

**A. Personal Information****Education**

1988-1995 Christ Church, Oxford, OX1 1DP, UK  
1982-1988 Fairfax School, Fairfax Road, Sutton Coldfield, West Midlands, B75 7JT, UK

**Qualifications**

1995 MA, University of Oxford  
1995 D. Phil. Chemistry, University of Oxford  
1992 BA(Hons) Chemistry, University of Oxford

**Present Employment**

2021- Group Supervisor of Jet Propulsion Laboratory, NASA  
Laboratory Studies and California Institute of Technology  
Atmospheric Observations Group

2017- Research Scientist Jet Propulsion Laboratory, NASA  
California Institute of Technology

**Previous Employment**

2012-2017 Professor of School of Earth, Atmospheric and  
Atmospheric Chemistry Environmental Sciences  
University of Manchester, UK

2009-2012 Reader School of Earth, Atmospheric and  
Atmospheric Science Environmental Sciences  
University of Manchester, UK

2004 -2008 Senior Lecturer School of Earth, Atmospheric and  
Atmospheric Science Environmental Sciences  
University of Manchester, UK

2003 -2004 Lecturer Department of Physics  
Physics University of Manchester Institute of Science and  
Technology, UK

2001-2003 Senior Lecturer Department of Chemistry and Physics  
Analytical Chemistry Nottingham Trent University, UK

1999-2001 Lecturer Department of Chemistry and Physics  
Analytical Chemistry Nottingham Trent University, UK

1997-1999 Research Fellow Department of Chemistry  
University of Cambridge, UK  
Supervisor: Dr R. A. Cox

1995-1997      Research Associate

Department of Chemistry  
Massachusetts Institute of Technology  
Supervisor: Prof. M. J. Molina

## **B. Research and academic/professional standing**

### **Funding**

C. Percival, J. Moses, F. Winiberg, M. Line, Understanding observations of exoplanet atmospheres through laboratory based chemical kinetics, NASA, 21-XRP21-0032 (2022-2025).

F. Winiberg and C. Percival, Laboratory Measurements of Dimethyl Sulfide Oxidation Product JPL R&TD spontaneous concept (2021).

F. Winiberg, C. Percival, Y Yung, F Mills and S. Sander, Laboratory and modeling studies of ClOx Chemistry on Venus, NASA, 20-SSW20-0092 (2021-2024).

S. Sander, F. Winiberg and C. Percival, POST-COVID Recovery for Early Career Researcher in Laboratory Atmospheric Chemistry, NASA, 20-COVID20-0106 (2021-2022).

C. Percival, F. Winiberg and S. Sander, HOx, NOx and ROx cycling and partitioning in the UTLS: Laboratory studies to reduce model uncertainties, NASA, 20-ACLS20-0004 (2021-2024).

S Sander and C. Percival Laboratory Kinetics and Photochemistry Studies Important for Ozone in the Upper Troposphere and Lower Stratosphere, NASA, 17-ACLS17-0008 (2018-2021).

S Sander and C. Percival Kinetics Studies of Peroxy Radical and Criegee Intermediates Relevant to the Tropospheric Ozone Budget, NASA, 17-ACLS17-0009 (rolling grant).

C. Percival and S. Sander Time of Flight Mass Spectrometer Chemical Ionisation Mass Spectrometer with Filter Inlet for Gases and Aerosols (FIGAERO-CI-TOF-MS) for Atmospheric Chemistry Research, JPL, TEFIM (2017).

Aerosol/Composition/Air-quality and Health Strategic Initiative, JPL, 2017 (Co-I).

C. Percival Exoplanets Kinetics Research Initiative, JPL, 2017.

C. Percival , Air Quality Urbain Analysis of Real-time Information and Actuation AQUARIA, Department for Transport Innovation Grant.

G. Allen, M. Gallagher and C. Percival, Global Methane Budget, National Environmental Research Council (NERC), NE/N015835/1 (2016-2019).

C. Percival, H. Coe, J. Allan and G. McFiggans, An Integrated Study of AIR Pollution PROCesses in Beijing (AIRPRO), NERC, NE/N00695X/1 (2016-2019).

J. Allan, H. Coe and C. Percival, Sources and Emissions of Air Pollutants in Beijing AIRPOLL, NERC, NE/N007123/1 (2016-2019).

C. Percival, Residual Chlorine gas Analysis, Defence Science and Technology Laboratory (DSTL), DSTLX10000098041 (2015).

C. Percival, G. Allen, K. Bower, M. Gallagher and C. Percival Green House gas UK and Global Emission, NERC, NE/K00221X/1 (2013-2016).

