

## Dr Juana Maria Delgado-Saborit PhD

Lecturer in Environmental Health

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### About

Dr Delgado-Saborit is an expert in exposure assessment studies using different sampling and analytical techniques to characterize inhalation doses, personal exposures and environmental levels of air pollutants. She has expertise in chemical speciation for source identification. She has coordinated large projects involving recruiting and sampling with subjects, sampling in a wide range of indoor and outdoor micro-environments, and using biomarkers as tracers of exposure to air pollutants.

### Qualifications

- MEng in Chemical Engineering (Universitat Jaume I, Spain)
- MSc in Industrial Environment Engineering and Management (AINIA & School of Industrial Organization, Spain)
- PhD in Environmental Sciences (Universitat Jaume I, Spain)

### Biography

Dr Juana Maria Delgado-Saborit did her undergraduate and postgraduate studies at Universidad Jaume I (Spain). Shortly after completion of her MEng degree in Chemical Engineering she was awarded a fellowship to undertake doctoral studies. During her PhD studies, Dr Delgado-Saborit did two research stages at prestigious centers, the Harvard School of Public Health (USA) under the supervision of Professor Petros Koutrakis, and the Division of Environmental Health and Risk Management – University of Birmingham (UK) supervised by Professor Roy Harrison. After graduating with honours from her PhD studies, she started working as a Research Fellow in the latter research group. During her work at the University of Birmingham she has coordinated several projects funded by the Health Effects Institute, NERC, MRC and Cefic.

Dr. Delgado-Saborit was awarded the 2010 Long Range Initiative Innovative Science Award, a coveted award for young researchers, for her research proposal "In quest of new fingerprints of exposure to VOC from consumer products". The award is granted by the European Chemical Industry Council (Cefic), in conjunction with the Association of European Toxicologists and European Societies of Toxicology (EUROTOX), the Society of Environmental Toxicology and Chemistry (SETAC), the International Society of Exposure Sciences (ISES) and Chemical Week.

Dr. Delgado-Saborit was awarded the 2011 Walter A. Rosenblith New Investigator Award. This is a very prestigious award given by the American Health Effects Institute to support the work of young researchers who possess outstanding research potential.

### Teaching

Dr. Delgado Saborit is the module leader of Air Quality Management module in the MSc Air Pollution Management & Control postgraduate course.

She is also lecturing in:

- "Indoor Air Quality and Personal Exposure" within the Causes and Effects of Air Pollution module in the MSc Air Pollution Management & Control postgraduate course.
- "Impact of changing energy sources" and "Carbon footprinting" within the Carbon Management module in the MSc Air Pollution Management & Control postgraduate course

### Postgraduate supervision

Dr. Delgado-Saborit currently supervises the following postgraduate students:

- Massimiliano Mascelloni – PhD - In quest of new fingerprints of exposure to VOC from consumer products
- Barbara Macias – PhD - Characterization of personal exposures and indoor concentrations of VOCs, PM2.5, PAH, quinones and black carbon
- Lami Karimatu Abdullahi – PhD - Characterisation of exposure from cooking emissions
- Paul Sanderson – PhD- Ambient characterisation of nanoparticle exposures
- Adobi Okam – PhD - Personal and indoor exposures to nanoparticles and its relationships with biological markers
- Van Tuan Vu - PhD - Calculating pollutant lung dose for use in health exposure studies

Former students are:

- Marian Querol Balaguer - PhD - Comparative study of levels, composition and origins of aerosol pollution in the Castellon ceramic cluster (2013)
- Paul Bentley - MSc - A travel mode comparison of commuters' exposure to air pollutants (2013)
- Ghania Ounoughene - MEng – Energy, Environment and Nanotechnology challenges and opportunities (2011)

- Nadarajah Tharshini- MEng – Use of real-time sensors to characterise human exposures to atmospheric pollutants (2011)
- Gaelle Urgin - MEng – Development of a user-friendly system for hazard and risk assessment (2011)
- Boris Roulle - MEng - Integrated analysis of polycyclic aromatic hydrocarbons and quinones in ambient air (2010)
- Mohamed Batnini - MEng - Source apportionment of PAHs and quinones in ambient air (2010)
- Alex Jandot - MEng - Characterisation of airborne concentrations of polycyclic aromatic hydrocarbons in trafficked roadsides and suburban environments (2009)
- Sai Ho David Ho - MPhil - Pollution of outdoor and indoor environments by volatile organic compounds and polycyclic aromatic hydrocarbons (2007)
- Zurahanim Fasha Annual - MSc - Personal exposure to volatile organic compounds (VOC) from different modes of transport (2007)
- Raul Sanchez - MSc - Measurement of traffic-related VOCs in the central London (2006)

Potential students can contact Dr. Delgado-Saborit directly for available opportunities.

