

# DMUG 2016

IAQM

# Programme



The Institution of  
environmental sciences

The IAQM acts as the voice of air quality in the UK by producing useful and timely guidance on matters affecting air quality professionals and by responding to government consultations.

We have a busy CPD calendar each year, with attendance at the majority of events being free or heavily discounted for members. We also publish reports and journals concentrating on the science, modelling, policy and legal issues surrounding air quality.

The IAQM is the largest membership organisation for air quality professionals in the UK.

**9:30 – 10:00**     **Registration and refreshments**

**10:00 – 10:05**     **Roger Barrowcliffe (IAQM)**  
Introduction and Welcome

**10.05 – 10.30**     **Alun Roberts-Jones (Environment Agency)**  
Using a Lagrangian particle model to assess long range impacts from large point sources

**10:30 – 10:55**     **Dr Aidan Farrow (University of Hertfordshire)**  
The use of mesoscale models to forecast air quality in cities

**10:55 – 11:20**     **Prof. Alan Robins (University of Surrey)**  
The role of physical modelling of atmospheric dispersion

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**11:20 – 11:50**     **Refreshments and networking**

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**11:50 – 12:15**     **Bethan Tuckett Jones (Parsons Brinckerhoff)**  
Investigation of near field effects of generator plumes using CFD

**12:15 – 12:40**     **David Carruthers (CERC)**  
Developments in modelling building wake effects on dispersion in ADMS

**12:40 – 13:05**     **Scott Hamilton (Ricardo AEA)**  
Use of WRF/CALPUFF for modelling odours at industrial facilities

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**13:05 – 14:05**     **Lunch**

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**14:05 – 14:30**     **Joana Medeiros (University of Hertfordshire)**  
New applications and important implications for policy makers and model users  
Highlights from the 10th International Air quality Conference

**14:30 – 14:55**     **Michel Vedrenne (Ricardo AEA)**  
The development of the Streamlined-PCM as a tool for screening the impact of road-traffic policy actions on NO<sub>2</sub> concentrations

**14:55 – 15:20**     **Nigel Bellamy (Highways England)**  
The latest version of DMRB

**15:20 – 15:45**     **Dr Ben Marnier (Air quality Consultants)**  
Real-world emissions, the EFT, and a new worst-case emissions calculator

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**15:45 – 16:05**     **Refreshments and networking**

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**16:05 – 16.30**     **Roger Barrowcliffe (IAQM) Plenary,**  
Closing remarks and suggestions from the audience for next meeting

**17:00**             **CLOSE**

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## Speakers



**Nigel Bellamy**  
at Highways England

Nigel has worked with Highways England over the last 4 years on research projects and more latterly as an air quality advisor. He has 15 years expertise and knowledge on all aspects of air quality and modelling assessment, with particular focus on road traffic led assessments.

Nigel has recently been looking at the emerging vehicle emissions data and leading a range of mitigation research projects.



**David Carruthers**  
Technical Director at CERC

David Carruthers is a technical director of CERC and has been involved with the company since its inception in 1986. His scientific background is in the structure of the atmospheric boundary layer and atmospheric processes. He has overall responsibility for the development of CERC software including the Atmospheric Dispersion Modelling System (ADMS) and CERC's urban modelling systems. He is a member of DEFRA's Air quality Expert Group (AQEG).



**Dr Aidan Farrow**  
Earth System Scientist at Centre for Atmospheric and Instrumental Research

Aidan is an Earth System Scientist with expertise in climate and air-quality modelling. Aidan works with a variety of climate and atmospheric models and runs the NCAS Air quality Forecast. His background is in Earth Sciences, having studied Environmental Geoscience at the University of Edinburgh followed by a Ph.D. in Geographical Science from the University of Bristol.



**Dr Scott Hamilton**  
Technical Lead at Ricardo Energy & Environment

Scott is the Technical Lead in Ricardo's team of urban scale dispersion modelling scientists. His main clients include the UK Foreign and Commonwealth Office, Defra, Scottish Government and the High Commission for the Development of ArRiyadh. Scott's dispersion modelling experience extends through the usual tools and methods (AERMOD, ADMS, ADMS-Roads, CALPUFF, HYSPLIT, Envi-Met CFD, etc) into meteorological modelling (WRF, WRF EMS) and via meteorological processing codes like MMIF and CALWRF. He has a keen and growing interest in programming in the R and Python languages.



