Australia-China Centre for Air Quality Science and Management

Annual Report

2017

1. Introduction

The ACC-AQSM was launched at the CRAESs in Beijing, in December 2014.

Our aim is to provide a platform for joint research to further understanding of the multi-dimensional problem of air pollution at all scales and its impact on human health and the environment, to provide technological and innovative solutions to the problem and continued effective monitoring of pollution sources, and to provide input into national policies that enable informed, efficient and regulated management and control.

The Centre operates as a virtual centre based at three offices, the: QUT (QUT), CRAES (CRAES), and Hong Kong University of Science and Technology (HKUST), and manage all research activities under the Centre banner established at each of the partner institutions. The Managing Offices are established to run the day to day activities of the Centre.

2. The Centre

Board

The Board will provide strategic advice to the Executive Committee on the full range of Centre activities and ensure that the Centre has clear objectives, and makes the most effective and efficient use of resources in order to achieve these objectives. The Board consists of two Chairs (the inaugural chairs in Australia: Prof. Ian Mackinnon, QUT; and in China, Professor Jiming Hao, Tsinghua University), a Vice-Chair (Professor Joseph Lee, HKUST). It also includes representatives from some of the partner institutions and relevant stakeholders.

Executive Committee

The Executive Committee consists of three Directors (the inaugural Directors in Australia: Professor Lidia Morawska, QUT; in China, Professor Fahe Chai, CRAES; in China HK, Prof. Christopher Chao, HKUST). The Deputy-Directors (or Executive Committee Members) will represent the partner institutions. The Executive Committee is established as the primary decision making forum for the collaborative Centre and maintains close contact with the Board between Board meetings in ways the Executive Committee considers appropriate, or the Board determines. The Executive Committee keeps the Board informed of important issues.

Member Organisations – China

- Chinese Research Academic of Environmental Science (CRAES)
- East China University of Science and Technology (ECUST)
- Fudan University (FDU)
- Hong Kong City University (HK CityU)
- Hong Kong Polytechnic University (HK PolyU)
- Hong Kong University (HKU)
- Hong Kong University of Science and Technology (HKUST)

- Peking University (PKU)
- Shanghai Research Academy of Environmental Sciences (SAES)
- Tsinghua University (TU)

Member Organisations – Australia

- CSIRO Oceans and Atmosphere (CSIRO)
- Curtin University (CU)
- QUT (QUT)
- University of New South Wales (UNSW)
- University of Sydney (USyd)

New Members

- None to mention.

Key Collaborating Organisations

Australia

- Department of Science, Information Technology, and Innovation (DSITI)

China

- Clean Air Asia
- Shanghai Environmental Monitoring Centre

Global

- Clean Air Asia Centre
- World Health Organisation, Geneva

Research Themes

- Theme 1: **Source Characterization and Emissions**
- Theme 2: **Pollution Sources, Dynamics, & Atmospheric Impacts (or Processes)**
- Theme 3: **Exposure, Health Effects & Wellbeing**
- Theme 4: **Airborne Infection Spread & Control**

Executive Committee / Research Leadership Teams

- Progress in organisation within the Teams:
  - Planning
  - Internal co-ordination
  - Training
  - Research funding
  - External collaboration
  - Communication
  - Implementation

3. Communication

News

- **25 January 2017:** Happy Chinese New Year – the year of the Rooster!
- **6 February 2017:** The Shanghai Cooking Emissions Campaign was carried out at the Tongji University from December 2016 to January 2017, led by Professor Zoran Ristovski and Dr. Svetlana Stevanovic from QUT, Associate Professor Lina Wang from the ECUST, Professor Jun Gao from the Tongji University, Professor Lin Wang from FDU, and Dr. Li Li and Dr. Hongli Wang from the SAES.
- **1 March 2017:** Science of the Total Environment Special Issue is complete!
- **10 March 2017:** OPPORTUNITY! Australia-APEC Women in Research Fellowship.
- **12 April 2017:** A joint PhD agreement has been signed between the Fudan University and the QUT!
- **27 April 2017:** Professor Hai Guo from HK PolyU visited QUT to continue discussions on the Centre's awarded joint Asian Universities Cluster (AUC) Center of Excellence in Civil Engineering project titled, *Impacts of Megacities on Regional Atmospheric Environment – A comparative study of emission, transformation and effects of urban pollution from Australia, Singapore, Shanghai, and Hong Kong.*

