



International Laboratory for Air Quality and Health

WHO Collaborating Centre

ANNUAL REPORT 2012

**INTERNATIONAL LABORATORY FOR AIR
QUALITY and HEALTH (ILAQH)
WORLD HEALTH ORGANISATION
COLLABORATING CENTRE FOR AIR QUALITY
AND HEALTH**

1. Introduction

The International Laboratory for Air Quality and Health (ILAQH) is part of the Institute for Health and Biomedical Innovation (IHBI) 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; radioactivity 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 2012

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)

Research Associates

Dr Branka Miljevic

Dr Congrong He

Dr Graham Johnson

Dr Luke Knibbs (until October 2012)

Dr Mandana Mazaheri

Dr Rohan Jayaratne

Dr Hao Wang

Associated QUT Academic Staff

A/Professor Flavia Huygens (Biomedical Sciences)

Professor Kerrie Mengersen (School of Mathematical Sciences)

Adjunct A/Professor Megan Hargreaves (Biomedical Sciences)

Adjunct A/Professor Riaz Akber (Nanotechnology & Molecular Science)

A/Professor Richard Brown (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 (Science & Technology)

Professor Steven Bottle (Center for FRCB)

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)

Dr 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 (enrolled in Discipline of Physics)

Adrian Friend (Supervisor: Godwin Ayoko)
Alamsyah Juwono (Supervisor: Lidia Morawska)
Ali Pourkhesalian (Supervisor: Zoran Ristovski)
Colette King (Supervisor: Megan Hargreaves)
Ehsan Faghihi (Supervisor: Lidia Morawska)
Farhad Salimi (Supervisor: Lidia Morawska)
Jayan Karunasinghe (Supervisor: Lidia Morawska)
Leigh Crilley (Supervisor: Godwin Ayoko)
Lingli Guo (Supervisor: Lidia Morawska)
Madhumita Iyengar (Co-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)
Sam Clifford (Supervisor: Lidia Morawska)
Svetlana Stevanovic (Supervisor: Zoran Ristovski)
Tenzin Wangchuk (Supervisor: Lidia Morawska)
Tom Cole-Hunter (Supervisor: Lidia Morawska)
Tran Ngoc Quang (Supervisor: Lidia Morawska)

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

J. Gunawardena (Urban Development, Co-Supervisor: Godwin Ayoko)
Madhumita Iyengar (Urban Development, Supervisor: Luis Ferreira)
Meisam Babaie (Engineering, Co-Supervisor: Zoran Ristovski)
Md Animul Islam (Engineering, Co-Supervisor: Zoran Ristovski)
Md Jahirul Islam (Engineering, Co-Supervisor: Zoran Ristovski)
S. Mahbub (Urban Development, Co-Supervisor: Godwin Ayoko)
Timothy Bodisco (Engineering Systems, Co-Supervisor: Zoran Ristovski)

Honours Students

Mr Marc Mallet (Physics, Supervisor: Zoran Ristovski)

Masters Students

Ms Soon-Che Chan (Supervisor: Godwin Ayoko)
Mr Luke Cravigan (Physics, Supervisor: Zoran Ristovski)
Praveen Vijaysegaran (Engineering Systems, Co-Supervisor: Lidia Morawska)

Post Graduate Completions

Hing Cho Cheung (Supervisor: Lidia Morawska)

3. Awards and Achievements

- Knibbs, L., He, C., Duchaine, C. and **Morawska, L.**, Vacuum Cleaner Emissions as a Source of Indoor Exposure to Airborne Particles and Bacteria, *Environmental Science and Technology*, 46: 534-542, 2011. **Ranked in the most read articles for the first quarter of 2012 in ES&T.**

- *Mejía, J., Low Choy, S., Mengersen, K. and **Morawska, L.** Methodology for assessing exposure and impacts of air pollutants in school children: data collection, analysis and health effects - a literature review. *Atmospheric Environment*, 45: 813-823, 2011. **Ranked in the top 25 most read articles for Elsevier's AE for the year 2011.**

- Chao, C., Wan, M.P., **Morawska, L.**, Johnson, G.R., Ristovski, Z.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. **Ranked in the top 25 most cited papers in the Journal from 2008-2012.**

