



**International Laboratory
for Air Quality
and Health**

WHO Collaborating Centre

2017 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 2017

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)

Dr Graham Johnson (School of Chemistry, Physics & Mechanical Engineering)

Research Fellows / Associates

Dr Congrong He

Dr Phong Thai

Dr Rohan Jayaratne

Dr Svetlana Stevanovic

Research Fellowships

Dr. Wenjie Liu

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)

Postgraduate & Research Co-ordinator

Ms Chantal Labbe

Doctoral Students

Akwasi Bonsu Asumadu-Sakyi (Supervisor: Lidia Morawska)

Alma de Jesus (Supervisor: Lidia Morawska)

Buddhi Pushpawela (Supervisor: Rohan Jayaratne)

Chiemiwo Godday Osuagwu (Supervisor: Branka Miljevic)

David Burns (Supervisor: Zoran Ristovski)

Joel Alroe (Supervisor: Zoran Ristovski)

Khanh Long Tran (Supervisor: Lidia Morawska)

Luke Cravigan (Supervisor: Zoran Ristovski)

Mawutorli Nyarku (Supervisor: Lidia Morawska)

Meng Xiu (Supervisor: Lidia Morawska)

Mohammad Jafari (Supervisor: Zoran Ristovski)

Nassib Jabbour (Supervisor: Graham Johnson)

Reece Brown (Supervisor: Zoran Ristovski)

Sadegh Niazi (Supervisor: Graham Johnson)

Xiaoting Liu (Supervisor: Lidia Morawska)

Yi Guo (Supervisor: Zoran Ristovski)

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

Farhad Hossein (Engineering, Supervisor: Richard Brown)

Meisam Babaie (Engineering, Supervisor: Richard Brown)

Md Animul Islam (Engineering, Supervisor: Richard Brown)

Md Jahirul Islam (Engineering, Supervisor: Richard Brown)

Md Saidul Islam (Engineering, Supervisor: Richard Brown)
Thuy Chu Van (Engineering, Supervisor: Richard Brown)

Masters Students

Bryce Christensen (Supervisor: Lidia Morawska)
Soon-Che Chan (Supervisor: Godwin Ayoko)

Graduate Certificate in Research

Samart Porncharoen (Supervisor: Lidia Morawska)

Honours Students

None.

Postgraduate Completions, PhD

Andjelija Milic (Supervisor: Zoran Ristovski)
Bijan Yeganeh (Supervisor: Lidia Morawska)
Marc Mallet (Supervisor: Branka Miljevic)
Md Mahmudur Rahman (Supervisor: Lidia Morawska)
Tommaso Villa (Supervisor: Lidia Morawska)
Sarah Lawson (Supervisor: Zoran Ristovski)

Postgraduate Completions, Masters

None.

Administrative Assistant

Ms Chantal Labbe

3. Major Developments

A collaborative research campaign titled, “**Study of air quality using a drone**”, to place at QUT from the 12–21st October 2017. Professor Kang-Ho Ahn from the Department of Mechanical Engineering, Hanyang University in the Republic of Korea, and two of his PhD students, Yong-Hee Park and Woo-Young Kim visited QUT to conduct the research project.

Professor Zoran Ristovski now has an invited Professor Position at the **East China University of Science and Technology**, in Shanghai, China!

The Clean Air Society of Australia and New Zealand (CASANZ), together with Queensland University of Technology presented a special training event: ***Application of Low Cost Sensors and Their Networks for Urban Air Quality Monitoring***. The training course was held on 19 October 2017, directly following the 23rd International Clean Air Conference in Brisbane, Australia, and among the presenters included members of the ACC-AQSM. This exciting course pairs the principles of low cost sensor monitoring with practical sessions on building and operating low cost sensor networks for air quality applications.