C. Percival, H. Coe, J. Allan, G. McFiggans, Time of Flight Mass Spectrometer, NERC Strategic Environmental Science Capital Funding (2014).

D. E. Shallcross and C. Percival, Urban Oxidising Capacity using reactive tracers, NERC, NE/K014811/1(2013-2017).

D. E. Shallcross, A. Orr-Ewing and C. Percival, gas phase studies of Criegee Intermediates, NERC, NE/K005316/1.

C. Percival and D. E. Shallcross, Isoprene and recycling, NERC, NE/J009210/1.

C. Percival, Novel photoionisation source, Investing in Success, University of Manchester (2012-2013).

D. O. Topping, A.M. Booth, M. R. Alfarra, B. Burton and C.J. Percival, *Improvement of composition and property prediction techniques for Secondary Organic Aerosol (SOA)*, NERC, NEJ009202/1.

D. Mok, J.M. Dyke and C.J. Percival, Studies of reactions of reactive intermediates of atmospheric importance produced from ozone-alkene reactions, Research Grants Council, Hong Kong.

D. O. Topping, C.J. Percival, A.M. Booth, I Riipinen, and J Reid, Novel approaches for quantifying the thermodynamics and kinetics of atmospheric gas-to-particle conversion, NERC, NE/J02175/X.

D.E. Shallcross, G.C. Lloyd-Jones and C.J. Percival, Isoprene oxidation and OH recycling, NERC, NEJ009210/1.

AB Horn, CJ Percival, DO Topping and AM Booth, Building Capability for Property Prediction Techniques for Secondary Organic Aerosol in the Centre for Atmospheric Science *via* New Measurements of Condensed-Phase Reactions, Engineering and Physical Sciences Strategic Fund, University of Manchester (2011).

M.W. Gallagher, M. Flynn, J. Dorsey, G. Vaughn, H. Coe and C. J. Percival, *Co-ordinated airborne studies in the tropics (CAST)*, NERC, NE/J006173/1, 2011-2015.

H. Coe, M. Gallagher, K. Bower and C.J. Percival, *Methane and other greenhouse gases in the arctic, measurements, process studies and modelling (MAMM)*, NERC, NE/I029293/1, 2011-2014.

D. Mok, J.M. Dyke and C.J. Percival, *Studies of peroxy and related radical reactions of atmospheric importance: determination of reaction mechanisms, channel specific rate coefficients, and studies of the reaction intermediates*, Research Grants Council, Hong Kong, GRF 501911.

C.J. Percival and D.E. Shallcross, *Simultaneous measurement of gas phase NH<sub>3</sub> and speciated NO<sub>y</sub>*, NERC-Clearflo NE/I014381/1 (2011-2014).

C.J. Percival, J.M. Dyke and D.E. Shallcross, *Laboratory studies of Criegee radical reactions*, NERC, NE/I014381/1 (2011-2014).

C.J. Percival, M. R. Alfarra, D. O. Topping and M. Benyazzar, *The development of a Lithium-attachment chemical ionization mass spectrometer for studies in the atmosphere*, NERC, NE/H003061/1, (2009-2012)

C.J. Percival, A. Orr-Ewing, D. E. Shallcross and M. E. Jenkin, *The gas phase atmospheric photolysis and reactions of key alkyl nitrates and their role in NO<sub>y</sub> partitioning*, NERC, NE/G017352/1, (2009-2012).

W.B. Bloss and C. J. Percival, *A laboratory Study of the Photolysis of the ClO Dimer*, NERC, NE/F018045/1 (2009-2011).

H. Coe, C.J. Percival, G. McFiggans, P. Williams and J. Allen, *RONOCO (ROle of Nighttime chemistry in controlling the Oxidising Capacity of the AtmOsphere)*, NERC Consortium, NE/F004656/1 (2008-2012).

D. O. Topping, G. McFiggans and C.J. Percival, *Direct Validated Improvement of Atmospheric Aerosol Property Prediction Using Laboratory Measurements*, NE/E018181/1, NERC, (2007 – 2010).

C.J. Percival, H. Coe, M. Gallagher, E. Nemitz, *An airborne dual ionisation Chemical Ionisation Mass Spectrometer* NE/E018092/1, NERC, (£653,519; 2007 – 2010).

C.J. Percival and D.E. Shallcross. *Laboratory and modelling studies of the reactions of peroxy radicals with XO (where X= Cl, Br or I)*, NERC, NE/E005268/1 (2007 – 2010).

