



**International Laboratory
for Air Quality
and Health**



WHO Collaborating Centre

2013 ANNUAL REPORT

**INTERNATIONAL LABORATORY FOR AIR
QUALITY and HEALTH
(ILAQH)**

1. Introduction

The International Laboratory for Air Quality and Health (ILAQH) is part of the Institute for Health and Biomedical Innovation (IHBI) and the Institute for Future Environments (IFE), at the Queensland University of Technology (QUT). ILAQH undertakes research, postgraduate training and consultancy in the complex, interdisciplinary field of air quality and its impact on human health, with a specific focus on ultrafine and nanoparticles. The three main aspects of ILAQH research activities are:

- Comprehensive characterisation of indoor and outdoor air, including emission sources;
- Integrated health and environmental risk assessments; and
- Strategies for controlling and managing air pollutants.

To address the challenge related to the interdisciplinary nature of air pollution and its impact on human health, academics from a number of Faculties within QUT are involved with the programs undertaken by the ILAQH, including discipline areas such as: physics, chemistry, microbiology, mathematics, public health and engineering. The expertise of the ILAQH personnel is strengthened by close collaboration with a number of government and non-government organizations. Through joint research, lecturing and postgraduate student supervision, the ILAQH collaborates closely with a number of North American, European and Asian research and tertiary organizations.

The facility is equipped with state of the art instrumentation for aerosol generation, mass and number size classification; monitoring of atmospheric gases; real time biological studies; vehicle emission testing, filter testing, lung deposition studies, and computer modelling. Access to electron microscopy and analytical chemistry facilities is available through the links existing within the Science and Engineering Faculty.

ILAQH has built up a scientific program, which is recognised internationally through a high publication rate in reputable international journals, visits by scholars from around the world to the facility, and invitations to the ILAQH key researchers to address international conferences and participate in international initiatives. In Australia both the Queensland State and the Federal government and non-government organizations regularly seek the expertise of this facility.

ILAQH is a Collaborating Centre of the World Health Organization on Research and Training in the field of Air Quality and Health, since 2004.

2. ILAQH Researchers in 2013

Director

Professor Lidia Morawska, PhD (School of Chemistry, Physics & Mechanical Engineering)

Academic Staff

Professor Godwin Ayoko (School of Chemistry, Physics & Mechanical Engineering)

Professor Zoran Ristovski (School of Chemistry, Physics & Mechanical Engineering)

Dr Branka Miljevic (School of Chemistry, Physics & Mechanical Engineering)

Research Fellows / Associates

Dr Congrong He

Dr Graham Johnson

Dr Hao Wang

Dr Mandana Mazaheri

Dr Rohan Jayaratne

Dr Sam Clifford

Research Fellowships

Dr Heidi Salonen

Dr Nurun Nabi

Associated QUT Academic Staff

A/Professor Flavia Huygens (School of Biomedical Sciences)

Professor Kerrie Mengersen (School of Mathematical Sciences)

Adjunct A/Professor Megan Hargreaves (School of Biomedical Sciences)

Adjunct A/Professor Riaz Akber (School of Chemistry, Physics and Mechanical Engineering)

A/Professor Richard Brown (School of Chemistry, Physics and Mechanical Engineering)

A/Professor Rosemary Kennedy (School of Design Office, Architecture)

Dr Samantha Low Choy (School of Mathematical Sciences)

Professor Shilu Tong (School of Public Health and Social Work)

Dr Thor Bostrom (School of Chemistry, Physics and Mechanical Engineering)

Professor Steven Bottle (School of Chemistry, Physics and Mechanical Engineering)

Associated Academic Adjunct Staff

Adjunct Prof Giorgio Buonanno (University of Cassino, Italy)

Adjunct Prof Tunga Salthammer (Fraunhofer WKI, Germany)

Adjunct Prof Werner Hoffman (University of Salzburg, Austria)

Associated Academic Staff Other Universities

Dr David Katoshevski (Ben Gurion University, Israel)

Prof Erik Uhde (Fraunhofer WKI, Germany)

A/Professor Hai Guo (Hong Kong Polytechnic University, Hong Kong)

Dr Marcelo Pereira (University of São Paulo, Brazil)

Prof Markku Kulmala (University of Helsinki Finland)

A/Prof Richard De Dear (University of Sydney, Australia)

Prof Urs Baltensperger (Paul Scherer Institute, Switzerland)

Dr Rob Modini (SCRIPS Institute)