## Research

Dr. Delgado-Saborit's research interests are the measurement and modelling of inhalation doses and personal exposures to air pollutants and related health effects; the use of biomarkers as tracers of exposure and effects to air pollution; the monitoring and assessment of air pollution in indoor microenvironments and ambient air; the characterization of airborne nanoparticle exposures and related health effects; the implementation of real-time sensors and passive samplers to assess air quality and human exposures to airborne pollutants; and the study of sources and processes determining airborne pollutant concentrations in indoor and ambient air.

Her recent research projects are:

**Use of real-time sensors to assess misclassification and to identify the contribution of main sources to peak and chronic exposures** funded by the Health Effects Institute 2011 Walter A. Rosenblith New Investigator Award. The aim is to assess the degree of misclassification associated with the use of surrogate measures of exposure — such as measurements made at central monitors — and to identify key activities and sources of these pollutants. A panel study will be conducted to improve methods of estimating human exposure to the air pollutant mixture (specifically ultrafine particulate matter [PM], fine PM, black carbon, and nitrogen dioxide). The subjects will wear personal monitoring equipment for four consecutive days in winter and summer. A novel feature of this study is the use of sensors that can provide detailed data on pollutant concentrations over time and accelerometers to estimate subjects' physical activity level so that equivalent respiration rates and inhaled doses can be calculated.

**Development of in-vivo and in-vitro methodologies to assess oxidative stress caused by ambient pollutants** funded by the Wellcome Trust Institutional Support Fund. The aim is to develop an analytical methodology suitable to detect multiple oxidative stress biomarkers both in-vivo and in-vitro systems and to apply this methodology to assess the association between oxidative stress and inhaled exposures to pollutants.

**In Quest of New Fingerprints of Exposure to Air Toxics (FIXAT Project)** (<http://www.birmingham.ac.uk/research/activity/environmental-health/projects/airtoxics/index.aspx>) funded by the Cefic 2010 LRI Innovative Science Award and subsidized by the Division of Environmental Health and Risk Management. The aims of the project are to characterise human exposures to a range of air toxics emitted from consumer products (VOCs) and combustion sources (PM2.5, PAH, quinones and black carbon); and to find suitable biomarkers to monitor the exposure and effects to low-level of VOCs, especially benzene, and other air toxics using novel analytical and cutting-edge methodologies

**From Airborne exposures to Biological Effects (FABLE): the impact of nanoparticles on health** (<http://www.birmingham.ac.uk/research/activity/mds/projects/HaPS/IOEM/fable/index.aspx>) funded by NERC/MRC Environment and Health. This linked programme of work begins with measurement and identification of metallic nanoparticles in the air, focusing on those from vehicle exhausts, manufacturing particles in the lab which have similar properties to ambient levels, using these in the lab to see how they enter cells and move within cells and then what effects these particles have on cellular function. We will use real life doses which we will have obtained from our ambient measures. Throughout the grant we will interact with policy makers in a range of Government departments and agencies so that these findings can influence policy development in nanoparticle exposure

**SPADE Project: Sources and atmospheric Processes determining Airborne concentrations of polycyclic aromatic hydrocarbons and their DEgradation products** funded by NERC. The major goals of this project are to study the rates and mechanisms of degradation of airborne PAH and to evaluate concentrations of their reaction products.

**Health Implications of Polycyclic Aromatic Hydrocarbons in Indoor Environments** funded by the National Institute for Health Research Central Commissioning Facility (NIHR-CCF). Research on the Health Effects of Outdoor and Indoor Air Pollution and Policy Research Programme. The aims of the project are to characterise PAH indoors and to compare whether indoor profile and carcinogenic potency are similar to those outdoors.

**MATCH Project: Measurement and modelling of exposure to Air Toxic Concentrations for Health effect studies & verification by biomarker** funded by the Health Effects Institute. The major goals of this project are to characterize exposures to VOC and PAH in personal, indoor and outdoor environments; to develop models to predict those exposures; to assess relationship between personal exposures and biomarker concentrations to VOCs and PAHs.