C.J. Percival, M. Van-Tongeren and D.E. Shallcross, *PPE:Pollution in the Classroom*, Engineering and Physical Sciences Research Council (EPSRC), EP/D068290/1 (2006).

R.C. Rees, M.I. Newton, G. McHale, C.J., Percival and I.A. Dodi. *Acoustic wave technique to assess MHC-peptide interactions*, EPSRC, GR/T24524/01 (2005 – 2006).

C.J. Percival and D.E. Shallcross. *Laboratory and modelling studies of peroxy radical cross reactions*, NERC, NER/A/S/2003/00374 (2004 – 2007).

C. J. Percival, M. I. Newton and G. McHale. *Measurement of atmospheric particulate matter using surface acoustic wave devices*, EPSRC, GR/R36718 (2001 – 2004).

C. J. Percival, *Development of a Turbulent Flow - Chemical Ionisation Mass Spectrometer For Laboratory Kinetic Measurements*, EPSRC, GR/R22766 (2001 – 2004).

C.J. Percival, *Airborne Detection of Atmospheric NO<sub>x</sub>*. Royal Society (2000 – 2001).

C.J. Percival (2000-2003). *Laboratory studies of peroxy radical reactions using a turbulent flow chemical ionisation mass spectrometer technique*, NERC, NER/B/S/2000/00108 (2000 – 2003).

## Facilities awards

C.J. Percival and R Caravan, The Impact of Criegee Intermediate water complexes on the oxidative capacity of the troposphere, ALS-09032, 40 shifts awarded (2017-2021).

C.J. Percival and D.E. Shallcross, The reactions of  $\text{CH}_3\text{O}_2$  radicals with OH radicals and Criegee Intermediates, ALS-07535, 40 shifts awarded (2015- 2018).

C.J. Percival and D.E. Shallcross, Temperature dependent studies of Criegee Intermediates, Advanced Light source, ALS-06638, 40 shifts awarded (2013-2016).

C.J. Percival and D.E. Shallcross, The production and kinetics of Criegee biradicals, towards the elucidation of the mechanism of ozonolysis of alkenes, Advanced Light source, ALS-05323, 40 shifts awarded (2012-2013).

C.J. Percival and D.E. Shallcross, The production and kinetics of the simplest Criegee biradical and adaptation of the Multiplexed Photoionization Mass Spectrometer to probe low temperatures, Advanced Light source, ALS-03890, 20 shifts awarded (2011-2012).

C. J. Percival and A. B. Horn, Ozonolysis of organic aerosols, Molecular Spectroscopy Facility, Rutherford Appleton Laboratory, NE/C004302/1, (2005-2006).

## Publications

### Group members are in bold

204. James D Lee, Freya Anne Squires, Tomás Sherwen, Shona Wilde, Samuel Cliff, Stephane Bauguitte, Chris Reed, Patrick Barker, **Thomas Bannan**, Emily Matthews, **Archit Mehra**, **Carl Percival**, Dwayne E Heard, Lisa K Whalley, Grace Ronnie, Samuel Seldon, Trevor Ingham, Christoph Keller, Emma Knowland (2021). Ozone production and precursor emission from wildfires in Africa, *Accepted by Environmental Science: Atmospheres*, DOI: 10.1039/D1EA00041A .

203. M. Anwar H. Khan, Sophia Bonifacio, Joanna Clowes, Amy Foulds, Rayne Holland, James C. Matthews, **Carl J Percival**, Dudley E. Shallcross (2021). Investigation of biofuel as a sustainable and viable replacement to fossil fuel, *accepted by Atmosphere*

202. Michael F Vansco, Kristen Zuraski, Frank AF Winiberg, Kendrew Au, Nisalok Trongsiwat, Patrick J Walsh, David L Osborn, **Carl J Percival**, Stephen J Klippenstein, Craig A Taatjes, Marsha I Lester, **Rebecca L Caravan** (2021). Functionalized Hydroperoxide Formation from the Reaction of Methacrolein-Oxide, an Isoprene-Derived Criegee Intermediate, with Formic Acid: Experiment and Theory, *Molecules*, 26, 3058, <https://doi.org/10.3390/molecules26103058>.