Dr Nicholas Meyer (Paul Scherer Institute, Switzerland)

Postgraduate & Research Co-ordinator

Mrs Rachael Appleby

Ms Chantal Labbe

Doctoral Students

Alamsyah Juwono (Supervisor: Lidia Morawska)

Ali Pourkhesalian (Supervisor: Zoran Ristovski)

Andjelija Milic (Supervisor: Zoran Ristovski)

Colette King (Supervisor: Megan Hargreaves)

Ehsan Faghihi (Supervisor: Lidia Morawska)

Farhad Salimi (Supervisor: Lidia Morawska)

Farzaneh Hedayat (Supervisor: Zoran Ristovski)

Jana Adamovska (Supervisor: Zoran Ristovski)

Jayan Karunasinghe (Supervisor: Lidia Morawska)

Lingli Guo (Supervisor: Lidia Morawska)

Marc Mallet (Supervisor: Zoran Ristovski)

Md Mahmudur Rahman (Supervisor: Lidia Morawska)

Megat Mokhtar (Supervisor: Lidia Morawska)

Mostafizur Rahman (Supervisor: Zoran Ristovski)

Nitika Mishra (Supervisor: Lidia Morawska)

Peter McGarry (Supervisor: Lidia Morawska)

Rachel Thomson (Supervisor: Megan Hargreaves)

Rusdin Laiman (Supervisor: Lidia Morawska)

Tenzin Wangchuk (Supervisor: Lidia Morawska)

Doctoral Students (enrolled in other QUT Schools and other Universities)

Madhumita Iyengar (Urban Development, Supervisor: Luis Ferreira)

Meisam Babaie (Engineering, Supervisor: Richard Brown)

Md Animul Islam (Engineering, Supervisor: Richard Brown)

Md Jahirul Islam (Engineering, Supervisor: Richard Brown)

Sarah Lawson (CSIRO, Supervisor: Zoran Ristovski)

Timothy Bodisco (Engineering Systems, Supervisor: Zoran Ristovski)

Masters Students

Jeremy Stamkos (Supervisor: Lidia Morawska)

Luke Cravigan (Supervisor: Zoran Ristovski)

Praveen Vijaysegaran (Supervisor: Lidia Morawska)

Soon-Che Chan (Supervisor: Godwin Ayoko)

Post Graduate Completions

Leigh Crilley (Supervisor: Godwin Ayoko, Co-Supervisor: Lidia Morawska)

Sam Clifford (Supervisor: Lidia Morawska)

Svetlana Stevanovic (Supervisor: Zoran Ristovski)

Tom Cole-Hunter (Supervisor: Lidia Morawska)

Tran Ngoc Quang (Supervisor: Lidia Morawska)

3. Awards and Achievements

- In January 2013: Chao, C., Wan, M.P., Morawska, L., Johnson, G.R.R., Ristovski, Z.D.D., Hargreaves, M., Mengersen, K., Corbett, S., Li, Y., Xie, X. and Katoshevski, D. Characterization of expiration air jets and droplet size distributions immediately at the mouth opening. *Journal of Aerosol Science*, 40: 122 – 133, 2009. **One of JAS' most cited journal articles since 2008, with the majority of citations in 2011-2012 – 21 times in 2011 and 17 times in 2012.**
- In March 2013: Buonanno, G., Morawska, L., Stabile, L. and Viola, A. Exposure to particle number, surface area and PM concentrations in pizzerias. *Atmospheric Environment*, 44: 3963-3969, 2010. **Top-50 most cited articles" published in *Atmospheric Environment* for 2010-2011.**
- In April 2013: PhD student **Nick Surawski** was awarded the **2012 Outstanding Doctoral Thesis Award**. Nick has done an exceptional job during his PhD. His thesis consisted of 7 papers out of which he was the first author on 5 (4 of those were published in the top journal in our field - *Environmental Science and Technology*).
- In May 2013: PhD student **Quang Tran** was the recipient of the **Physics Higher Degree Research Student Publication Prize for the 2012** academic year in the faculty (SEF), awarded to the Physics HDR student with the **Best First Author Publication record**.
- In June 2013: Masters student Praveen Vijaysegaran, won the *Don Tuffley Award for Best Registrar Paper* award titled **Space Suits – An Unrecognised source of Infection?** presented at the *Australian Orthopaedic Association Queensland Branch Annual Scientific Meeting 2013* (22-23 June 2013).
- In August 2013: article Veillette, M., Knibbs, L.D., Pelletier, A., Charlebois, R., Lecours, P.B., He, C., Morawska, L. and Duchaine, C. The microbial content of vacuum cleaner bag dust and emitted bioaerosols: Implications for human exposures indoors. *Applied and Environmental Microbiology*, **Accepted 2 August 2013, In Press**. has been selected by the editors of Applied and Environmental Microbiology for inclusion in "**Spotlight**", a feature in the Journal highlighting research articles in the upcoming issue that have been deemed of significant interest. This section follows the table of contents and includes short descriptions of four to six especially meritorious articles.

