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About

Roy Harrison's research interests lie in the field of environment and human health. His main specialism is in air pollution, from emissions through atmospheric chemical and physical transformations to exposure and effects on human health. Much of this work is designed to inform the development of policy.

Qualifications

B.Sc. (Class I Honours Chemistry), University of Birmingham (July 1969)

Ph.D. (Organic Chemistry), University of Birmingham (December 1972)

D.Sc. (Environmental Chemistry), University of Birmingham (1989)

Biography

- Head, **Division of Environmental Health and Risk Management (from 1999 -) (http://www.gees.bham.ac.uk/research/clusters/eh/dehrm.shtml)** (from 1999 -)
- Part-time Strategic Theme Leader for Natural Environment Research Council on Environment, Pollution & Human Health (2007 - 2012)
- Distinguished Adjunct Professor, King Abdulaziz University (KAU), Jeddah, Saudi Arabia (since 2011)
- Member, Court of the University of Birmingham

Roy Harrison started his academic career as a chemist, gaining both BSc and PhD degrees from the University of Birmingham. He then undertook postdoctoral work at **Imperial College in the Department of Civil Engineering (http://www.cv.ic.ac.uk/)** working on air pollution by heavy metals. Subsequently he took up a lectureship in atmospheric chemistry at **Lancaster University (http://www.lancs.ac.uk/)** where his work focused on particulate air pollutants and photo oxidants. In 1984 he moved to the **University of Essex (http://www.essex.ac.uk/)** as Reader and Director of the Institute of Aerosol Science, pursuing both laboratory-based research on the physical properties of combustion aerosols and largely field-based work in the chemistry of airborne particulate matter. In 1989 he was awarded the degree of DSc in Environmental Chemistry of the University of Birmingham.

He moved to the University of Birmingham in 1991 to take up the newly created post of Queen Elizabeth II Birmingham Centenary Professor of Environmental Health, becoming Director of the Institute of Public and Environmental Health in 1994, and in 1999 Head of the Division of Environmental Health and Risk Management. He has played an active role outside the University as Chairman of the Quality of Urban Air Review Group for the Department of Environment and the Airborne Particles Expert Group for the Department of Environment, Transport and the Regions and was subsequently a member of Defra's Science Advisory Council). He has been a member of the DETR (now DEFRA) Expert Panel on Air Quality Standards (now the COMEAP Sub-Committee on Standards) since 1991 and is currently Deputy Chairman. He is a member of the Department of Health Committee on the Medical Effects of Air Pollutants, the DEFRA Air Quality Expert Group and the Department of Health Committee on Toxicity. He has also served on numerous other committees including the Natural Environment Research Council's Atmospheric Science and Technology Board, the HEFCE RAE 2001 Earth & Environmental Sciences Panel and RAE 2008 Earth Systems and Environmental Sciences Panel, the Medical Research Council Advisory Board, NERC Peer Review College and the **Natural Environment Research Council's (http://www.nerc.ac.uk/)** Science & Innovation Strategy Board. He was appointed a Part-time Strategic Theme Leader for Environment, Pollution & Human Health, Natural Environment Research Council (NERC) from 2007 to 2012. He is a member of the Earth Systems and Environmental Sciences Panel for REF 2014.

Roy Harrison is listed by ISI Thomson Scientific (on **ISI Web of Knowledge (http://www.isihighlycited.com/)**) as a Highly Cited Researcher in the Environmental Science/Ecology category. He has an h-index of 59 (December 2013); total citations exceed 14,000. In 2004 he was appointed OBE for services to environmental science in the New Year Honours List. He was profiled by the Journal of Environmental Monitoring (Vol 5, pp 39N-41N, 2003).

National Centre for Atmospheric Science: Roy Harrison leads the Birmingham node of the National Centre for Atmospheric Science. This is funded by NERC as part of the Directorate for Atmospheric Composition of the distributed Centre.

Postgraduate supervision

Research Students since 2001

Anna Jang - Source apportionment and reactivity of PAH

Zhe Tian - Source apportionment of airborne particulate matter associated with haze in megacities in China

Paul Sanderson – Ambient characterisation of nanoparticle exposures

Lami Karimatu Abdullahi – Measurement and modelling of exposure to air toxics and verification by biomarker

Adewale Taiwo – Source apportionment of air pollution

Jon Dredge – Aerosol contributions to speleothem chemistry

Ian Keyte – Sources and properties of polycyclic aromatic hydrocarbons in the UK atmosphere

Barbara Macias Hernandez – Personal exposure to toxic substances

Massimiliano Mascelloni – In quest of new fingerprints of exposure to VOC from consumer products