- **29 May 2017:** First announcement that the annual conference of our Centre will take place from 4-6th November in Beijing and will be hosted by the CRAES!
- **23 June 2017:** the *Science of the Total Environment (STOTEN) Special Issue: Air Quality in China: Current and Emerging Challenges* has now been published and is available online on the STOTEN website!
- **10 July 2017:** our recent article titled, "*Role of Chinese cooking emissions on ambient air quality and human health*" published in our *STOTEN Special Issue: Air Quality in China: Current and Emerging Challenges*, has been selected for inclusion in the China Elsevier Research Selection, and an e-newsletter for science journalists and reporters!
- **14 July 2017:** The Clean Air Society of Australia and New Zealand (CASANZ), together with QUT are pleased to present a special training event: *Application of Low Cost Sensors and Their Networks for Urban Air Quality Monitoring*, held on 19 October 2017.
- **21 July 2017:** The 600th Session of the Xiangshan Science Conference titled *Bioaerosols and Human Health, National Bio-security as well as Air Pollution* took place in Beijing!
- **14 August 2017**: The 3rd Annual Conference of the ACC-AQSM will be held in Beijing from the 4 – 5th November 2017, and will be hosted by the CRAES.
- **25 August 2017:** On 30th July 2017, a delegation from Guangzhou arrived at QUT in Brisbane, Australia for a workshop on air quality.

- **8 September 2017:** Annual Meeting update – Preliminary Program is now available!
- **18 September 2017:** The 2017 *Annual Conference of Atmospheric Environment* two-day conference to be held on the 8-9th December 2017 in Beijing!
- **25 September 2017:** Congratulations to the members of the ACC-AQSM on a successful Hong Kong Research Grants Council grant!
- **5 October 2017:** On the 26th June 2017, the Environmental Protection Department (EPD) of the Hong Kong Government together with the HK CityU hosted a low-cost sensor workshop to establish a joint platform for the work and also to bring any other colleagues working on this.
- **20 October 2017:** Annual Meeting update – updated version of the program is available. Call out for co-leaders for the sessions.
- **1 November 2017:** Annual Meeting update – Final Draft of the Program is now on the website!
- **15 November 2017:** Post Annual Meeting 2017 Update!
- **11 December 2017:** *5RAQM* was held in Guangzhou between 16 – 19th November
- **20 December 2017:** Merry Christmas!

Web

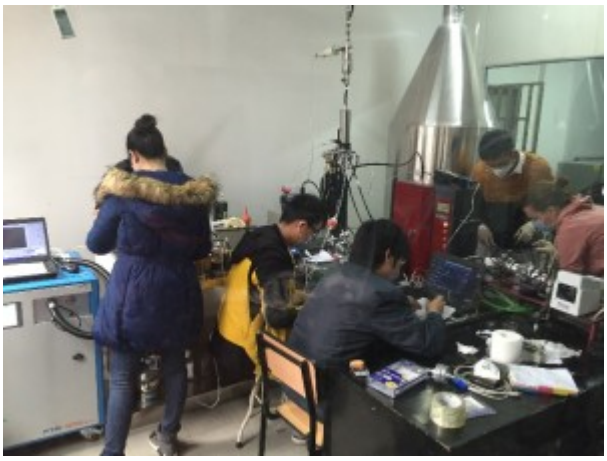
- The English and Chinese versions are live: http://www.accaqsm.org/

4. Current Research Projects & Campaigns

1. Low-Cost PM Sensors in Beijing and Brisbane, June 2016 – December 2018 (Ongoing). The Low-cost PM sensors in Beijing and Brisbane campaign was carried out in June 2016 – December 2016, by the QUT and CRAES. The studies included both laboratory and field investigations with two existing PM sensors and a new sensor that was not been tested before. The studies investigated the effects of type of aerosol, particle size, number concentration, temperature and relative humidity. A number of low-cost PM sensors were tested at CRAES and at QUT. The results are to be presented in a research paper and PhD student, Ms Xiaoting Liu, from the QUT visited the CRAES in March 2017, and there are plans to return to Beijing in 2018. This project is continuing in 2018.