4. Peer Reviewed Publications

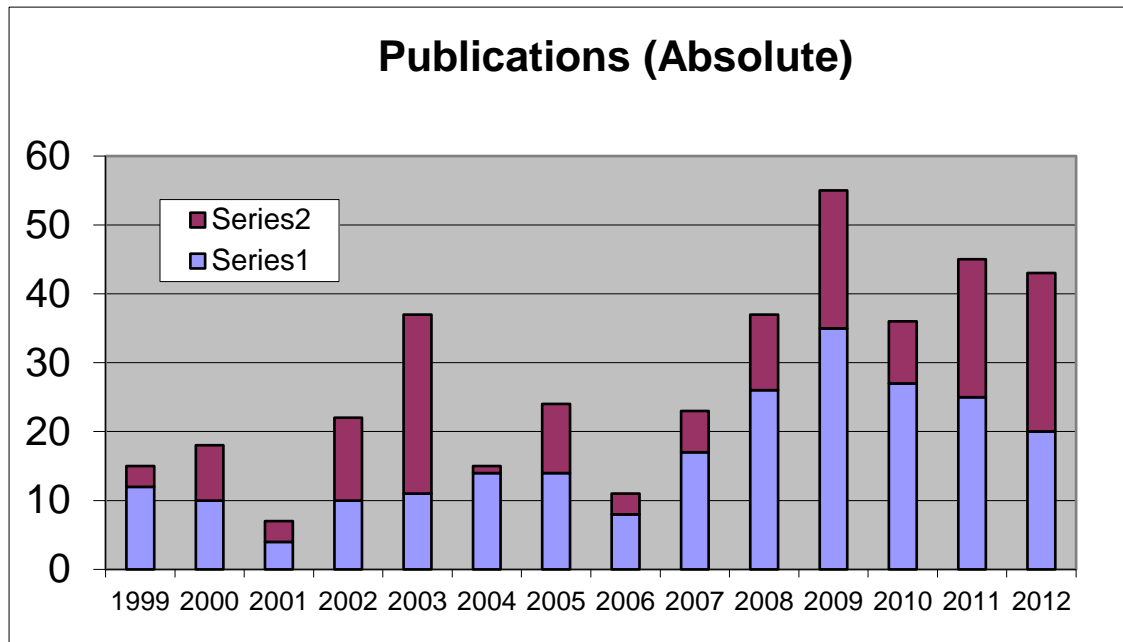


Figure 1. ILAQH Refereed Publications from 1999 – 2012.

5. Competitive Grants (Granted and Applied)

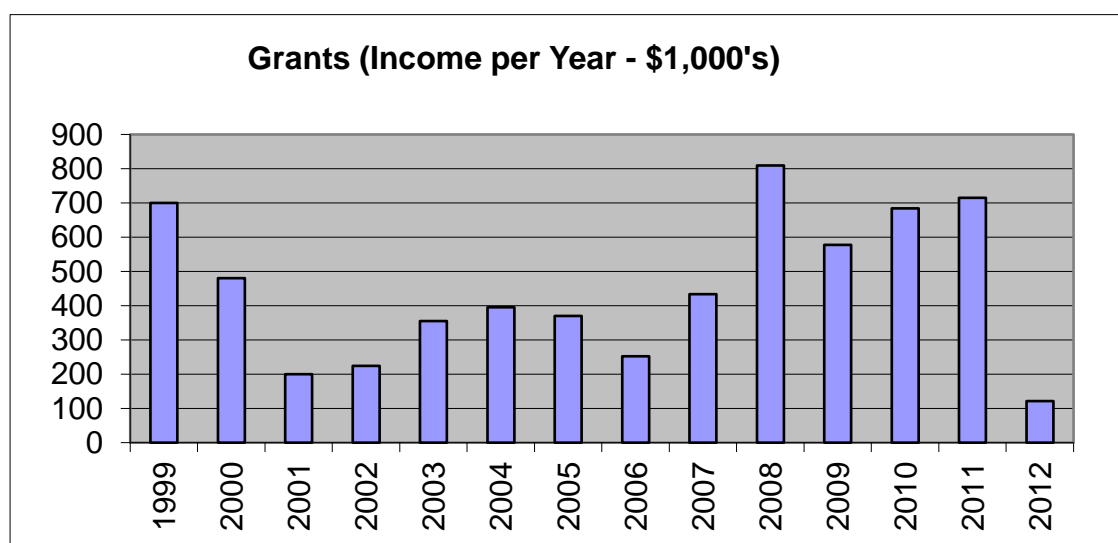


Figure 2. ILAQH Grant Income Distribution per Year (1999-2012)

Granted

Project Title: Spatial modelling of ambient ultrafine particle number concentrations with Land-Use Regression (LUR)

Funded By: NHMRC Centres for Research Excellence, Centre for Air pollution, energy and health Research (CAR) Seed Funding Grant (2012-2013)

Awarded: \$20,000

Chief Investigators: Lidia Morawska

Applied (Not Successful)

Grant Title: ATN-DAAD

Project Title: Nanometrology of Airborne Engineered Ultrafine and Nano Particles for Human Exposure Assessment

Chief Investigators: Lidia Morawska, Hao Wang, Congrong He, Tunga Salthammer, Erik Uhde, Tobias Schripp