4. Peer Reviewed Publications

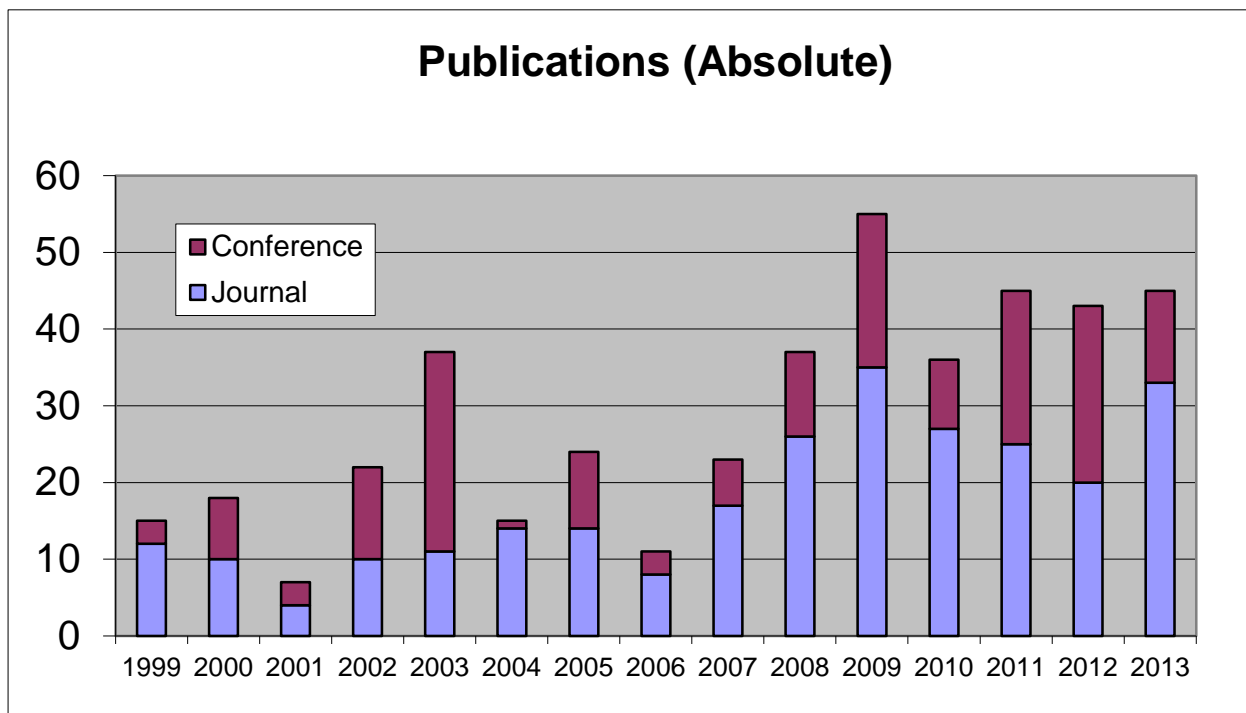


Figure 1. ILAQH Refereed Publications from 1998 – 2013.