2. Components of Ambient Air Fine Particulate Matter and Mechanism of Its Effects on Respiratory Oxidative Stress and Inflammation, 2016 – 2018 (Ongoing).
This study was led by Professor Tong Zhu from the PKU in collaboration with the Department of Pulmonary Medicine, Peking University First Hospital in Beijing, China and the ILAQH, QUT. The study was funded by the Ministry of Science and Technology of the People's Republic of China (2016 – 2018). The campaign was conducted in seven communities in Shichahai, Beijing between December 2016 and September 2017. QUT provided two personal monitors (Aerosense Nanotracer) to measure time-series of UFP concentrations and size in real-time. Data collection campaign included measuring pulmonary function and personal UFP exposure from 30 chronic obstructive pulmonary disease (COPD) patients and 30 healthy participants, aged 45 to 70 years old. Dr Mandana Mazaheri, Senior Researcher and Postdoctoral Fellow at QUT, led the personal UFP monitoring design, providing research support and training to the Chinese partners, as well as led the analysis on personal UFP exposure assessments. This project is continuing in 2018.

3. National Natural Science Foundation of China (NSFC) Grant 2016, titled **Shanghai Cooking Emissions Campaign, December 2016 – January 2018 (Ongoing).**
The Shanghai Cooking Emissions Campaign was carried out at the Tongji University from December 2016 to January 2017, led by Professor Zoran Ristovski and Dr. Svetlana Stevanovic from QUT, Associate Professor Lina Wang from ECUST, Professor Jun Gao from the Tongji University, Professor Lin Wang from FDU, and Dr. Li Li and Dr. Hongli Wang from the SAES. The project was funded by a National Natural Science Foundation of China (NSFC) Grant, with Dr. Svetlana Stevanovic and Associate Professor Lina Wang as the Chief Investigators. The project focused on the measurement of the physical and chemical properties of cooking aerosols, as well as their ROS profiles and cell toxicity. Chemical analysis of the gaseous compounds was performed by PTR-MS (SAES) and CIMS (FDU, QUT). The laboratory was built by Tongji University just before the measurements commenced, which allowed investigation of some other factors such as different dilution factors, position and heights during cooking processes. This project is continuing in 2018.



4. Commercial Project titled, **Literature Review for Plantower PM2.5 Sensors Development, 2017 – 2018.** Fahe Chai (CRAES), Jian Gao (CRAES), Lidia Morawska (QUT), Congrong He (QUT). Beijing Plantower, as a front runner in industry, is a high-tech enterprise on research, development and marketing for air quality sensor that has established good relationship with lots of well-known enterprises in China and overseas by innovation and quality creation. Plantower would like to support the activities of ACC-AQSM, especially participate in the project titled "Harnessing the emerging sensing and data science to protect cities of tomorrow from air pollution". Plantower is very interested in its subproject for low cost air quality sensor innovation and development which will be conducted at QUT and will contribute to the planned project activities, as well as provide the financial contribution. This project is continuing in 2018.

5. Hong Kong Research Grants Council Grant 2017 titled, **Photochemical Air Pollution in Highly Urbanized Subtropical Regions: from Micro Environments to Urban-Terrestrial-Oceanic Interactions**. Prof Tao Wang (HK PolyU), Profr Guy Brasseur (Max Planck Institute, also a distinguished chair professor at HKPU), Prof Hai Guo (HK PolyU), Dr Kin-fai Ho (Chinese University of HK), Prof Alexis Lau (HKUST), Prof Shuncheng Lee (HK PolyU), Dr Chun-ho Liu (UHK), Dr Peter Louie (Environment Protection Department (EPD) of the Hong Kong Government), Prof Xinming Wang (CAS), Dr Zhe Wang (HK PolyU), Dr Kenneth Leung (HK's EPD), and Dr Yingjun Liu (University of California at Berkeley).