Professor Morawska is currently leading efforts of an international, multi-disciplinary centre of research, the ‘**Australia - China Centre for Air Quality Science and Management**’ (ACC-AQSM). The aim of the ACC-AQSM is to provide a platform for joint research to further scientific understanding of the multidimensional problem of air pollution and its impact on human health and the environment, to provide technological and innovative solutions to the problem, and to provide input into national policies and thus enabling informed and efficient regularly management and control. **The Annual Meeting of the ACC-AQSM was held in Beijing from the 4-5 November 2017.**

4. Awards and Achievements



Professor Lidia Morawska received The American Association for Aerosol Research (AAAR) 2017 David Sinclair Award.

Professor Lidia Morawska also received QUT Vice Chancellor's Performance Award 2017, "in recognition of a significant and superior contribution to the work of the university".

PhD student Tommaso Villa received the SEF High Achiever Award for the month of August 2017.

PhD student Tommaso Villa received the Best Poster presented at the 23rd International Clean Air and Environment Conference 2017, organized by the Clean Air Society for Australia and New Zealand (CASANZ), which was held in Brisbane this week (15-18 October)!



Dr. Tenzin Wangchuk, who completed his PhD under Professor Lidia Morawska's supervision in 2016, received the 2016 Executive Dean's Commendation for Doctoral Thesis Award.

PhD student Nassib Jabbour received 'Research Support Grant' for publishing in the journal Science from QUT for co-authoring the paper titled, *Emergence and spread of a human-transmissible multidrug-resistant nontuberculous mycobacterium*.

5. Peer Reviewed Publications

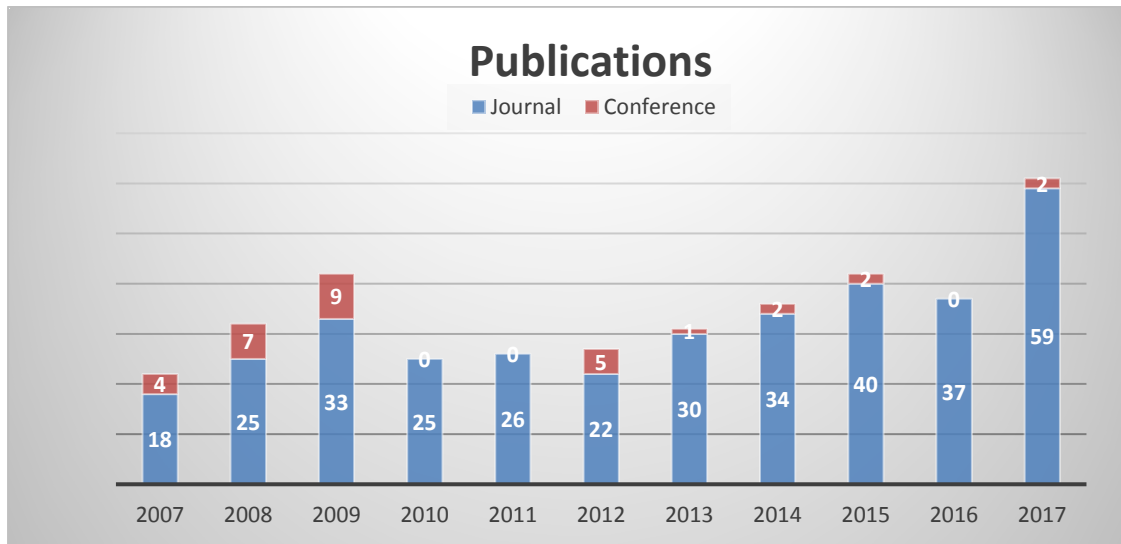


Figure 1. ILAQH Refereed Publications per Year (2007-2017)