5. Competitive Grants (Granted and Applied)

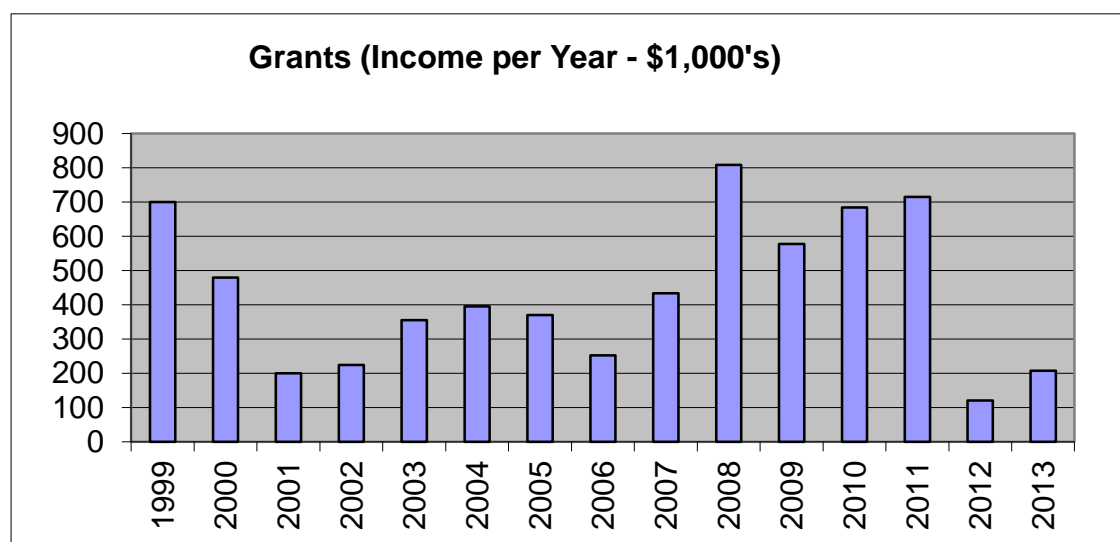


Figure 2. ILAQH Grant Income Distribution per Year (1999-2013)

GRANTED

Grant Title: NHMRC Centre of Air quality and health Research and evaluation (CAR) Seed Funding

Project Title: Estimating the Australian burden of disease due to air pollution

Chief Investigators: Lidia Morawska, Luke Knibbs, Adrian Barnett, Sam Clifford

Awarded: \$19,993

Grant Title: NHMRC Centre of Air quality and health Research and evaluation (CAR) Postdoctoral Fellowship

Project Title: CAR Postdoctoral Fellowship

Chief Investigators: Sam Clifford

Awarded: \$52,418

Grant Title: IHBI Collaborative Research Development

Project Title: How transmissible is influenza by the airborne route?

Chief Investigators: Graham Johnson, Ian Mackay, Scott Bell, Lidia Morawska, Congrong He

Requested: \$29,922

Grant Title: IHBI Collaborative Research Development

Project Title: Airborne Infection Mechanisms in Paediatric Intensive Care and High Dependency Units – A Pilot Study

Chief Investigators: Lidia Morawska, Congrong He, Graham Johnson, Claire Wainwright, Ian Mackay, Scott Bell, Mark Coulthard, Luke Knibbs, Timothy Kidd

Requested: \$29,968

Grant Title: IHBI Collaborative Research Development

Project Title: Comparative risk assessment analysis of personal exposure to ultrafine particles (UFP) over four continents

Chief Investigators: Mandana Mazaheri, Sam Clifford, Lidia Morawska, Giorgio Buonanno

Requested: \$29,000

Grant Title: ATN-DAAD

Project Title: Children exposure to airborne nanoparticles at school: application of Multivariate and Bayesian statistics towards assessment of spatial and temporal trends, and exposure mitigation.

Chief Investigators: Lidia Morawska, Mandana Mazaheri, Sam Clifford, Tunga Salthammer, Erik Uhde, Tobias Schripp

Requested: \$24,600

Grant Title: QUT Early Career Academic Recruitment and Development (ECARD) Grant

Chief Investigators: Branka Miljevic

Requested: \$15,000

Grant Title: QUT Vice Chancellor's Travel Grant

Chief Investigators: Branka Miljevic

Requested: \$7,000

6. New Consultancy Research Projects Commenced

None.

7. Collaboration with WHO

Lidia Morawska

- Member of the Development Group for the WHO's Housing and Health Guidelines, which took place in Washington, D.C., USA from 9-11 April 2013.
- Took part in revising the draft of document for EC-WHO REVIHAAP Project at the end of 2012 and beginning of 2013.
- Part of the WHO IAQ Guidelines chapter revisions in April-June 2013.
- Part of the WHO IAQ Guidelines: Household Fuel Combustion chapter revisions in June 2013.
- Part of the WHO Position Papers (IAQ and Ventilation) revisions in June-July 2013.

8. Conference Presentations

Lidia Morawska

Invited Plenary Presentation at the **10th Annual Air Quality and Health Workshop on Ultrafine Particles**, Sheraton Vancouver Wall Centre Hotel, Vancouver, B.C., Canada, 20th February 2013. Title: *Ultrafine particles: Emission Sources and Ambient Levels*.