6. A New Hypothesis to Explain the Formation of Haze Events in China involving Charged Particles in the Atmosphere, November 2015 – December 2018 (Ongoing). Led by Professor Zhaolin Gu and Professor Yan Chen from the Xian Jiaotong University (XJU) in Xian, in collaboration with CRAES in Beijing and QUT. The team is working on a new hypothesis to explain the formation of haze events in China involving charged particles in the atmosphere. QUT provided for this project: charged particle data from QUT/CRAES Neutral Cluster and Air Ion Spectrometer (NAIS) measurements conducted in Beijing, for the modelling studies that are presently on-going. There are plans to take QUT's NAIS to Xian in the middle of 2017 to collect more data. The first research paper is in preparation.

7. Asian Universities Cluster (AUC) Center of Excellence in Civil Engineering grant titled, **Impacts of Megacities on Regional Atmospheric Environment – A comparative study of emission, transformation and effects of urban pollution from Australia, Singapore, Shanghai, and Hong Kong.** Prof Hai Guo (HK PolyU), Prof Lidia Morawska (QUT), A/Prof Rajasekhar Balasubramanian (National University of Singapore) and Prof Yingjun Chen (Tongji University).

8. National Natural Science Foundation of China (NSFC) Young Scholar 2017-2018 grant, titled: **Investigation on the role of aging, different aerosol fractions, different sources and different conditions on the formation of SOA and Chemical ROS in urban environments.** For Dr Svetlana Stevanovic (QUT), hosted by Dr. Lina Wang (ECUST).

9. Hong Kong Research Council Grant 2016, titled: **Semi-volatile particulate matter (PM) species in roadside environment: Role in gas-particle partitioning and formation of oxidative potential.** Led by Zoran Ristovski (QUT) and Zhi Ning (HK CityU). The Hong Kong Winter-Time ROS Campaign was carried out at the HK CityU in September – October 2016, led by Professor Zhi Ning (HK CityU). The project focused on the measurement of the diurnal profiles of $PM_{2.5}$ and gas-phase ROS concentrations at two different sampling sites. The samples were performed with the latest prototype of the novel real-time PM ROS sampler developed by QUT, the Particle into Nitroxide Quencher (PINQ). Reece Brown, a PhD candidate from QUT, spent two weeks in Hong Kong setting up, calibrating, and performing preliminary samples with the PINQ. The diurnal measurements were then taken over a month long period by Dr Nirmal Kumar, a Post-Doctoral research fellow from CityU. The measurements will provide diurnal trends in PM2.5 and gas-phase ROS concentrations for each day of the week at both roadside and rooftop sampling sites. This campaign is the winter time partner to the summertime campaign "Hong Kong City University Campaign" from September to December of 2015. Both are part of the project "Semi-volatile particulate matter (PM) species in roadside environment: Role in gas-particle partitioning and formation of oxidative potential". The first paper was submitted for publication and the second paper is in preparation for submission in 2017-2018.

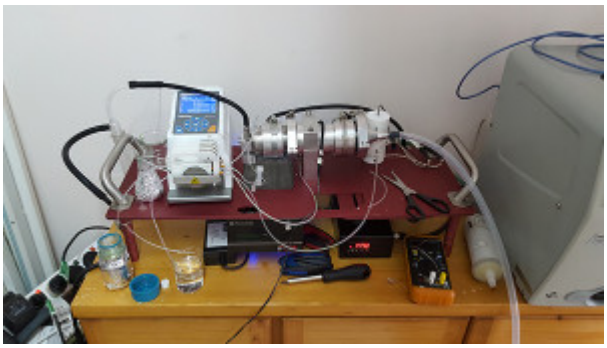
10. Australia Research Council Linkage Projects Grant 2016, titled: **Developing and utilising advanced networks for air quality sensing and analysis**, **2017 – 2019 (Ongoing).** Led by Lidia Morawska from the QUT, investigators include: Kourosh Kalantar-zadeh (RMIT), Nunzio Motta (QUT), Benjamin Mullins (CU), Godwin Ayoko (QUT), Zoran Ristovski (QUT), Mandana Mazaheri (QUT), Samuel Clifford (QUT), Matthew Dunbabin (QUT), Phong Thai (QUT), Luis Gonzalez (QUT), Dian Tjondronegoro (QUT), Matthew Riley (NSW OEH), Yvonne Scorgie (NSW OEH), David Wainwright (DSITI), Gavin Fisher (VIC EPA), Kelvyn Steer (SA EPA), Elizabeth Ebert (BOM), Jiming HAO (TU).

