4.com/news/spacex-launch-makes-history-as-four-amateur-astronauts-orbit-earth

CNBC, https://www.cnbc.com/2021/08/27/how-blue-origin-spacex-virgin-galactic-space-race-could-impact-the-atmosphere.html

Smart Prosperity Podcast, https://institute.smartprosperity.ca/podcast21 [interview at 10 min 09 sec]

The Guardian, https://www.theguardian.com/environment/2021/jul/25/billionaire-space-cowboys-could-become-heroes-by-focusing-on-the-climate-crisis

The Guardian, https://www.theguardian.com/business/2021/jul/19/billionaires-space-tourism-environment-emissions
CTV News, [https://www.ctvnews.ca/climate-and-environment/space-travel-is-open-for-business-but-what-about-the-environmental-impact-1.5506132](https://www.ctvnews.ca/climate-and-environment/space-travel-is-open-for-business-but-what-about-the-environmental-impact-1.5506132)

BBC World Service, [https://www.bbc.com/afrique/monde-59556066](https://www.bbc.com/afrique/monde-59556066) [French],
[https://www.bbc.com/zhongwen/trad/world-59551259](https://www.bbc.com/zhongwen/trad/world-59551259) [Chinese]

ABC’s The Signal Podcast, [https://www.abcs.net.au/radio/programs/the-signal/billionaires-space-race/13597636](https://www.abcs.net.au/radio/programs/the-signal/billionaires-space-race/13597636) [interview at 18 min 22 sec]

NPR’s 1A Podcast, [https://the1a.org/segments/bezoz-branson-space-billionaires/](https://the1a.org/segments/bezoz-branson-space-billionaires/) [interview at 36 min 40 sec]

Aerospace America, [https://aerospaceamerica.aaia.org/features/space-transportations-pollution-conundrum/](https://aerospaceamerica.aaia.org/features/space-transportations-pollution-conundrum/)

Mashable, [https://mashable.com/article/space-tourism-environmental-costs](https://mashable.com/article/space-tourism-environmental-costs)

Media coverage of Vohra et al. (2021), doi:10.5194/acp-21-6275-2021 on air pollution trends in cities in the UK and India:
[https://phys.org/news/2021-04-hidden-air-pollutants-cities-india.html](https://phys.org/news/2021-04-hidden-air-pollutants-cities-india.html)
[https://econews.com.au/66423/hidden-air-pollutants-on-the-rise-in-cities-in-india-and-the-uk-study/](https://econews.com.au/66423/hidden-air-pollutants-on-the-rise-in-cities-in-india-and-the-uk-study/)
[https://www.cnbc18.com/india/levels-of-air-pollutants-on-rise-in-indian-cities-study-9104501.htm](https://www.cnbc18.com/india/levels-of-air-pollutants-on-rise-in-indian-cities-study-9104501.htm)
[https://economictimes.indiatimes.com/news/india/levels-of-air-pollutants-on-rise-in-indian-cities-study/articleshow/82304287.cms](https://economictimes.indiatimes.com/news/india/levels-of-air-pollutants-on-rise-in-indian-cities-study/articleshow/82304287.cms)
[https://scienmag.com/hidden-air-pollutants-on-the-rise-in-cities-in-india-and-the-uk-study/](https://scienmag.com/hidden-air-pollutants-on-the-rise-in-cities-in-india-and-the-uk-study/)
[https://www.eurasiareview.com/29042021-hidden-air-pollutants-on-rise-in-cities-in-india-and-uk/](https://www.eurasiareview.com/29042021-hidden-air-pollutants-on-rise-in-cities-in-india-and-uk/)

Extensive media coverage of Vohra et al. (2021), doi:10.1016/j.envres.2021.110754 on global early deaths due to air pollution from fossil fuel combustion. Select coverage:
Tweeter by environmental activist Greta Thunberg: [tinyurl.com/7liwievc](https://tinyurl.com/7liwievc)