201. M Anwar H Khan, **Thomas J Bannan**, Rayne Holland, Dudley E Shallcross, Alex T Archibald, Emily Matthews, **Asan Bacak**, James Allan, Hugh Coe, Paulo Artaxo, **Carl J Percival** (2021). Impacts of Hydroperoxymethyl Thioformate on the Global Marine Sulfur Budget, *ACS Earth and Space Chemistry*, <https://doi.org/10.1021/acsearthspacechem.1c00218>.
200. Craig A Taatjes, **Rebecca L Caravan**, Frank AF Winiberg, Kristen Zuraski, Kendrew Au, Leonid Sheps, David L Osborn, Luc Vereecken and **Carl J Percival** (2021). Insertion products in the reaction of carbonyl oxide Criegee intermediates with acids: Chloro(hydroperoxy)methane formation from reaction of CH<sub>2</sub>OO with HCl and DCl, *Molecular Physics*, <https://doi.org/10.1080/00268976.2021.1975199>.
199. Xuan Wang, Daniel J Jacob, William Downs, Shuting Zhai, Lei Zhu, Viral Shah, Christopher D Holmes, Tomás Sherwen, Becky Alexander, Mathew J Evans, Sebastian D Eastham, J Andrew Neuman, Patrick Veres, Theodore K Koenig, Rainer Volkamer, L Gregory Huey, **Thomas J Bannan**, **Carl J Percival**, Ben H Lee, Joel A Thornton (2021) Global Tropospheric halogen (Cl, Br, I) chemistry and its impact on oxidants, *Atmospheric Chemistry and Physics Discussions*. <https://doi.org/10.5194/acp-2021-441>.
198. **Archit Mehra**, Manjula Canagaratna, **Thomas J Bannan**, **Stephen D Worrall**, **Asan Bacak**, **Michael Priestley**, Dantong Liu, Jian Zhao, Weiqi Xu, Yele Sun, Jacqueline F Hamilton, Freya A Squires, James Lee, Daniel J Bryant, James R Hopkins, Atallah Elzein, Sri Hapsari Budisulistiorini, Xi Cheng, Qi Chen, Yuwei Wang, Lin Wang, Harald Stark, Jordan E Krechmer, James Brean, Eloise Slater, Lisa Whalley, Dwayne Heard, Bin Ouyang, W Joe F Acton, C Nicholas Hewitt, Xinming Wang, Pingqing Fu, John Jayne, Douglas Worsnop, James Allan, **Carl Percival**, Hugh Coe (2021). Using highly time-resolved online mass spectrometry to examine biogenic and anthropogenic contributions to organic aerosol in Beijing. *Faraday Discussions*, 226, 282-408.
197. Mike J Newland, Daniel J Bryant, Rachel E Dunmore, **Thomas J Bannan**, W Joe, Ben Langford, James R Hopkins, Freya A Squires, William Dixon, William S Drysdale, Peter D Ivatt, Mathew J Evans, Peter M Edwards, Lisa K Whalley, Dwayne E Heard, Eloise J Slater, Robert Woodward-Massey, Chunxiang Ye, **Archit Mehra**, **Stephen D Worrall**, **Asan Bacak**, Hugh Coe, **Carl J Percival**, C Nicholas Hewitt, James D Lee, Tianqu Cui, Jason D Surratt, Xinming Wang, Alastair C Lewis, Andrew R Rickard, Jacqueline F Hamilton (2021). Low-NO atmospheric oxidation pathways in a polluted megacity, *Atmospheric Chemistry and Physics*, 1613-1625.
196. Lisa K Whalley, Eloise J Slater, Robert Woodward-Massey, Chunxiang Ye, James D Lee, Freya Squires, James R Hopkins, Rachel E Dunmore, Marvin Shaw, Jacqueline F Hamilton, Alastair C Lewis, **Archit Mehra**, **Stephen D Worrall**, **Asan Bacak**, **Thomas J Bannan**, Hugh Coe, **Carl J Percival**, Bin Ouyang, Roderic L Jones, Leigh R Crilley, Louisa J Kramer, William J Bloss, Tuan Vu, Simone Kotthaus, Sue Grimmond, Yele Sun, Weiqi Xu, Siyao Yue, Lujie Ren, W Joe F Acton, C Nicholas Hewitt, Xinming Wang, Pingqing Fu, Dwayne E Heard (2021). Evaluating the sensitivity of radical chemistry and ozone formation to ambient VOCs and NO<sub>x</sub> in Beijing, *Atmospheric Chemistry and Physics*, 2125-2147.
195. Petroc Shelley, **Thomas J Bannan**, **Stephen D Worrall**, M Rami Alfarra, **Carl J Percival**, Arthur Garforth, David Topping (2021). Measured Solid State and Sub-Cooled Liquid Vapour Pressures of Benzaldehydes Using Knudsen Effusion Mass Spectrometry. *Atmosphere*, 12, 397.
194. Aristeidis Voliotis, Yu Wang, Yunqi Shao, Mao Du, **Thomas J Bannan**, **Carl J Percival**, Spyros N Pandis, M Rami Alfarra, Gordon McFiggans (2021). Exploring the composition and volatility of secondary organic aerosols in mixed anthropogenic and biogenic precursor systems, *Atmospheric Chemistry and Physics Discussions*, 1-39.
193. James Weber, Scott Archer-Nicholls, Nathan Luke Abraham, Youngsub Matthew Shin, **Thomas J Bannan**, **Carl J Percival**, **Asan Bacak**, Paulo Artaxo, Michael Jenkin, M Anwar H Khan, Dudley E Shallcross, Rebecca H