11. Hong Kong Research Council Grant 2016, titled: **Thermal desorption aerosol gas chromatograph and time of flight aerosol mass spectrometer**. Led by Hai GUO from the HK PolyU, investigators include: Lidia Morawska (QUT), Xiangdong Li (HK PolyU), Chak Chan (HKUST), Xinming Wang (CAS), Linwei Tian (HKU), Kin-Fei Ho (CUHK), Man-Nin Chan (CUHK), Zi Ning (HK City).

12. NSFC Funded Project 2016, titled: **Identification and Evaluation of Key Impact Factors on the Multiple-Time-Resolution Particle Source Apportionment and Its Comprehensive Validation over Beijing-Tianjin-Hebei Region.** Led by Dr. Jian GAO from the CRAESs, investigators include: Jian GAO, YiSheng XU, Shuang DENG, Yingjie SHI, Kai LI, Yingze TIAN, Caiqing YAN, Miikka Ilmari Dal Maso, Lidia MORAWSKA, Zhisheng ZHANG.

13. NSFC Funded Project 2016, titled: **Concentrations and Compositions of Biogenic Volatile 6. Organic Compounds in Forests of Heavy Photochemical Pollution Regions and Their Role in Secondary Pollutant Formation.** Led by Prof Boguang WANG from Jinan University (Guangzhou), investigators include: Boguang WANG, Linyan HE, Wei SONG, Hao WANG, Duohong CHEN, Lei ZHOU, Congrong HE, Peng CHENG, Yunpeng LI, Zhijuan ZHANG

14. Real time Measurements of ROS (Ongoing). Led by Zoran Ristovski (QUT) Svetlana Stevanovic (QUT), Zhi Ning (HK CityU). This Hong Kong campaign was carried out by the HK CityU, and was led by Professor Peter Brimblecombe and Professor Zhi Ning from the HK CityU. Dr Svetlana Stevanovic was a Visiting Assistant Professor at City University of Hong Kong in the period September - December 2015. She participated in a research campaign that was a part of a project "Semi-volatile particulate matter (PM) species in roadside environment: Role in gas-particle partitioning and formation of oxidative potential". This project was a joint project of Professor Zoran Ristovski from QUT and Assistant Professor Zhi Ning from City University of Hong Kong funded by HK Research Grants Council. Measurements were carried out at two locations that represented background and road-side pollution. Evaluation of diurnal profiles of ROS concentrations at different locations in Hong Kong was done for the first time in Australasia. For the measurement of oxidative potential Particle Into Liquid Sampler (PILS) was used. This instrument was designed and made at QUT. Furthermore, PILS was also used to measure the influence of semi-volatile organics to the overall oxidative potential and investigate further gas-particle partitioning. This campaign was done in December and January to characterize winter emissions. Corresponding summer campaign is planned for August in 2016. Professor Zoran Ristovski was supervising the measurements and was a Visiting Professor in the School of Energy and Environment at the City University of Hong Kong. The first paper has been submitted, and the second is in preparation for submission in 2017-2018.