6. Competitive Grants (Granted)

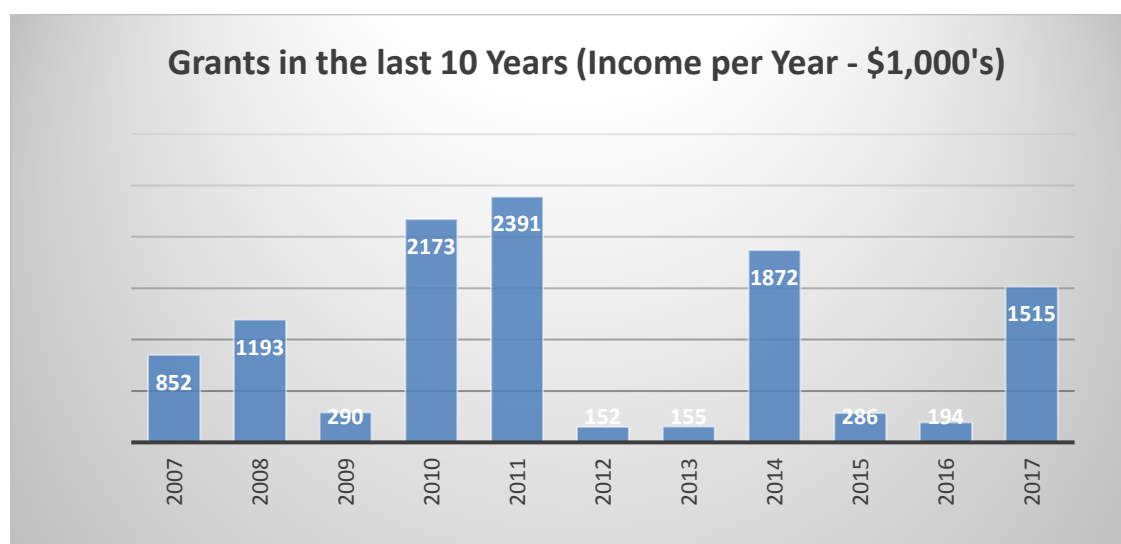


Figure 2. ILAQH Grant Income Distribution per Year (2007-2017)

Australian Competitive Grants (Awarded)

Project Scheme: QUT Engagement Innovations Grant (2017-2018)

Chief Investigators: Lidia Morawska, Matt Dunbabin, Dian Tjondronegoro, Rohan Jayaratne, Phong Thai

Awarded: \$25,530

Project Title: State-of-the-art air quality sensing network for the Gold Coast Commonwealth Games 2018: engaging the community and showcasing QUT as a global leader in innovative technologies

Project Scheme: IHBI Visiting Research Award (2017-2018)

Chief Investigators: Lidia Morawska, Prashant Kumar

Awarded: \$2,000

Recognition Awards:

Project Scheme: QUT Vice-Chancellor Award (2017)

Chief Investigator: Lidia Morawska

Awarded: \$6,000

Administered by external organisations (QUT Co-CI)

Project Scheme: NHMRC Centres for Research Excellence (2018-2020)

Chief Investigators: Guy Marks, Bin Jalaludin, Geoff Morgan, Christine Cowie, Yuming Guo, Martin Cope, Luke Knibbs, Lidia Morawska, Jane Heyworth, Andrea Hinwood

Awarded: \$1,041, 409

Project Title: Air pollution and mortality and morbidity in adult Australians (APMMA Study): a large population based cohort study (APP1142222)

Project Scheme: NHMRC Centres for Research Excellence (2018-2020)

Chief Investigators: Guy Marks, Bin Jalaludin, Geoff Morgan, Christine Cowie, Yuming Guo, Martin Cope, Luke Knibbs, Lidia Morawska, Jane Heyworth, Andrea Hinwood

Awarded: \$1,041, 409

Project Title: Air pollution and mortality and morbidity in adult Australians (APMMA Study): a large population based cohort study (APP1142222)

Project Scheme: Minerals Research Institute of Western Australia (MRIWA) (2017-2018)

Chief Investigators: S Black, B Mullins, Z Ristovski

Awarded: \$40,000 (QUT)

Project Title: A Study of Nano Diesel Particulate Matter (nDPM) Behaviour and Physico-chemical Changes in Underground Hard Rock Mines of Western Australia [external ref: M495]

Foreign Competitive Grants (Awarded)

Project Scheme: Federal Ministry for Environment, Nature Conservation, Building and Nuclear Safety (BMUB) (2017-2018)

Chief Investigators: Lidia Morawska and Tunga Salthammer

Awarded: \$100,000 EUR

Project Title: Migration of the web information platform www.iaq.ip into the Fraunhofer Web-Content-Management-System (CMS) and adaption of the content to the Fraunhofer-Corporate-Design – Enhancement of the web pages to enable presentation of the current issues related to the Indoor Environmental Quality

7. Other Public Sector / New Consultancy Research Projects Commenced

Project Scheme: Innovation Connection 2017-2018

Chief Investigators: R Brown, Z Ristovski, T Rainey, ...