Invited Plenary Presentation at the **Coupling of Modeling and Experiment for Dynamic Processes in Fine Particle Technology (CME-FPT) Sino-German Workshop**, China Jiliang University, Hangzhou, China, 3-6th April 2013. Title: *The relationship between indoor and outdoor airborne particles in the residential environment*.

Invited Plenary Speaker at the **3rd Annual Basic Science International Conference 2013 (BaSIC2013)**, Brawijaya University, Malang, Indonesia, 16-17th April 2013. Title: *Emissions to the Air: from Multidisciplinary Science to Applications*.

Invited Plenary Speaker at the **European Union's Advanced Training Course ATC1 Techniques for Monitoring air pollutants including aerosols indoors/outdoors for the Human Exposure to Aerosol Contaminants in Modern Microenvironments (HEXACOMM) Project**, Institute of Environmental Assessment and Water Research (IDAEA), Barcelona, Spain, 15-16th July 2013. Two presentations, titled: *Indoor Aerosol and Urban Aerosol*.

Invited Plenary Speaker at the **European Aerosol Conference 2013 (EAC2013)**, Clarion Congress Hotel, Prague, Czech Republic, 1-6th September 2013. Title: *The Dynamics of Indoor Aerosol: what is important, where, when and why?*

Invited Plenary Speaker at the **8th Asian Aerosol Conference 2013 (AAC2013)**, Australia Technology Park, Sydney, NSW, 2-5 December 2013. Title: *Urban Air Pollution: trends and challenges in Asia*.

Invited Plenary Speaker at the **Australian Institute of Occupational Hygienists 2013 (AIOH2013)** conference, Hilton Hotel, Sydney, NSW, 2-4 December 2013. Title: *Approaches to Evaluation of Nano Exposures*.

Zoran Ristovski

Invited Plenary Speaker at the **9th Asia-Pacific Conference on Combustion**, Gyeongju, Korea 19-22 May 2013. Title: *Particle Emissions from Diesel Engines - Looking beyond Carbon Soot Emissions*.

Invited Plenary Speaker at the **Australian & New Zealand Society of Occupational Medicine, QLD Branch Annual meeting**, Brisbane, Australia, August 2013. Title: *Understanding Diesel Particle Emissions: The Health Aspects of DPM*.

Invited Plenary Speaker at the **4th International WeBIOPATR Workshop & Conference**, Belgrade, Serbia, 2 October 2013. Title: *Particle Emissions from Diesel Engines - Looking beyond Carbon Soot Emissions*.

Godwin Ayoko

Presentation at the **Clean Air Society of Australia and New Zealand Conference**, 7-11 September 2013, Sydney, Australia. Title: *Multivariate analysis of airborne pollutants at a site located inside a high school.*

Presentation at the **Clean Air Society of Australia and New Zealand Conference**, 7-11 September 2013, Sydney, Australia. Title: *Multi-criteria ranking and source identification of Gaseous species at an urban site in Brisbane, Australia.*

Presentation at the **European Aerosol Conference 2013** in Prague, Czech Republic, 1-6 September, 2013. Title: *Elemental composition and potential toxicity of airborne particles at some urban schools.*

Presentation at the **European Aerosol Conference 2013** in Prague, Czech Republic, 1-6 September, 2013. Title: *Multi-criteria ranking and source apportionment of airborne particles.*

Branka Miljevic

Presentation at the **Air Protection 2013 Conference** in Sibenik, Croatia, September 2013. Title: *The role of organic fraction in the toxicity of combustion-generated particulate matter.*

Presentation at the **4th WeBIOPATR Workshop & Conference** in Belgrade, Serbia, October 2013. Title: *To Sonicate or not to sonicate: The influence of sonication on chemical composition of particulate matter.*

Congrong He

Presentation at the **European Aerosol Conference 2013** in Prague, Czech Republic, 1-6 September, 2013. Title: *Spatial variation of air pollutants in multilevel office buildings.*

Mandana Mazaheri

Presentation at the **European Aerosol Conference 2013** in Prague, Czech Republic, 1-6 September, 2013. Title: *Alveolar dose of ultrafine particles for children in urban environments.*

9. Presentations - Other

Lidia Morawska

- *Managing Feedback* (within Research Student Centre Seminar: Exam Process/Write up Scholarship) – Be informed IHBI, Brisbane, 6 June 2013.
- *Global Burden of Disease and Secondary Organic Aerosols*, – DISITIA, Brisbane 26 June 2013.