**Alun Roberts Jones**  
at Environment Agency

Alun started working for the Environment Agency Air quality Modelling and Assessment Unit (AQMAU) in 2008 after graduating from Cardiff University with a BSc in Mathematics.

AQMAU is the Environment Agency's national focus of expertise on air quality modelling and assessment, providing both leadership and operational support to internal and external stakeholders. The team helps ensure that air quality modelling and assessments for permit applications, compliance, enforcement and incident investigations are consistent, of a high standard and based on sound science.



**Bethan Tuckett-Jones**  
Head of Air quality at WSP Parsons Brinckerhoff

Currently the acting Head of Air quality at WSP | Parsons Brinckerhoff, Bethan has worked at PB (now WSP|PB) for the past 10 years. Prior to joining PB, Bethan spent 4 years working for the Environment Agency's Air quality Modelling and Assessment Unit and 10 years working as a Research Fellow in the Centre for Applied Oceanography in Bangor University. Bethan has a PhD in meteorology from the University of Reading. Throughout her career, her focus has been modelling the dispersion of pollutants in the atmosphere.

## Speakers



**Dr Ben Marnar**  
Technical Director  
at Air quality  
Consultants

Ben is the Technical Director at Air quality Consultants Ltd. He has 17 years' experience in air quality and has been responsible for a large number of air quality assessments of roads and rail schemes, airports, power stations, incinerators, energy from waste, and both commercial and residential developments in the UK and internationally. He has contributed to the development of industry best practices in a range of areas. He was responsible for updating the DMRB air quality model on behalf of the Highways Agency. He has provided public inquiry expert witness services, as well as support and advice to Defra, the Environment Agency, Transport Scotland, Transport for London, and numerous local authorities.



**Joana Medeiros**  
at University of  
Hertfordshire

Joana is a geophysicist specialising in atmospheric physics. She gained her MSc in 2011 at Faculty of Sciences of the University of Lisbon, Portugal, with a study of the meteorological conditions over Portugal and the Iberian Peninsula for the present and future climate in the frame of a 20 years high resolution numerical simulation using the WRF model. On completion of her MSc, she was retained as a fellowship researcher at the University's Institute. In 2014 she came to the UK as a PhD student with the Centre for Atmospheric and Instrumentation Research (CAIR) at the University of Hertfordshire, to study the relationship between circulation and weather extremes over Asia for present and future climate and its impact on the levels of pollutants concentrations during extreme episodes of severe weather conditions.



**Prof. Alan Robins**  
Professor of  
Environmental  
Fluid Mechanics at  
University of Surrey

Alan Robins completed his undergraduate and postgraduate studies at Imperial College, in aeronautics. He holds the Chair of Environmental Fluid Mechanics at the University of Surrey and is Director of the Environmental Flow Research Centre (EnFlo). Prior to joining the University of Surrey, he worked with the CEGB, firstly at MEL and then at CERL where he was Head of the Flow and Dispersion Modelling Group. Current research concentrates mainly on local scale meteorology, dispersion and air quality issues.



**Michel Verdenne**  
Senior Consultant  
at Ricardo Energy &  
Environment

Michel Verdenne is a Senior Consultant specialising in Air quality Modelling at Ricardo Energy & Environment. Originally from a Chemical Engineering background, he has focused on the development of simplified models for policy use at the national and local level in Spain and the UK. Currently he supports the European Commission and Member States in the integrated appraisal of policy measures to achieve air quality targets. He is an active member of the International Environmental Modelling and Software Society.

## Exhibitor

Exhibiting at DMUG 16 are some of the leading companies within air quality. Make sure you stop by and introduce yourself.



UNDERSTANDING,  
ACCELERATED

### TSI

TSI, a world leader in particle measurements for over 50 years, offers a variety of instruments for real-time, direct-reading results. Every day, thousands of people use TSI's trusted DustTrak™ products and IAQ probes for environmental and process monitoring. The new Environmental DustTrak Aerosol Monitor provides near-reference method quality data, and can be set up and collecting data in less than an hour. This instrument has the ability to simultaneously measure size-segregated mass fraction concentrations corresponding to PM1, PM2.5, respirable, PM10 and total PM size fractions. Our UK based service department also ensures your instruments are calibrated and serviced by TSI in market leading turnaround time.