Awarded: \$100,000

Project Title: Effect of variations in waste tyre feedstocks on tyre oil performance [external ref: ICG000077]

8. Collaboration with WHO

Lidia Morawska

- Attended by invitation as an expert on air pollution, to participate in the **3rd Meeting of the WHO Global Platform on Air Quality and Health**, which was held in Madrid, Spain, from the 7-9 March 2017.
- Attended by invitation as an expert on air pollution, to participate and co-chair a session at the '**Expert Consultation Meeting on Air Quality and Health in the Eastern Mediterranean Region**', held in Amman, Jordan, 24-25 May 2017. Professor Morawska has prepared material for the **Concept Note titled, 'What Individuals can do to minimize exposure to air pollution?; The role of Health Sector in Eastern Mediterranean Region in promoting air quality management intentions by other sectors'**. The work is continuing.
- Attended by invitation as a as an expert on air pollution, as a Keynote Speaker and Panel Discussion member at the **Health and the Environment Unit, WHO Regional Office for the Western Pacific (WHO WPRO)** meeting on '**Member States Consultation on Addressing Health Impact of Air Pollution**', Manila, Philippine, 23-25 October 2017, and was the lead person for PIC.
- Attended by invitation as a as an expert on air pollution, the **sixty-eighth session of the World Health Organization Regional Committee for the Western Pacific** held from 9 to 13 October 2017 in Brisbane, Australia.

9. Conference Presentations (Keynote/Plenary)

Lidia Morawska

Gave an invited plenary presentation at the '**2017 Alfred P. Sloan Workshop on Virus Transmission in Buildings**', Yale-NUS College, Singapore, 12-13 January 2017.

Presentation: *Viral aerosols and risk assessment*

UGPN Workshop at the University of Wollongong as part of a University Global Partnership Network seed-funding project called '**Next-Generation Environmental Sensing for Local To Global Scale Health Impact Assessment**', University of Wollongong, NSW, 11 April 2017. Presentation: *Developing and utilising advanced networks for air quality sensing and analyses*

Gave an invited plenary presentation at the '**Expert Consultation Meeting on Air Quality and Health in the Eastern Mediterranean Region**', Amman, Jordan, 24-25 May 2017. Presentation: *Interventions for minimizing adverse health impacts of air pollution*

Gave an invited lecture at the **School of Human Settlements and Civil Engineering of Xi'an Jiaotong University**, 25 May –1 June 2017. Lecture: *Urban air pollution*

Gave an invited plenary presentation at the '**Bioaerosol detection and health effects**' Conference, Peking University, Beijing, China, 28 June 2017. Presentation: *Bioaerosol detection and how will it help in infection spread control*

Gave an invited keynote presentation at the '**Bioaerosol Xiangshan Conference**', Beijing, China 29-30 June 2017. Presentation: *Air Pollution and Health Effects*

Gave an invited plenary presentation at the **WHO Special Session titled 'Healthy housing as a key determinant of sustainable development'** held at the '**Healthy Buildings 2017 Conference**', Lublin, Poland from the 2-5 July 2017. Presentation: *Housing characteristics and their impact on the exposure to airborne particulate matter*

Gave an invited plenary presentation at the '**Healthy Buildings 2017 Conference**', Lublin, Poland from the 2-5 July 2017. Presentation: *Healthy Buildings in Healthy Cities*

Gave an invited plenary presentation at the '**14th International Conference on Urban Health (ICUH) 2017**' pre-conference workshop, titled: "**Healthy-Polis: Harnessing opportunities for improving urban health and wellbeing through environmental sustainability**", Coimbra, Portugal, 25 September 2017. Presentation: *The emergence of low-cost sensor technologies: will they help to improve urban air quality?*