## Other activities

### Other Professional Experience

- 2008-2009 - Temporary advisor on Indoor Air Quality Guidelines, World Health Organization; Benzene sub-committee; Polycyclic Aromatic Hydrocarbons sub-committee
- 2002-2005 - Lecturer in Inorganic Chemistry, Universitat Jaume I, Castellon, Spain
- 2000-2003 - Consultant on Quality and Environmental Management, QPT SL, Villareal, Spain
- 2000-2001 - Research Associate, Universitat de Valencia, Valencia Spain
- 1999 - Laboratory Technician, Johnson Matthey, Castellon, Spain.
- 1998 - Consultant on European Funding, Eurovias SLU, Brussels, Belgium.

### Professional Memberships

- 2010 - Member of the Students and New Researchers Committee of the Int Soc of Exposure Sciences
- 2009 - Member of the International Society of Exposure Science (ISES)
- 2009 - Member of the United Kingdom Indoor Environment Group (UKIEG)
- 2003 - Member of the Spanish Society of Environmental Health (SESA)

## Publications

Delgado-Saborit JM, Stark CP and Harrison RM (2014) **Use of a Versatile High Efficiency Multiparallel Denuder for the Sampling of PAHs in Ambient Air: Gas**

Claudio Sartini, Stefano Zauli Sajani, Isabella Ricciardelli, **Juana Mari Delgado-Saborit**, Fabiana Scotto, Arianna Trentini, Silvia Ferrari and Vanes Poluzzi (2013) **Ultrafine particle concentrations in the surroundings of an urban area: comparing downwind to upwind conditions using Generalized Additive Models (GAMs)**. (<http://pubs.rsc.org/en/content/articlelanding/2013/em/c3em00228d#divAbstract>) Environmental Science: Processes & Impacts, 15, 2087-2095

**Delgado-Saborit JM**, Alam MS, Godri Pollitt KJ, Stark CP and Harrison RM (2013) **Analysis of atmospheric concentrations of quinones and polycyclic aromatic hydrocarbons in vapour and particulate phases** (<http://www.sciencedirect.com/science/article/pii/S1352231013004536#>). Atmospheric Environment, 77, 974-982.

García-Aleix JR, **Delgado-Saborit JM**, Verdú-Martín G, Amigó-Descarrega JM and Esteve-Cano V (2013). **Trends in arsenic levels in PM10 and PM2.5 aerosol fractions in an industrialized area**. (<http://link.springer.com/article/10.1007%2Fs11356-013-1950-0>) Environmental Science and Pollution Research, published online 11/07/2013.

Alam MS, **Delgado-Saborit JM**, Stark CP and Harrison RM (2013) **Using atmospheric measurements of PAH and quinone compounds at roadside and urban background sites to assess sources and reactivity** (<http://www.sciencedirect.com/science/article/pii/S1352231013003324>). Atmospheric Environment, 77, 24-35

Abdullahi LK, **Delgado-Saborit JM**, Harrison RM (2013). **Emissions and indoor concentrations of particulate matter and its specific chemical components from cooking: A review**. (<http://www.sciencedirect.com/science/article/pii/S1352231013000861>) Atmospheric Environment, 71: 260-294

**Delgado-Saborit** (2012). **Use of real-time sensors to characterise human exposures to combustion related pollutants**. (<http://pubs.rsc.org/en/content/articlepdf/2012/em/c2em10996d>) J. Environ. Monit., 14, 1824-1837

**Delgado-Saborit JM**, Stark CP, Harrison RM (2011) **Carcinogenic potential, levels and sources of polycyclic aromatic hydrocarbon mixtures in indoor and outdoor environments and their implications for air quality standards** (<http://www.sciencedirect.com/science/article/pii/S0160412010002278>). *Environment International*, Volume 37, Issue 2, Pages 383-392, Volume 37, Issue 2, Pages 383-392, Volume 37, Issue 2, Pages 383-392

**Delgado-Saborit JM**, Aquilina NJ, Baker SJ, Meddings C, Harrison RM. (2011) **Relationship of personal exposure to volatile organic compounds to home, work and fixed site outdoor concentrations** (<http://www.sciencedirect.com/science/article/pii/S0048969710010995>). *Science of the Total Environment*, 409 478–488, 409 478–488, 409 478–488

Harrison, RM, **JM Delgado-Saborit**, F Dor, R Henderson (2010) **WHO Guidelines for Indoor Air Quality: Selected pollutants. Chapter 1 – Benzene** ([http://www.euro.who.int/\\_data/assets/pdf\\_file/0009/128169/e94535.pdf](http://www.euro.who.int/_data/assets/pdf_file/0009/128169/e94535.pdf)). World Health Organization, Copenhagen, Denmark. Pp 15-54