Schwantes, Jonathan Williams, Alex T Archibald (2021). Improvements to the representation of BVOC chemistry-climate interactions in UKCA (vn11. 5) with the CRI-Strat 2 mechanism: Incorporation and Evaluation, *Geoscientific Model Development*, 14, 5239-5268.

192. M Anwar H Khan, James W Dennis, **Thomas J Bannan**, **Asan Bacak**, **Alastair M Booth**, **Jennifer BA Muller**, Douglas Lowe, **Carl J Percival**, Dudley E Shallcross (2021). Tropospheric modeling of acetic acid in the UK for Summer, Winter and Spring seasons using a mesoscale 3-dimensional chemistry and transport model, WRF-Chem-CRI. *Atmospheric Research*, 254, 10556.

191. Rayne Holland, M Anwar H Khan, Isabel Driscoll, Rabi Chhantyal-Pun, Richard G Derwent, Craig A Taatjes, Andrew J Orr-Ewing, **Carl J Percival**, Dudley E Shallcross (2021). Investigation of the Production of Trifluoroacetic Acid from Two Halocarbons, HFC-134a and HFO-1234yf and Its Fates Using a Global Three-Dimensional Chemical Transport Model, *ACS Earth and Space Science*, 5, 849-857.

190. M Anwar H Khan, Rayne Holland, Amy Foulds, James C Matthews, Sanjee Panditharatne, Michael E Jenkin, Douglas Lowe, Panida Navasumrit, **Carl J Percival**, Dudley E Shallcross (2021). Investigating the background and local contribution of the oxidants in London and Bangkok, *Faraday Discussions*, 226, 515-536.

189. Jacqueline F Hamilton, Daniel J Bryant, Peter M Edwards, Bin Ouyang, **Thomas J Bannan**, **Archit Mehra**, Alfred W Mayhew, James R Hopkins, Rachel E Dunmore, Freya A Squires, James D Lee, Mike J Newland, **Stephen D Worrall**, **Asan Bacak**, Hugh Coe, **Carl Percival**, Lisa K Whalley, Dwayne E Heard, Eloise J Slater, Roderic L Jones, Tianqu Cui, Jason D Surratt, Claire E Reeves, Graham P Mills, Sue Grimmond, Yele Sun, Weiqi Xu, Zongbo Shi, Andrew R Rickard (2021). Key Role of NO<sub>3</sub> Radicals in the Production of Isoprene Nitrates and Nitrooxyorganosulfates in Beijing. *Environmental Science & Technology*, 55, 842-853.

188. **FAF Winiberg**, **K Zuraski**, Y Liu, SP Sander and **CJ Percival** (2020) Pressure and Temperature Dependencies of Rate Coefficients for the Reaction OH + NO<sub>2</sub> + M, *J. Phys. Chem.*, 124, 10121-10131.

187. R Chhantyal-Pun, MAH Khan, CA Taatjes, **CJ Percival**, AJ Orr-Ewing and DE Shallcross (2020). Criegee intermediates: production, detection and reactivity, *Int. Rev. Phys. Chem.*, 39, <https://doi.org/10.1080/0144235X.2020.1792104>.

186. PA Barker, G Allen, **T Bannan**, **A Mehra**, KN Bower, **J R Pitt**, SJ-B Bauguitte, D Pasternak, RE Fisher, JD Lee, H Coe, M Gallagher, **CJ Percival** and EG Nisbet (2020). Airborne measurements of fire Emission Factors for African biomass burning sampled during the MOYA Campaign, *Atmos. Chem. Phys.* 20, 15443-15459.

185. **M Priestley**, **TJ Bannan**, **M Le Breton**, **SD Worrall**, S Kang, I Pullinen, S Schmitt, R Tillmann, E Kleist, D Zhao, J Wildt, O Garmash, **A Mehra**, **A Bacak**, DE Shallcross, Å Halquist, M Ehn, A Kiendler-Scharr, TF Mentel, G McFiggans, M Halquist, H Coe and **CJ Percival** (2021). Chemical characterisation of benzene oxidation products under high and low NO<sub>x</sub> conditions using chemical ionisation mass spectrometry. *Atmos. Chem. Phys.*, 21, 3473-3490.