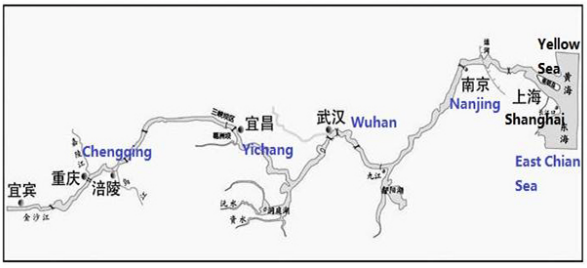
15. Air Quality Monitoring in Hong Kong, September – November 2016. This sampling campaign is led by Professor Hai Guo from HK PolyU in collaboration with the Sun Yat-Sen University, National Central University, QUT, Ji'nan University and HKUST. It is being conducted simultaneously at two sites: a sub-urban site in Tung Chung, Hong Kong and a rural island site in Zhuhai, China. The measurements include canister sampling, real-time monitoring of weather conditions, trace gases, volatile organic compounds (VOCs) as well as other precursors of photochemical ozone production. This will be followed by a comprehensive analysis of the chemical database using a combination of statistical analysis of field observations, mesoscale meteorological simulations, diagnostic and prognostic box models, for example, an observation-based box model, an emission-based model, and chemical transport models. The proposed study will significantly improve our understanding of photochemical formation and transport mechanisms for subtropical coastal regions with complex coupling of meteorology and chemistry, and will advance our knowledge of the atmospheric chemistry in the marine boundary and have wide implications for other subtropical coastal regions. The scientific findings will have direct policy implications for reducing O3 pollution and visibility degradation in subtropical South China.

16. Contribution of Primary Sources (Traffic, Biomass Burning) to SOA formation (Ongoing). Led by Li Hong (CRAES), Zoran Ristovski (QUT). The project is expected to start at the end of 2017.

17. Assessment of Air Pollution Exposure during Construction Work: Towards the Improvement of Dust Control and Management in the Construction Industry. Bo Xia (QUT), Geoffrey Shen (HK PolyU), Martin Skitmor (QUT), Dongping FANG (TU), Robin Drogemuller (QUT), Dezhi LI (Southeast University), Lidia Morawska (QUT), Congrong He (QUT)

18. New particle formation in Beijing air – winter campaign, measurements and modelling. Jian Gao (CRAES), Rohan Jayaratne (QUT), Buddhi Pushpawela (QUT), Min Hu (PKU), Melita Keywood (CSIRO), Congrong He (QUT)

19. Yangtze River Campaign, November 2017 – 2018 (Ongoing). Led by Jianmin Chen (FUD), Rohan Jayaratne (QUT). The Yangtze River Air Monitoring Campaign was carried out in November – December 2015 by Fudan University and was led by Professor Jianmin Chen from the FDU. Air and water quality measurements were made from a research boat carrying over 60 state of the art, high quality scientific instruments while sailing from Shanghai to Wuhan and back over a period of two weeks. QUT provided one instrument to monitor ultrafine particle concentrations in real time and this was installed on the boat by Dr. Rohan Jayaratne, Senior Research Fellow at QUT. The Project was a success and we are presently analysing the results acquired. We expect this to result in several high quality scientific publications. The data is being analysed and the first paper is in preparation for submission in 2017-2018.



20. Impact of autumn agricultural burning on air quality in Beijing. Jian Gao (CRAES), Congrong He (QUT)

21. Application of the camera for atmospheric PM measurements. Lidia Morawska (QUT), Rohan Jayaratne (QUT), Jian Gao (CRAES), Lina Wang (ECUST), Md Mahmudur Rahman (QUT)

22. School children personal exposure to Ultrafine Particles, April 2016 (Ongoing). Led by Zhu Tong (PKU), Lidia Morawska (QUT), Mandana Mazaheri (QUT), WeiWei Lin (Sun Yat-Sen University). School children personal UFP exposure monitoring in Hehsan Campaign was carried out in April 2016, as part of a children's panel study funded by the National Natural Science Foundation of China (NSFC), led by Associate Professor Weiwei Lin from the Sun Yat-Sen University (SYSU) in Guangzhou, China. QUT provided three personal monitors (Aerosense Nanotracer) to measure time-series of UFP concentrations and size in real-time. The monitoring campaign was conducted in a primary school in Heshan County, the city of Jiangmen within the Pearl River Delta region in China between 18 and 29 April 2016. Health (cardiopulmonary testings) and personal UFP monitoring data were collected from 59 participating school children. Dr Mandana Mazaheri, a senior researcher and Postdoctoral Fellow at QUT, led the personal UFP monitoring design, provided training to the SYSU team and participated in the first week of the campaign in Heshan. The data analysis is currently in progress and a paper is in preparation.