Requested: \$23,600

Grant Title: ARC Discovery

Project Title: Urbanisation and Atmospheric Secondary Organic Matter: Role of Anthropogenic Processes on its Formation and Consequences on Human Exposure and Health

Chief Investigators: Lidia Morawska, Zoran Ristovski, Godwin Ayoko, Luke Knibbs, Rohan Jayaratne, Giorgio Buonanno

Requested: \$714,111

Grant Title: AusAID ADRAS

Project Title: Exposure to household fuel combustion in Bhutan, its drivers and effective interventions to minimise it: towards global improvement of indoor air quality and its impact on health

Chief Investigators: Lidia Morawska, Kerrie Mengersen, Tenzin Wangchuk, Marzenna Dudzinska, Nigel Bruce

Requested: \$1,127,042

6. New Consultancy Research Projects Commenced

Project Title: Investigation of Air Quality at Lithgow Correctional Centre

Funded By: Corrective Services New South Wales (OCS)

Awarded: \$58,128.51

Chief Investigators: Lidia Morawska

Project Title: Investigation of Indoor and Outdoor Air Quality (Particulate Matter) at Edinglassie Stud

Funded By: Mt Arthur Coal Pty Ltd, BHP Billiton

Awarded: \$62,882

Chief Investigators: Lidia Morawska, Congrong He

7. Collaboration with WHO

- Member of the Development Group for the WHO's Indoor Air Quality Guidelines for Household Fuel Combustion, which took place in Delhi, India from 24-26 April 2012.
- WHO Review and Meeting: Evidence on health aspects of air pollution to review EU policies – REVIHAAP, which took place in Bonn, Germany from 21-23 August 2012.

8. Conference Presentations

Invited Keynote Speaker at the Workplace and Indoor Aerosols Conference, Lund University, Sweden, 19-20 April 2012

- Exposure to airborne particles in indoor workplace environment
Morawska, L

9. Presentations - Other

Lidia Morawska

- “Indoor air quality in Brisbane homes after the January 2011 flood” – Be informed IHBI, Brisbane, March 2012.
- “Becoming a researcher” – be informed – Be informed IHBI, Brisbane, March 2012.

10. Activities – Other

Lidia Morawska

- **President**, 10th International Healthy Buildings 2012 conference held in Brisbane, 9th-12th July 2012. (This conference involved the whole group, there would have been much more activities.)

11. Media Appearances

Lidia Morawska

- Channel 7 Interview (Healthy Buildings 2012)
- Brisbane Times Newspaper, June 2012 (Healthy Buildings 2012)
- Sunday Mail Newspaper, June 2012 (Healthy Buildings 2012)
- Triple M Radio, June 2012 (Healthy Buildings 2012)
- ABC Coast FM, June 2012 (Healthy Buildings 2012)
- Numerous other media appearances in relation to Healthy Buildings 2012
- The Courier Mail, 12 December 2012 (Title: *Top coal expert has fast fix for rail corridor coal dust problem*)

ILAQH

- PhD students Sam Clifford, Leigh Crilley and Lingli Guo appeared on Channel Ten's *Dirty Science* (29 March 2012), in a story about the 2009 Brisbane dust storm.

12. Visitors

- Professor Greg Evans, Director of the Southern Ontario Centre for Atmospheric Aerosol Research, University of Toronto, 6 February 2012
Visiting Academic - The Impacts of Aerosol on Air Quality and Health
- A/Professor James McGlothlin, Graduate Program Director for Occupational and Environmental Health Sciences, Purdue University, February – June 2012
Visiting Academic – Video Exposure Modelling
- Adjunct Professor Tunga Salthammer, Fraunhofer WKI, Germany, July 2012
Visiting Academic
- Professor Erik Uhde, Fraunhofer WKI, Germany, July 2012
Visiting Academic
- Adjunct Professor Giorgio Buonanno, University of Cassino, Italy, July 2012
Visiting Academic
- Mr Sofiane Elkhoul, L'École Nationale Supérieure des Techniques Industrielles et des Mines d'Albi, France. 21 May 2012 to 17 August 2012
Visiting Internship (Student) – Investigation of indoor environment comfort and building energy usage in office buildings
- Mr Pierre Marabese, Polytech' Clermont-Ferrand, Graduate School of Engineering within the Blaise Pascal University. 21 May 2012 to 3 August 2012
Visiting Internship (Student) - Eliminating water condensation during ambient aerosol sampling with minimal particle loss.
- Mr Benjamin Coubetergues, Polytech' Clermont-Ferrand, Graduate School of Engineering within the Blaise Pascal University. 21 May 2012 to 3 August 2012
Visiting Internship (Student) - Optimisation of indoor air quality, thermal comfort and energy usage within buildings located in busy transit-oriented urban developments