Tweet by historian Naomi Oreskes:
[https://twitter.com/NaomiOreskes/status/1359244585852092419](https://twitter.com/NaomiOreskes/status/1359244585852092419)
[https://www.theguardian.com/environment/2021/feb/09/fossil-fuels-pollution-deaths-research](https://www.theguardian.com/environment/2021/feb/09/fossil-fuels-pollution-deaths-research)
[https://www.independent.co.uk/news/uk/home-news/air-pollution-fossil-fuels-deaths-b1799380.html](https://www.independent.co.uk/news/uk/home-news/air-pollution-fossil-fuels-deaths-b1799380.html)
[https://www.reuters.com/article/health-pollution-fossil fuels-fossil-fuel-pollution-causes-one-in-five-premature-deaths-globally-study-idUSKBN2A90UB](https://www.reuters.com/article/health-pollution-fossil fuels-fossil-fuel-pollution-causes-one-in-five-premature-deaths-globally-study-idUSKBN2A90UB)
[https://www.thetimes.co.uk/article/pollution-from-fossil-fuels-twice-as-deadly-as-thought-scientists-warn-lxbgtpp6pc](https://www.thetimes.co.uk/article/pollution-from-fossil-fuels-twice-as-deadly-as-thought-scientists-warn-lxbgtpp6pc)
[https://www.bloomberg.com/news/articles/2021-02-09/fossil-fuel-pollution-kills-millions-more-than-scientists-knew](https://www.bloomberg.com/news/articles/2021-02-09/fossil-fuel-pollution-kills-millions-more-than-scientists-knew)
[https://www.newscientist.com/article/2267035-deaths-from-fossil-fuel-air-pollution-are-doubling-what-we-thought/](https://www.newscientist.com/article/2267035-deaths-from-fossil-fuel-air-pollution-are-doubling-what-we-thought/)
[https://www.bostonglobe.com/2021/02/09/metro/burning-fossil-fuels-kills-an-estimated-350000-people-year-study-finds/](https://www.bostonglobe.com/2021/02/09/metro/burning-fossil-fuels-kills-an-estimated-350000-people-year-study-finds/)
[https://news.harvard.edu/gazette/story/2021/02/deaths-from-fossil-fuel-emissions-higher-than-thought/](https://news.harvard.edu/gazette/story/2021/02/deaths-from-fossil-fuel-emissions-higher-than-thought/)
[https://www.forbes.com/sites/carlieporterfield/2021/02/09/fossil-fuel-pollution-caused-nearly-1-in-5-global-deaths-in-2018-groundbreaking-study-suggests/](https://www.forbes.com/sites/carlieporterfield/2021/02/09/fossil-fuel-pollution-caused-nearly-1-in-5-global-deaths-in-2018-groundbreaking-study-suggests/)
[https://www.huffpost.com/entry/fossil-fuel-air-pollution_n_6022a51dc5b6c56a89a49185](https://www.huffpost.com/entry/fossil-fuel-air-pollution_n_6022a51dc5b6c56a89a49185)
[https://www.cbsnews.com/news/fossil-fuel-air-pollution-emissions-1-in-5-deaths-worldwide-each-year/](https://www.cbsnews.com/news/fossil-fuel-air-pollution-emissions-1-in-5-deaths-worldwide-each-year/)

Expertise sought on the climate impact of aircraft emissions:

BBC, [https://www.bbc.co.uk/news/science-environment-49349566](https://www.bbc.co.uk/news/science-environment-49349566).
Public Engagement

2023 The Conversation, Cornwall space launch: Why the environmental cost of rocket launches is large even when they fail, https://theconversation.com/cornwall-space-launch-why-the-environmental-cost-of-rocket-launches-is-large-even-when-they-fail-197567, 3,177 reads, 12 Tweets, 18 Facebook shares, 5 comments

2022 The Conversation, Air pollution in fast-growing African cities presents a risk of premature death, https://theconversation.com/air-pollution-in-fast-growing-african-cities-presents-a-risk-of-premature-death-183944, 4,545 reads, 24 Tweets, 70 Facebook shares

2022 The Conversation, Axiom launch: why commercial space travel could be another giant leap for air pollution, https://theconversation.com/axiom-launch-why-commercial-space-travel-could-be-another-giant-leap-for-air-pollution-180990, 38,686 reads, 15 Tweets, 77 Facebook shares, 20 comments

2021 The Conversation, Ditching fossil fuels will have immediate health benefits for millions – world leaders must seize the chance, https://theconversation.com/ditching-fossil-fuels-has-immediate-health-benefits-for-millions-world-leaders-must-seize-the-chance-171015, 8,583 reads, 11 Tweets, 277 Facebook shares, 2 comments

2021 The Conversation, Space tourism: rockets emit 100 times more CO₂ per passenger than flights – imagine a whole industry, https://theconversation.com/space-tourism-rockets-emit-100-times-more-co-per-passenger-than-flights-imagine-a-whole-industry-164601, 112,787 reads, 703 Tweets, 4292 Facebook shares, 53 comments

2019 Co-ordinator, First Leicester chapter of the International Pint of Science Festival, Leicester, UK.

2019 Presenter, International Pint of Science Festival, Leicester, UK.

2019 Lecturer, British Council Air Quality Capacity Building Workshop, University of Nairobi, Nairobi, Kenya.

2018 Presenter, International Pint of Science Festival, Birmingham, UK.

2017 Lecturer, NASA/COSPAR Capacity Building Workshop, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana.

Professional Membership

NASA ATom Science Team and Airborne Program
European Geophysical Union
American Geophysical Union
Royal Society of Chemistry
Earth Science Women’s Network
Fulbright Alumni Association
Harvard Alumni Association