184. R Chhantyal-Pun, MAH Khan, N Zachhuber, **CJ Percival**, DE Shallcross and AJ Orr-Ewing (2020). Impact of Criegee Intermediate Reactions with Peroxy Radicals on Tropospheric Organic Aerosol. *ACS Earth Space Chem.*, 4, 1743-1755.

183. **K Zuraski**, **A O Hiu**, FJ Grieman, E Darby, KH Moller, **FAF Winiberg**, **CJ Percival**, MD Smarte, M Okumura, HG Kjaergaard and SP Sander (2020). Acetyl Peroxy and Hydro Peroxy Self-and Cross-Reactions: Kinetics,

- Mechanism, and Chaperone Enhancement from the Perspective of the Hydroxyl Radical Product, *J. Phys Chem A*, 124, 8128-8143.
182. MAH Khan, B Schlich, ME Jenkin, MC Cooke, RG Derwent, JL Neu, **CJ Percival** and DE Shallcross (2021). Changes to simulated global atmospheric composition resulting from recent revisions to isoprene oxidation chemistry. *Atmospheric Environment*, <https://doi.org/10.1016/j.atmosenv.2020.117914>.
181. Michael F Vansco, Rebecca L Caravan, Shubhrangshu Pandit, Kristen Zuraski, Frank AF Winiberg, Kendrew Au, Trisha Bhagde, Nisalak Trongsiwat, Patrick J Walsh, David L Osborn, Carl J Percival, Stephen J Klippenstein, Craig A Taatjes, Marsha I Lester (2020). Formic acid catalyzed isomerization and adduct formation of an isoprene-derived Criegee intermediate: experiment and theory, *Phys. Chem. Chem. Phys.*, 22, 26796-26805.
180. Z. Bibi, H Coe, J. Brooks, P.I. Williams, E. Reyes-Villegas, **M. Priestley, C.J. Percival** and J.D. Allan. (2021). A new approach to discriminate different black carbon sources by utilising fullerenes and metals in Positive Matrix Factorisation analysis of High-Resolution Soot Particle Aerosol Mass Spectrometer data, *Atmospheric Chemistry and Physics*, 21, 10763-10777.
179. JB Burkholder, SP Sander, JPD Abbatt, JR Barker, C Cappa, JD Crouse, TS Dibble, RE Huie, CE Kolb, MJ Kurylo, VL Orkin, CJ Percival, DM Wilmouth, PH Wine (2020). Chemical kinetics and photochemical data for use in atmospheric studies; evaluation number 19.
178. O Garmash, MP Rissanen, I Pullinen, S Schmitt, O Kausiala, R Tillmann, D Zhao, **CJ Percival, T Bannan, M Priestley**, AM Hallquist, E Kleist, A Kiendler-Scharr, M Hallquist, T Berndt, G McFiggans, J Wildt, TF Mentel and M Ehn (2020). Multi-generation OH oxidation as a source for highly oxygenated organic molecules from aromatics. *Atmospheric Chemistry and Physics*, 20, 515-537.
177. MJ Newland, DJ Bryant, RE Dunmore, **TJ Bannan**, WJF Acton, B Langford, JR Hopkins, FA Squires, W Dixon, WS Drysdale, PD Ivatt, MJ Evans, PM Edwards, LK Whalley, DE Heard, EJ Slater, R Woodward-Massey, C Ye, **A Mehra, SD Worrall, A Bacak**, H Coe, **CJ Percival**, CN Hewitt, JD Lee, T Cui, JD Surratt, X Wang, AC Lewis, AR Rickard and JF Hamilton (2020) Rainforest-like atmospheric chemistry in a polluted megacity. *Atmospheric Chemistry and Physics Discussions*, <https://doi.org/10.5194/acp-2020-35>.
176. R Holland, MAH Khan, R Chhantyal-Pun, AJ Orr-Ewing, **CJ Percival**, CA Taatjes and DE Shallcross (2020). Investigating the Atmospheric Sources and Sinks of Perfluorooctanoic Acid Using a Global Chemistry Transport Model, *Atmosphere*, 11 (4), 407.
175. MF Vansco, **RL Caravan, K Zuraski, FAF Winiberg**, K Au, Ni Trongsiwat, PJ Walsh, DL Osborn, **CJ Percival**, MAH Khan, DE Shallcross, CA Taatjes and MI Lester (2020). Experimental Evidence of Dioxole Unimolecular Decay Pathway for Isoprene-Derived Criegee Intermediates, *J. Phys. Chem A*, 124 (18), 3542-3554.
174. **RL Caravan**, M F Vansco, K Au, **MAH Khan, Y- Li, FAF Winiberg, K Zuraski**, Y-H Lin, W Chao, N Trongsiwat, PJ Walsh, DL Osborn, CJ Percival, DE Shallcross, L Sheps, SJ Klippenstein, CA Taatjes and MI Lester (2020). Direct kinetic measurements and theoretical predictions of an isoprene-derived Criegee intermediate. *Proceedings of the National Academy of Sciences*, 117 (18), 9733-9740.
173. P Shelley, **TJ Bannan, SD Worrall**, MR Alfara, UK Krieger, **CJ Percival**, A. Garforth and DO Topping (2020). Measured solid state and subcooled liquid vapour pressures of nitroaromatics using Knudsen effusion mass spectrometry. *Atmospheric Chemistry and Physics*, 20 (14), 8293-8314.