### Air Monitors

Based in the UK, Air Monitors is an independent, privately owned company representing some of the world's leading environmental monitoring technology manufacturers. Providing monitoring solutions which encompass the very best products, technology and services, Air Monitors offers technical support, maintenance, calibration, operation, analysis and reporting services in addition to the sale or hire of monitoring equipment. Typical applications include the monitoring of particulate matter and gaseous pollutants in both workplace and ambient air. The staff at Air Monitors are experts in air quality; able to provide help and guidance on which technologies are best suited for specific applications.



### Enviro Technology Services plc

A leading supplier and service provider of bespoke 'turn-key' environmental monitoring systems for the measurement of air pollution.

## Talk Summaries

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### **Nigel Bellamy**

at Highways England

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#### **Talk Summary**

An overview of the DMRB assessment procedures including good practices for undertaking large scale road traffic models and assessment.

As part of the talk Highways England will be presenting its newly developed DMRB GIS Toolkit.

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### **David Carruthers**

Technical Director at CERC

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#### **Talk Summary**

The commonality of stacks being located close to buildings and the tendency of buildings to increase surface concentrations resulting from elevated sources means that the treatment of building wake effects remain a key aspect of any short range dispersion model.

Approaches to modelling the effect of buildings on dispersion in ADMS will be described and contrasted with other models including AERMOD. Comparisons of the model with measured data including field data from Prudhoe Bay in Alaska and wind tunnel data from the comprehensive Thomson study will be used to illustrate model performance and the impact of some recent model modifications. These have included expanding the horizontal scale of the building wake in the most stable conditions, improving the transitions between the various building effect regimes and model adjustments for long narrow buildings when the building effects on the flow may be close to two-dimensional.

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### **Dr Aidan Farrow**

Earth System Scientist at Centre for Atmospheric and Instrumental Research

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#### **Talk Summary**

Mesoscale models and air quality forecasts run by the academic community can provide a valuable resource for professional and statutory organisations interested in air quality on local scales. The University of Hertfordshire's 'HiRAE' project is a collaboration between UK city authorities and researchers to generate and exploit air quality forecasts. Co-designed by researchers and practitioners the HiRAE project is developing a new air quality forecasting platform that will improve our understanding of air quality problems and directly inform local authorities of air quality hazards, helping them to reduce the health impact of air pollution.

The University of Hertfordshire-NCAS air quality forecast produces daily forecasts, covering the UK. In collaboration with Bristol City Council and Transport for Greater Manchester we have now developed the system to produce high resolution air quality data at the city scale. Our high resolution forecasts are mapped according to street geometries and reflect the regional and local air quality and meteorological conditions. A suite of online data distribution tools provide access to the forecast and archive of data. This talk will explore how the academic and professional communities can collaborate to improve our understanding of air quality issues and ability to manage them.

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### **Dr Scott Hamilton**

Technical Lead at Ricardo Energy & Environment

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#### **Talk Summary**

This presentation will illustrate recent experience in the use of a loose coupled WRF/CALPUFF modelling system for near field odour assessment. Among the topics covered will be the pros and cons of the approach, including issues like the meteorological modelling in WRF and CALPUFF parameterisation. The intention is to share some practical tips for delegates thinking of using similar techniques in their work. There are significant data handling challenges to consider when using these tools which will be discussed as well.

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### **Alun Roberts Jones**

Environment Agency Air Quality

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#### **Talk Summary**

Gaussian plume air dispersion models are widely used for regulatory purposes, as they are simple, efficient, and perform well within 10 km from a source. However, in cases where pollutants are emitted from very large buoyant sources, impacts can be experienced at much greater distances, outside the limits of Gaussian plume models. In such cases, more complex dispersion models are required to accurately assess the impacts.

This presentation gives a case study example where a Lagrangian particle model has been used to assess the impact of coal fired power station emissions at habitat sites in North England, up to 130 km from the source.

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## Talk Summaries

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### Bethan Tuckett-Jones

Head of Air quality at WSP

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#### Talk Summary

The installation of diesel generators for the provision of emergency power and STOR is becoming increasingly common at residential, municipal and mixed use developments. At the same time, due to their anticipated 'limited' operating hours, developers are proposing low flue discharge heights. This presentation gives a case study of the use of CFD to assess emissions from such generators, balancing the need to reduce impacts on both ambient air quality and on the fabric of the building due to the high temperature of the exhaust gases. Critical receptors for these effects were potentially located within a few metres of the flues and, therefore, the focus of the study was on near field effects in plumes.