Pallavi Pant – Source apportionment of airborne particulate matter in India

Suad Al Kindi - Artificial chemical aging of atmospheric particles

Krystal Godri - Chemical composition and toxicity of airborne particulate matter (joint project with Kings College, London)

Bunthoon Laongsri - Measurement and source apportionment of airborne particulate matter

Asma Zakaria – Congenital malformation in relation to air quality in Malaysia

Lihua Wilson Hu – Biomass burning contribution to airborne particle concentrations

Sai Ho David Ho - Pollution of outdoor and indoor environments by volatile organic compounds

Wing Yip Lee – Application of mass spectrometry to air pollutant characterisation

Anna Lia Presicci – Evolution of particle size distributions in urban air

Salah Saeed Abdalmogith - Processes affecting secondary aerosol in the atmosphere

Manuel Dall'Osto - Studies of atmospheric aerosol by single particle mass spectrometry

Alexia Economopoulou – Development of graphical models of abatement devices for use in constructing emissions inventories

Siwat Pongpiajun - Sources and atmospheric chemistry of polycyclic aromatic hydrocarbons

Noel Aquilina - Measurement and modelling of exposure to air toxics and verification by biomarker

Wayne Smith – High time resolution chemical fingerprinting of particulate emissions from the steel industry

Alistair Thorpe – The coarse fraction of airborne particles

Aftab Alam - Formation and processes affecting particles in the atmosphere

Sarah Baggott - Numerical modelling of atmospheric chemistry in the West Midlands

Doug Evans - The generation of model aerosols for human exposure studies

Ben Marner - Atmospheric nitrogen deposition to a nitrate vulnerable zone

Jianxin Yin - Monitoring of airborne particulate mass and number concentrations in the UK atmosphere

Bendita Lachmansingh - An investigation of the health impacts of air pollution upon vulnerable population subgroups

Rob Tilling - Source-receptor modelling of particulate matter in the urban atmosphere

Research

Current and completed projects

- Artificial chemical ageing of ambient atmospheric aerosol
- Novel compact after treatment systems for simultaneous reduction of diesel engine NOx, PM, CO and HC emissions
- Use of chemical composition and molecular markers to infer the sources of airborne particulate matter
- Health implications of polycyclic aromatic hydrocarbons in indoor environment
- Sources and atmospheric processes determining airborne concentrations of polycyclic aromatic hydrocarbons and their degradation products
- Diesel particulate filter regeneration with on-board produced hydrogen-rich gas
- Risks of Airborne ParTiclES (RAPTES)
- Links between urban and ambient particulate matter and health-particle metrics
- Determinants of oxidative potential, a health-based metric to assess particulate matter toxicity
- Understanding the fate of traffic-generated particles
- The formation and characterisation of secondary organic aerosol
- European Supersites for Atmospheric Aerosol Research (EUSAAR)
- European Integrated Project on Aerosol Cloud Climate and Air Quality (EUCAARI)
- Airborne particle concentrations and numbers in the United Kingdom
- Characterisation of emission and impact of ultrafine particulate matter
- Measurement and modelling of exposure to air toxics and verification by biomarker
- Network on nanoparticles at the science and engineering/medicine interface

- High time-resolution chemical fingerprinting of particulate emissions from the steel industry
- Design, implementation, synthesis and interpretation of the field measurements in funded UK field programmes
- A novel instrument to measure molecular clusters and newly nucleated particles in the atmosphere
- Relationship of ultrafine and fine particles in indoor and outdoor respiratory health (RUPIOH)
- Nature and origin of PM10 and smaller particulate matter in the urban air
- Processes affecting the size distribution of fine particles in diesel exhaust and ambient air
- Processes responsible for the formation of new particles within the atmosphere
- Studies of the atmospheric bio-aerosol
- Development of air quality management models for the West Midlands and South-East England
- Improved parameterisation of atmospheric chemistry in numerical models
- Oxidant and particle chemistry in the marine atmosphere
- Source apportionment of airborne particulate matter
- Temporal trends in lead exposure and population blood leads
- Processes affecting fine and ultrafine particles in the urban atmosphere
- Personal exposure to airborne particulate matter, volatile organic compounds and nitrogen dioxide
- Indoor-outdoor relationships of particulate air pollutants and VOC
- Epidemiological studies of the effects of particulate matter on human health
- Clinical studies of the effects of particulate matter and sulphur dioxide on human health
- The effect of airports on respiratory health in the general population
- The atmospheric chemistry of nitrogen compounds
- Composition, sources and properties of the organic component of urban airborne particulate matter
- Source apportionment of urban airborne PAH
- Processes influencing contrail formation in jet engine exhaust
- Application of single particle mass spectrometry to atmospheric aerosol characterisation