172. DJ Bryant, WJ Dixon, JR Hopkins, RE Dunmore, KL Pereira, M Shaw, FA Squires, **TJ Bannan, A Mehra, SD Worrall, A Bacak**, H Coe, **CJ Percival**, LK Whalley, DE Heard, EJ Slater, B Ouyang, T Cui, JD Surratt, D Liu, Z Shi, R Harrison, Y Sun, W Xu, AC Lewis, JD Lee, AR Rickard and JF Hamilton (2020). Strong anthropogenic control of secondary organic aerosol formation from isoprene in Beijing, *Atmospheric Chemistry and Physics*, 20 (12), 7531-7552.
171. M.A.H. Khan, B. Miles, M. E. Jenkin, R.G. Derwent, **C.J. Percival** and D.E. Shallcross (2020) Investigating the impacts of non-acyl peroxy nitrates on the global composition of the troposphere using a 3-D chemical transport model, STOCHEM-CRI., *ACS Earth Space Chem.*, 4,1201-1212.
170. J.C. Matthews, M.D. Wright, H.G. Silva, D. Martin, **A. Bacak, M. Priestly, T Bannan**, M. Flynn, **C. Percival**, D.E. Shallcross (2020). Urban Tracer Dispersion and Infiltration into Buildings Over a 2-km Scale *Boundary-Layer Meteorol* (2020). <https://doi.org/10.1007/s10546-019-00498-5>.
169. LR. Crilley, LJ Kramer, B Ouyang, J Duan, W Zhang, S Tong, M Ge, K Tang, M Qin, P Xie, MD Shaw, AC Lewis, **A Mehra, TJ Bannan, SD Worrall, M Priestley, A Bacak**, Coe, J Allan, **CJ Percival**, OAM Popoola, RL Jones, and W. Bloss (2019). Intercomparison of nitrous acid (HONO) measurement techniques in a megacity (Beijing) *Atmos. Meas. Tech.*, 12, 6449–6463.
168. M.D. Wright, J.C. Matthews, H.G. Silva, **A. Bacak, C. Percival**, D.E. Shallcross (2019). The relationship between aerosol concentration and atmospheric potential gradient in urban environments. *Science of the Total Environment*, doi: <https://doi.org/10.1016/j.scitotenv.2019.134959>.
167. M.A.H. Khan, J. Clements, D. Lowe, G. McFiggans, **C.J. Percival**, D.E. Shallcross (2019). Investigating the behaviour of the CRI-MECH gas-phase chemistry scheme on a regional scale for different seasons using the WRF-Chem model. *Atmospheric Research* 229, 145-156.
166. MAH Khan, D Lowe, RG Derwent, A Foulds, R Chhantyal-Pun, G McFiggans, AJ Orr-Ewing, **CJ Percival**, DE Shallcross, Global and regional model simulations of atmospheric ammonia. *Atmospheric Research*, 234 (2020) 104702.
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### **The holding of an office in a learned society or professional body.**

- 2015 - 2017      Treasurer of the gas kinetics group of the Royal Society of Chemistry
- 2012 - 2014      President of the gas kinetics group of the Royal Society of Chemistry
- 2012 - 2016      Committee Member of the Royal Society of Chemistry Faraday Standing Committee on Conferences.
- 2010 - 2017      Member of National Environmental Research Council peer review college
- 2010 - 2012      Secretary of the gas kinetics group of the Royal Society of Chemistry.
- 2007 - 2017      Committee member of the gas kinetics group of the Royal Society of Chemistry.
- 2003 - 2010      Member of Engineering Physical Sciences Research Council peer review college