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### Ben Marner

Technical Director at air quality Consultants Ltd

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#### Talk Summary

The literature now contains a reasonable number of real-world emissions measurements from Euro 6/VI vehicles. These have been drawn together and examined in the context of the predictions from COPERT 4, as used in Defra's Emissions Factors Toolkit (EFT). The outcomes have been used to produce a new traffic emissions calculator which provides a realistic worst-case set of emissions.

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### Joana Medeiros

Geophysicist specialising in atmospheric physics at University of Hertfordshire

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#### Talk Summary

The 10th international air quality conference, held in Milan 2016 stimulated a cross-fertilisation of ideas and cooperation between the different air pollution science and user communities. The topics presented at the conference reflected the diversity of scales, processes and interactions affecting air pollution and its impact on health and the environment, where the key messages focused on the importance of process connections between climate – air pollution, health and ecosystem and the need for greater interactions between these communities and alignment of research goals. As a result, the new directions from this meeting englobed the fusion of information of long term (decadal) time-series of air pollution and health effects; more non-exhaust PM pollution impact studies and more detailed modelling of suspended dust; more population exposure modelling taking into account population movements and indoor-outdoor infiltration; and the use of unmanned aerial vehicles (UAV) and aircraft measurements.

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### Prof. Alan Robins

Professor of Environmental Fluid Mechanics at University of Surrey

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#### Talk Summary

A selection of illustrative examples will be used to review the use of wind tunnel modelling in solving problems in atmospheric dispersion, developing scientific understanding and instigating new research. Topics covered will include urban dispersion – vehicle and point source emissions, emergency response, inverse modelling for source identification; power plant - complex issues affecting siting, concentration fluctuations; process plant – diffuse emissions, loss rate assessment and leak detection. The importance of integrating wind tunnel work with computational modelling will be emphasised and the feedback between the two approaches discussed.

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### Michel Verdenne

Senior Consultant at Ricardo

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#### Talk Summary

The Streamlined PCM is a tool that allows quantifying the impact of measures applied to different aspects of road transportation on the emissions of nitrogen oxides (NO<sub>x</sub>) and on the annual mean concentration of nitrogen dioxide (NO<sub>2</sub>) at numerous road receptors in the United Kingdom. It has been developed relying on information from the National Atmospheric Emissions Inventory (NAEI) to support the assessment of abatement measures by providing evidence on how effective these measures may be in improving air quality and meeting limits specified in European legislation. The presentation will provide an overview of how this tool was conceived, its underlying assumptions and limitations and its use in informing the NO<sub>2</sub> air quality Plans recently published by DEFRA

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Institute of  
Air Quality  
Management

# Routes<sup>to</sup> Clean Air

Air Quality Conference

## 11th- 12th October 2016

The Grand Hotel, Bristol

The IAQM presents **Routes to Clean Air**, a forum for academics, professionals and policy makers to share experiences of improving traffic emissions.

Our UK and international speakers will be highlighting the importance of public communication and behavioural change surrounding road transport and air quality issues.

### Confirmed Speakers:

- **What has been achieved in the 60 years since the first Clean Air Act?** Prof. Jim Longhurst (Assistant Vice Chancellor, Environment and Sustainability, UWE)
- **How to Solve London's Air quality Crisis**, Richard Howard (Policy Exchange)
- **Promoting the Message in Wales**, Marion Jones (Former Director, Public Health Wales - UWE)
- **Health effects of NO<sub>2</sub>: do these differ from those associated with PM<sub>2.5</sub> exposure and if so, how?** Prof. Frank Kelly (COMEAP & King's College London)
- **Upholding the right to clean air**, Alan Andrews (ClientEarth, Lawyer, Health and Environment Clean Air Project Leader)
- **Germany's plan for air quality**, Marion Wichmann-Fiebig (Head of Air quality, German Environment Agency)
- **European action to improve air quality: changes to the vehicle type approval system**, Thomas Verheye (Head of Industrial Emissions and Air DG Environment, European Commission)
- **How to Solve London's Air quality Crisis**, Richard Howard, (Policy Exchange)

**Super Early Bird Discount**

Available Until  
**July 31**

### Attendance Costs:

**Super Earlybird** IAQM/IES members  
(Until July 31st) ~~£250~~ – £210

**Super Earlybird** Non-members (Until July 31st) ~~£350~~ – £310

Standard IAQM/IES – £250

Standard Non-member – £350



Email or call to register  
see our website for more information.