H Choi, RM Harrison, H Komulainen, **JM Delgado-Saborit** (2010) **WHO Guidelines for Indoor Air Quality: Selected pollutants. Chapter 6 – PAH** ([http://www.euro.who.int/\\_data/assets/pdf\\_file/0009/128169/e94535.pdf](http://www.euro.who.int/_data/assets/pdf_file/0009/128169/e94535.pdf)). World Health Organization, Copenhagen, Denmark. Pp 289-346

Aquilina NJ, **Delgado-Saborit JM**, Gauci AP, Baker S, Meddings C, Harrison RM (2010). **Comparative modeling approaches for personal exposure to particle-associated PAH** (<http://pubs.acs.org/doi/abs/10.1021/es102529k>). *Environmental Science and Technology*, 44: 9370–9376

**Delgado-Saborit JM**, Aquilina NJ, Baker SJ, Meddings C, Harrison RM (2010). **Determination of atmospheric particulate-phase polycyclic aromatic hydrocarbons from low volume air samples** (<http://pubs.rsc.org/en/Content/ArticleLanding/2010/AY/b9ay00157c>). *Anal Methods*, 2:231-242

Aquilina, NJ, **Delgado-Saborit JM**, Meddings, C, Baker, S, Harrison, RM, Jacob Iii, P, Wilson, M, Yu, L, Duan, M & Benowitz, NL (2010) **Environmental and biological monitoring of exposures to PAHs and ETS in the general population** (<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3148021/?tool=pubmed>), *Environ Int*, 36 (7): 763-771

Harrison, R.M., **Delgado-Saborit JM**, Baker, S.J., Aquilina, N., Meddings, C., Harrad, S., Matthews, I., Vardoulakis, S. and Anderson, R. (2009). **Measurement and Modeling of Exposure to Selected Air Toxics for Health Effects Studies and Verification by Biomarkers** ([http://staff.um.edu.mt/\\_data/assets/pdf\\_file/0019/109414/pdf9\\_PUBLICATIONS\\_NA.PDF](http://staff.um.edu.mt/_data/assets/pdf_file/0019/109414/pdf9_PUBLICATIONS_NA.PDF)). *HEI Research Report 143. Health Effects Institute, Boston, MA*. Health Effects Institute, Boston, MA.

**Delgado-Saborit JM**, Aquilina NJ, Baker SJ, Meddings C, Harrison RM. **Model development and validation of personal exposure to volatile organic compound concentrations** (<http://ehp03.niehs.nih.gov/article/info%3Adoi%2F10.1289%2Fehp.0900561>). *Environmental Health Perspectives*. 117:1571-1579. doi:10.1289/ehp.0900561 117:1571-1579. doi:10.1289/ehp.0900561

**Delgado-Saborit JM**, N. Aquilina, C. Meddings, S. Baker, Vardoulakis, S and R. M. Harrison. (2009) **Measurement of personal exposure to volatile organic compounds and particle associated PAH in three UK regions** (<http://pubs.acs.org/doi/abs/10.1021/es9005042>). *Environmental Science and Technology*, 43 (12), 4582-4588

**Delgado-Saborit, J.M.** (2009) Effects of Air Pollution on Citrus Trees. In: Tennant P, Benkeblia N (Eds) *Citrus II. Tree and Forestry Science and Biotechnology 3 (Special Issue 1)*, 92-104.

**Delgado-Saborit, J.M** and V.J. Esteve-Cano (2008) Assessment of tropospheric ozone effects on citrus crops using passive samplers in a western Mediterranean area. *Agriculture, Ecosystems & Environment*, 124, 147-153

**Delgado-Saborit, J.M** and V.J. Esteve-Cano (2007) Field comparison of passive samplers versus UV-photometric analyser to measure surface ozone in a Mediterranean area. *J. Environ. Monit.*, 9, 610 - 615

**Delgado-Saborit, J.M.** and Esteve-Cano, V (2006) Field Study of Diffusion Collection Rate Coefficients of a No2 Passive Sampler in a Mediterranean Coastal Area. *Environmental Monitoring and Assessment*. 02.06.2006, vol. 120, no. 1, pp. 327-345

Seung Joo Lee, Philip Demokritou, Petros Koutrakis and **Juana M. Delgado-Saborit** (2006) Development and evaluation of personal respirable particulate sampler (PRPS). *Atmospheric Environment*, Volume 40, Issue 2, January 2006, Pages 212-224