### **C. Administration and Management**

- 2017-              Member of the JPL Data Evaluation Panel on Chemical Kinetics and Photochemical data for use in Atmospheric Studies
- 2017-              Member of Scientific Standing Committee for International Conference on Chemical Kinetics
- 2017-              Lead Science Advisor Atmospheric Chemical Mechanisms conference series,  
<https://acm.aqrc.ucdavis.edu>
- 2015-              Editorial Board Member, Atmospheres, <https://www.mdpi.com/journal/atmosphere/editors>
- 2015 - 2016      Member of Engineering and Physical Sciences Recruitment and Admissions group, University of Manchester, UK.
- 2012 - 2016      Member of School Executive, School of Earth Atmospheric and Environmental Sciences, University of Manchester, UK.
- 2012 - 2017      Director of Outreach, School of Earth Atmospheric and Environmental Sciences, University of Manchester, UK.
- 2012 - 2016      Director of Undergraduate Admission, School of Earth Atmospheric and Environmental Sciences, University of Manchester, UK.
- 2007 - 2011      Member of Faculty of Engineering and Physical Sciences Skills Training and Development Steering Group, University of Manchester, UK.
- 2006 - 2009      Member of School Teaching Committee, School of Earth Atmospheric and Environmental Sciences, University of Manchester, UK.
- 2005 - 2017      Member of School Safety Committee, School of Earth Atmospheric and Environmental Sciences, University of Manchester, UK.
- 2005 - 2010      Member of School Computing Committee, School of Earth Atmospheric and Environmental Sciences, University of Manchester, UK.

2003 - 2017 Radiological Protection Supervisor for Centre for Atmospheric Science, School of Earth Atmospheric and Environmental Sciences, University of Manchester, UK.

## D. Knowledge and Technology Transfer

### Creative or innovative work

Two patents awarded

*Method and apparatus for monitoring atmospheric particulate matter*, M. I. Newton, C. J. Percival and G. McHale, UKPA No: NOTA/P23775GB (2001).

*Molecular imprinted coated acoustic wave devices for the detection of steroids*, C. J. Percival, S.M. Stanley, A. Braithwaite, M. I. Newton, G. McHale, UKPA No: NOTA/P24855GB (2001).

## E. Supervision of Research Students

16 PhD students successfully graduated and 4 MSc students successfully graduated.

1. Dr. Simon Stanley, Molecular Imprinting For Sensor Recognition Elements: Development of Novel Recognition Elements For a Variety of Applications.
2. Dr. Max Bardwell, The Study of the Reaction of Peroxy Radicals With NO Under UTLS Conditions.
3. Dr. Asan Bacak, The Study of the Reaction of Peroxy Radicals With NO<sub>2</sub>.
4. Dr. Teresa Raventos-Duran, Experimental and Theoretical Studies of Peroxy Radical Cross Reactions.
5. Dr. Carl Evans, The Use of Acoustic Wave Devices for the Detection of Biological Molecules.
6. Dr. Max McGillen, Laboratory and Structure-Activity Relationship (SAR) Studies Into the Oxidation Kinetics Of Non-Methane Hydrocarbons (NMHCs) In the Troposphere.
7. Dr. Ruth Wamsley, Studies Of Heterogeneous Transformations of Atmospheric Aerosols.
8. Dr. Jennifer Muller, Ozone Fluxes In The Surface Layer: Measurement Techniques and Application.
9. Dr. Kimberley Leather, Ozonolysis of alkenes
10. Dr. Mohamed Ghalainey, laboratory studies on formic acid production
11. Dr. Sebastien O'Shea, Development of Quantum Cascade Laser detection of Methane
12. Dr. Mike Le Breton, Development of Airborne Measurements using Chemical Ionisation Mass Spectrometry.
13. Dr. Thomas Bannan, Detection of nitryl chloride in the troposphere
14. Dr. Ben Jones, Detection of Organic Acids in Arctic and biomass Burning plumes
15. Dr. Joseph Pitt, Development of QCLAS technique to measure atmospheric Methane
16. Dr. Michael Priestley, Investigating atmospheric chemistry using a time of flight chemical ionization mass spectrometer.

## F. Awards, Honors

2008 Elected Fellow of the Royal Society of Chemistry  
2012 Awarded David A. Shirley Award for outstanding scientific achievement at the Advanced Light <https://als.lbl.gov/past-meetings/>