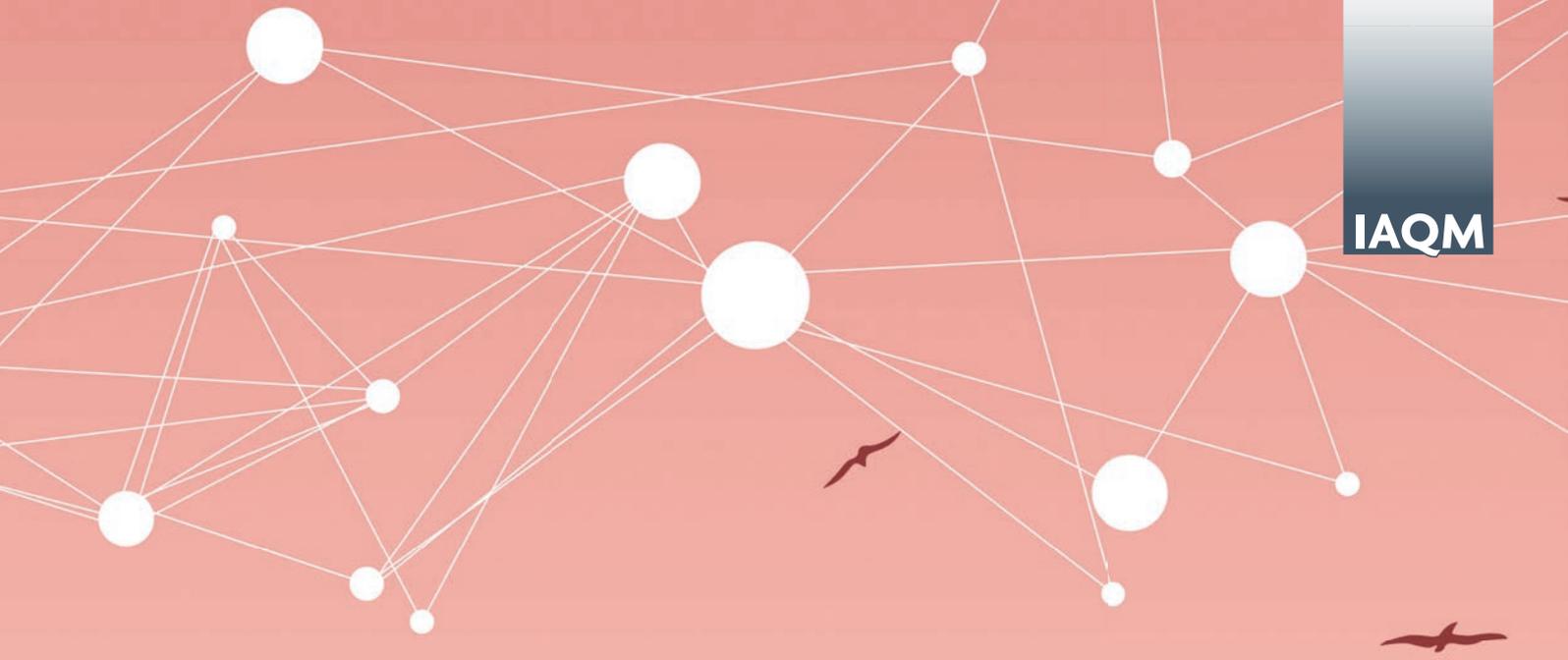
**emma @the-ies.org**

**020 7601 1920**



**www.the-ies.org/events/RTCA16**

**Location:** Thistle Bristol City Centre, The Grand, Broad Street BS1 2EL.



IAQM

The Institute of Air quality Management  
C/O IES 3rd Floor 140 London Wall,  
London EC2Y 5DN

☎ +44(0)20 7601 1920

✉ [info@the-ies.org](mailto:info@the-ies.org)

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