Mandana Mazaheri

- *Ultrafine Particles from Traffic Emissions and Children's Health - Personal Exposure Assessment* – Invited talk at the Department of Civil and Mechanical Engineering, University of Cassino and Southern Lazio, Italy, 20 September 2013.

Student – Peter McGarry

- *Determining concentration of nanomaterials in air: techniques and sampling protocols* – Working Party on Manufactured Nanomaterials (WPMN meeting).

10. Activities – Other

Lidia Morawska

- Participated and gave evidence at the **Senate Enquiry into the impacts on health of air quality in Australia**, in Brisbane on the 11 June 2013.
- Reviewed a grant proposal for an international granting body, the **Engineering and Physical Sciences Research Council (EPSRC), UK** in April – March 2013.
- Reviewed a grant proposal for an international granting body, the **Qatar National Research Fund (QNRF)**, for the 6th Cycle of our flagship program, the **National Priorities Research Program (NPRP)**, USA in February – March 2013.
- Reviewed abstracts for the **8th Asian Aerosol Conference 2013**, conference held in Sydney from the 2-5 December 2013.
- Appointed Coordinator of the new established **Task Group TG86 on Building Healthy Cities**. The Group is to stimulate and facilitate international corporation on research for building healthy cities, October 2013.
- **Co-Chair of the Scientific Steering Committee (SSC)** for the 8th Asian Aerosol Conference 2013 (AAC2013), Australia Technology Park, Sydney, NSW, 2-5 December 2013.
- **NHMRC Centre of Air quality and health Research and evaluation (CAR) Investigator's Meeting**, Woolcock Institute of Medical Research, 31 May 2013, Sydney, NSW.
- New member for the **ARC College of Experts**. Attended Induction on Friday, 8 November 2013 in Canberra, ACT.

Godwin Ayoko

- Reviewed abstracts and full papers for the **Clean Air Society of Australia and New Zealand Conference**, 7-11 September 2013, Sydney, Australia.

Branka Miljevic

- Appointed an ECARD Lecturing position in the School of Chemistry, Physics and Mechanical Engineering, Science and Engineering Faculty, 7 March 2013.

11. Media Appearances

Lidia Morawska

Many media appearances / interviews, for example:

- 4ZZZ Community Radio news and current affairs program, Brisbane Line (on the inquiry into the impacts on health of air quality in Australia) on June 12, 2013.
- 2UE's George and Paul Program, (How Vacuuming can aggravate your allergies), on 6 October, 2013.

ILAQH

- QUT News published our story titled with *Clearing the air on changing pollution risks* on 11 June 2013 (<http://www.qut.edu.au/about/news/news?news-id=59407>)

12. Visitors

- Dr Antti Rosettedt, Visiting Researcher, Aerosols Physics Group, Tampere University of Technology, Finland, April to June 2013.
Visiting Research Fellow
- Mr Thomas Clayeux, L'École Nationale Supérieure des Techniques Industrielles et des Mines d'Albi, France. 27 May 2013 to 23 August 2013.
Visiting Internship (Student)
- Prof Nurun Nabi, RUET, Bangladesh. May 2013 – May 2015.
Visiting Research Fellow
- Ms Natascha Savic, Karlsruhe University of Technology in Karlsruhe, Germany. 10 October 2013 to 10 October 2014.
Visiting Internship (Student)
- Mr Nassib Jabbour, QUT, 20 November 2013 – 17 February 2014.
VRES Student
- Mr Joel Alroe, QUT, 20 November 2013 – 17 February 2014.
VRES Student
- Mr Cassey Roff, QUT, 20 November 2013 – 17 February 2014.
VRES Student
- Adjunct Professor Tunga Salthammer, Fraunhofer Wilhelm-Klauditz-Institute (WKI), Germany, 28 November – 12 December 2013.
- Prof Hai Guo, Hong Kong Polytechnic University, 6-8 December 2013.
- Dr Xavier Querol, Institute of Environmental Assessment and Water Research (IDÆA), Consejo Superior de Investigaciones Científicas (CSIC), 6-8 December 2013.
- Dr Andres Alastuey, Institute of Environmental Assessment and Water Research (IDÆA), Consejo Superior de Investigaciones Científicas (CSIC), 6-8 December 2013.