

ELOISE A. MARAIS

Geography, Earth & Environmental Sciences
University of Birmingham
Edgbaston, UK

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EDUCATION

- Ph.D.**, Earth and Planetary Sciences, Harvard University, Cambridge MA 2014
Research Advisor: Professor Daniel J. Jacob
- 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

- Research Fellow**, University of Birmingham, Edgbaston, UK 2016-present
- Postdoctoral Research Fellow**, Harvard University, Cambridge MA 2014-2016

RESEARCH SUPPORT

Scholarships, fellowships, and travel grants awarded totals £310,000.

- 2016-2018** Birmingham Independent Research Fellowship (£27,000)
- 2017-2019** *A Systems Approach to Air Pollution in East Africa*, DFID East Africa Research Fund (£20,000)
- 2017-2018** NASA ATom Science Team Travel Award (£5,000)
- 2016** *Health effects of fossil and traditional fuels*, Wallace Foundation, USA (£8,000)
- 2014-2015** *Air quality in Africa*, Schlumberger Faculty for the Future Postdoctoral Grant, USA (£59,000)
- 2014-2015** South African National Research Foundation (NRF) Postdoctoral Fellowship for Research Abroad, USA (£29,000)
- 2011-2012** Harvard Center for the Environment Fellowship, USA (£12,000)
- 2011-2013** South African NRF Graduate Scholarship for Study Abroad, USA (£16,000)
- 2008-2011** International Fulbright Science and Technology Award, USA (£134,000)

AWARDS

- 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, top BSc Chemistry Honours student, University of KwaZulu-Natal, South Africa
- 2004** Merck, SASOL and Perkin-Elmer Medals, top 3rd year Chemistry undergraduate student, University of KwaZulu-Natal, South Africa
- 2002-2004** Dean's commendations for numerous undergraduate and postgraduate courses, University of Natal/KwaZulu-Natal, South Africa

PUBLICATIONS

Total citations is 541, h-index is 13 (*Google Scholar*). ORCID: 0000-0001-5477-8051

- 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, accepted, *Environ. Sci. Tech.*

- 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.
- 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.
- Cady-Pereira 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.
- 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.
- 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.
- 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.
- Silvern, J. A. 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.

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.
- Marais E. A.**, C. Wiedinmyer: Air Quality Impact of Diffuse and Inefficient Combustion Emissions in Africa (DICE-Africa), *Environ. Sci. Tech.*, 50, 10739-10745.
- 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.
- Fisher, J. A. et al., including **E. A. Marais**: Organic nitrate chemistry and its implications for nitrogen budgets in an isoprene- and monoterpene-rich atmosphere: constraints from aircraft (SEAC⁴RS) and ground-based (SOAS) observations in the Southeast US, *Atmos. Chem. Phys.*, 16, 5969-5991.
- 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.

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.

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.
- 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.
- 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.
- 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.

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.

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.

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.

TEACHING

Training

2010 *Harvard Bok Center Teacher Training*, Harvard University, USA

2009 *Scientists Teaching Science*, graduate course on effective science teaching, Harvard-Smithsonian Center for Astrophysics, USA

Experience

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

2017 *Environmental Protection*, University of Birmingham, UK

2013 *Energy Technology*, Harvard University, USA

2010 *Introduction to Environmental Science*, Harvard University, USA

2009 *Environmental Science and Technology*, Harvard University, USA

2009 *Atmospheric Chemistry*, Harvard University, USA

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

RESEARCH SUPERVISION

2017- Alfred Bockarie (PhD) *Air quality, climate, and ecosystem impacts of charcoal production, use and transport in Africa*, co-mentor with A. R. MacKenzie

2017- Karn Vohra (PhD) *A new tool to quantify air pollution detrimental to health and food security in rapidly urbanizing cities*, co-mentor with W. J. Bloss

2017 Jeremy Lu (MSc) *Critical evaluation of satellite-derived PM_{2.5} in 5 large cities in China*.

INVITED PRESENTATIONS

University of Cambridge, Cambridge, UK, 2017.

Centre for Ecology & Hydrology, Edinburgh, UK, 2017.

University of Edinburgh, Edinburgh, UK, School of Geosciences, 2017.

University of Birmingham, Birmingham, UK, School of Geography, Earth, and Environmental Sciences, 2016.

MIT, Cambridge, MA, Department of Earth, Atmospheric, and Planetary Sciences, 2016.

Texas A&M, Atmospheric Sciences, College Station, TX, 2016.

Rhodes University, Grahamstown, South Africa, Department of Chemistry, 2015.

Georgia Institute of Technology, Atlanta, GA, School of Civil and Environmental Engineering, 2015.

University of East Anglia, East Anglia, UK, School of Environmental Sciences, 2015.

University of York, York, UK, Department of Chemistry and National Centre for Atmospheric Science, 2015.

University of Leeds, Leeds, UK, School of Chemistry, 2015.

University of Manchester, Manchester, UK, School of Earth, Atmospheric and Environmental Sciences, 2015.
Colorado University, Boulder, CO, Cooperative Institute for Research in the Environmental Sciences, 2015.
National Center for Atmospheric Research, Boulder, CO, Atmospheric Chemistry Observations and Modeling, 2015.
North-West University, Potchefstroom, South Africa, Unit of Environmental Sciences and Management, 2014.
West Africa Air Quality Workshop, Abuja, Nigeria, 2014.

MEDIA COVERAGE

May 19, 2016, Inter Press Service News: *Many Cities Don't Know How Dangerous Their Air Pollution Is*, L. Rowlands: www.ipsnews.net/2016/05/many-cities-dont-know-how-dangerous-their-air-pollution-is/

PROFESSIONAL ACTIVITIES

Professional Service

2017- GEOS-Chem Model International Steering Committee Co-Chair
2017 Session Co-Chair, *Atmospheric Chemistry of the Southern Hemisphere*, American Geophysical Union Annual General Meeting, New Orleans, LA
2017- NASA ATom Science Team Member
2016-2017 Chair of Air Pollution seminar series, University of Birmingham, UK
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)
2014-2015 Chair of weekly Harvard Atmospheric Sciences seminar series
2013 Professional Development Workshop Chair, Fulbright Science and Technology Capstone Conference, Washington, DC
2013 Head of the Fulbright Science and Technology Alumni Election Committee
2012 Session Chair, *Remote Sensing of the Terrestrial Biosphere*, American Meteorological Society's 1st Conference on Atmospheric Biogeosciences, Boston, MA

Peer Review: Journals

Frequent reviewer for numerous prestigious scientific journals:

Proceedings of the National Academy of Sciences, Atmospheric Environment, Atmospheric Chemistry and Physics, Journal of Air and Waste Management, Environmental Science & Technology, Journal of Geophysical Research, Geoscientific Model Development, Atmospheric Measurement Techniques.

Peer Review: Grant Agencies

2017 UK National Environmental Research Council (NERC)
2016 European Research Council (ERC) Advanced Grant
2014-2016 US National Oceanic and Atmospheric Association (NOAA)
2015 Belgian Science Policy Office (BELSPO)

Professional Memberships

American Geophysical Union (AGU)
European Geophysical Union (EGU)
Royal Society of Chemistry (RSC)
Earth Science Women's Network (ESWN)
South African Association of Women Graduates
Fulbright Alumni Association