Gave an invited plenary presentation at the '**14th International Conference on Urban Health (ICUH) 2017**', Coimbra, Portugal, 26-29 September 2017. Presentation: *Environmental Health and Urban Sustainability*

Gave an invited plenary presentation at the '**Indoor Air Quality 2017 Forum in Trosa**', Sweden, 4 September 2017. Presentation: *The advancement of technologies and their impact on IAQ*

Gave an invited keynote presentation and Panel Discussion Member at the **Health and the Environment Unit, WHO Regional Office for the Western Pacific (WHO WPRO)** meeting on '**Member States Consultation on Addressing Health Impact of Air Pollution**', Manila, Philippine, 23-25 October 2017. Presentation: *Current policies and control actions of ambient air pollution management*

10. Presentations - Other

None to mention.

11. Activities – Other

Lidia Morawska

- Guest Editor for the Special Issue titled “Air Quality in China: Current and Emerging Challenges” for the *Science of the Total Environment* Journal.
- Guest Editor for the Special Issue titled: “Indoor and Workplace air quality” for the *Science of the Total Environment* Journal.
- Guest Editor for the Special Issue titled "Regional transport and transformation of air pollution in eastern China" for the *Atmospheric Chemistry and Physics* Journal.

12. Media Appearances

Lidia Morawska

Many media appearances / interviews, for example:

- ABC, Chanel 7, Brisbane Times, Sydney Sadio 2GB, on airborne disease, June 2017.
The link to the Media Release:
<https://www.qut.edu.au/news/news?news-id=118758>
- Think programs on health and sustainability on 2SER, 11 May 2017.
- Feature article for the Australian Financial Review on the health effects of air pollution, 21 November 2017.

13. Visitors

- Dr. Wenjie Li (Chongqing University of Science and Technology, hosted by QUT, 6 February – 31 December 2017)
- Professor Hai Guo, *Visiting Research Academic*, Hong Kong Polytechnic University, 6 April 2017
- Ms. Juliana Regis, *Visiting Research Doctoral Student*, Federal University of São Paulo, Brazil, 12 April – 31 March 2018
- Ms. Rabbaneh Roughani, *Visiting Research Doctoral Student*, University of Tehran, Tehran, Iran, 12 April – 31 March 2018
- Professor Giorgio Buonnano, *Visiting Research Academic*, University of Cassino, Italy, 18 – 30 June 2017.
- Mr. Sadegh Niazi Sadgeh, *Visiting Research Student*, 1 September – 31 December 2017
- Professor Junyu Zheng (School of Environment and Energy, South China University of Technology); Professor Xinming Wang and Associate Professor Yanli Zhang (Guangzhou Institute of Geochemistry, Chinese Academy of Sciences); Associate Dean and Professor Xuemei Wang, Professor Jun Zhao and Lecturer Shengzhen Zhou (School of Atmospheric Sciences, Sun Yat-sen University), 31 July – 4 August 2017
- Professor Kang-Ho Ahn and two of his PhD students, Yong-Hee Park and Woo-Young, from the Department of Mechanical Engineering, Hanyang University in the Republic of Korea, 12–21 October 2017
- Ms. Haoyu Jiang, *Visiting Research Student*, Guangzhou Institute of Geochemistry, 11 October 2017 to the 15 April 2018
- Professor Yan Cheng, *Visiting Research Academic*, Xi'an Jiaotong University, 25 October 2017 – 25 October 2018
- Professor Xavier Querol, *Visiting Research Academic*, Institute of Environmental Assessment and Water Research, Spanish Council for Scientific Research, 16-25 October 2017
- Professor Heidi Salonen, *Visiting Research Academic*, AALTO, Finland, 29 October 2017 – 11 December 2018
- Professor Tunga Salthammer, *Visiting Research Academic*, Fraunhofer WKI, Germany, 21 November – 9 December 2017
- Professor Xulong Wang, *Visiting Research Academic*, Chinese Academy of Sciences, 15 December 2017 – 14 June 2018