Much of this research is collaborative with **Dr Stuart Harrad (/staff/profiles/gees/harrad-stuart.aspx)**, **Dr Bill Bloss (/staff/profiles/gees/bloss-william.aspx)**, Professor Rob MacKenzie, Dr Xiaoming Cai and **Professor Jamie Lead (/staff/profiles/gees/lead-jamie.aspx)**. Together, the activity comprises probably the largest University-based air pollution research group in the UK and one of the largest in Europe. We also collaborate extensively with other research groups from the UK and mainland Europe. Specific recent collaborations include the following:

RAPTES - Risks of Airborne ParTiclES: National Institute for Public Health, Environment (RIVM), Netherlands, Utrecht University, Kings College (London), University of Birmingham

RUPIOH – Universities of Utrecht, Helsinki, Birmingham, Athens, Finnish Meteorological Institute & Institute of Public Health, ECN (Netherlands) and National Observatory of Athens.

Health Effects Research – University of Aberdeen, St. George's Hospital Medical School and University of Birmingham (School of Medicine).

EUSAAR (European Supersites for Atmospheric Aerosol Research) - CNRS, Paul Scherrer Institut, University of Stockholm, JRC-Commission of the European Community, TNO-Netherlands, Leibniz Institut für Troposphärenforschung e.V., NILU-Norway, ISAC-CNR-Italy, University of Helsinki, National University of Ireland-Galway, University of Crete, Finnish Meteorological Institute, Pannon University-Hungary, Institute of Chemical Process Fundamentals AS CR-Czech Republic, University of Heidelberg, Institute for Nuclear Research and Nuclear Energy Bulgarian Academy of Sciences, Institute of Physics-Lithuania, Lunds Universitet, Consejo Superior de Investigaciones Cientificas-Spain, Hoffmann Messtechnik GmbH

EUCAARI - Universities of Helsinki, Leeds, Lund, Veszprém, Oslo, Copenhagen, East Anglia, Copenhagen, Kuopio, Manchester, Sao Paolo-Brazil, Crete, Stockholm, Warsaw, Aveiro, Tarto, Mainz, Peking, Aegean, North-West University-South Africa, Hebrew University of Jerusalem, National University of Ireland-Galway, The French National Center for Scientific Research, Max Planck Institute (Meteorology & Chemistry), Institute for Tropospheric Research, Institute of Atmospheric Sciences and Climate, Swiss Federal Institute of Technology, Netherlands Organisation for Applied Scientific Research, Netherlands Royal Meteorological Institute, Finnish Meteorological Institute, Joint Research Centre of the EU Commission, UK Met Office, Norwegian Institute for Air Research, Norwegian Meteorological Institute, Paul Scherrer Institute, Institute of Chemical Engineering in Patras, Academy of Sciences of the Czech Republic, French Meteorological Service, Research Centre Jülich, The Energy and Resources Institute-India, Airel AS (Ltd), German Aerospace Center, The International Institute for Applied Systems Analysis, Chinese Academic of Meteorological Sciences, Laboratory of Climate and Environmental Sciences, Risø National Laboratory, German Weather Service.

SAPUSS - IDAEA-CSIC, Spain, University of Birmingham, UK, National University of Ireland Galway, Center for Aerosol and Cloud Chemistry, USA, University College Cork, Ireland, National Institute of Nuclear Physics (INFN), Italy, University of Florence, Italy, University of Colorado, USA, CIEMAT, Spain, Paul Scherrer Institute, Switzerland, Jenoptik, Defense & Civil Systems, Germany, Wehrwissenschaftliches Institut für Schutztechnologien, Germany, Area de Medi Ambient, Spain, Universidad de Murcia, Spain, Carleton College, USA, Gencat, Direcció General de Qualitat Ambiental, Spain.

ClearfLo - University of Reading, Reading, Center for Aerosol and Cloud Chemistry Aerodyne Research, USA, Center for Atmospheric and Environmental Chemistry Aerodyne Research, USA, University of Hertfordshire, Centre for Ecology and Hydrology,University of Washington, Seattle, USA, University of York, University of Leicester, University of Birmingham, Paul Scherrer Institut, University, Lancaster, King's College, London, University of Manchester, Institute of Technology, USA, University of Edinburgh, University of Leeds.

Professor Harrison has been involved in a number of **research projects (PDF 14KB) (/Documents/college-les/gees/staff/harrison-projects.pdf)**

Publications

Recent publications

See a **full publications list since 2001 (PDF 105KB) (/Documents/college-les/gees/staff/harrison-publications.pdf)**

Peer-Reviewed Journal Papers

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