23. Sensor Intercomparison. Jian Gao (CRAES), Shuxiao Wang (TU), Lidia Morawska (QUT), Phong Thai (QUT), Mandana Mazaheri (QUT), Christhina Candido (USyd)

24. Temperature, air quality and health effects. Haidong Kan (FDU), Adrian Barnett (QUT), Lidia Morawska (QUT), Phong Thai (QUT), Yuming Guo (UQ)

25. Epidemiology. Ben Mullins (CU), Jing (Peter) Ming (CMA)

26. Environmental pollution and adverse birth outcomes. Gunther Paul (QUT), Guanghui Dong (SYSU), Lidia Morawska (QUT)

5. Events

Training Course

Application of Low Cost Sensors and Their Networks for Urban Air Quality Monitoring, 19th October 2017

The Clean Air Society of Australia and New Zealand (CASANZ), together with QUT put together a special training event which was held on the 19th October 2017, directly following the 23rd International Clean Air Conference in Brisbane, Australia, and among the presenters were members of the ACC-AQSM. This exciting course paired the principles of low cost sensor monitoring with practical sessions on building and operating low cost sensor networks for air quality applications.

Workshop

Low-cost sensor workshop, Hong Kong, 26th June 2017

On the 26th June 2017, the Environmental Protection Department (EPD) of the Hong Kong Government together with the HK CityU hosted a low-cost sensor workshop to establish a joint platform for the work and also to bring any other colleagues working on this. Professor Lidia Morawska from the QUT gave a plenary presentation at the workshop titled, *The use of advance portable Air Quality sensors*, and had meetings with Dr. Peter Louie (HK EPD), Professors Jimmy Fung and Alexis Lau (HKUST), as well as Professor Zhi Ning and Dr. Dane Westerdahl (HK CityU).

Discussions at the meeting related to the work being carried out by QUT, as well Professor Ning's work on sensors, system development, and various applications in urban air quality settings, such as the International Marathon sensor network and bus platform based mobile air sensor network in Hong Kong. These discussions and joint work lead to a new initiative: progress of low-cost sensor technologies and their applications across China and globally was presented at a high level workshop organised in association with the *5th International Symposium on Regional Air Quality Management in Rapidly Developing Economic Regions (RAQM)* held in Guangzhou, China from the 16-19th November 2017. The *5th RAQM* was organised by the Institute for Environmental and Climate Research, Jinan University. More information is available on the conference website (https://5raqm.jnu.edu.cn/en/).

Conferences

Xiangshan Science Conference, Beijing China, 29-30th June 2017.

The 600th Session of the Xiangshan Science Conference took place in Beijing on from the 29-30th June 2017 and was titled: *Bioaerosols and Human Health, National Bio-security as well as Air Pollution*. A number of ACC-AQSM Centre members attended and participated in it.

The Xiangshan Conferences are known to be of the highest level academic conferences in China, and the specific aspects of the 600th Session included:

- the sources, emissions, spreading and pathogenic mechanism of bioaerosols, and their influential factors and zoonoses;
- theoretical system underlying new methods for bioaerosol capture, biological sensing, decontamination and protection; and
- bioaerosols and the formation mechanism of atmospheric pollution and haze, toxicity monitoring and prediction of particulate matter and human health effects.

2017 Annual Conference of Atmospheric Environment, 8-9th December 2017

The 2017 Annual Conference of Atmospheric Environment, together with the Chinese Society for Atmospheric Environment, Chinese Society for Environmental Sciences, and the CRAES presented a two-day conference held in Beijing on the 8-9th December 2017, and among the presenters included members of the ACC-AQSM. The Conference aimed at bringing together scientists from different fields, industry and

representatives of local governments, to share research and discuss how to improve urban air quality and its specificities in East Asia.

Annual Meeting

The Annual Meeting is hosted at rotating partner sites in Australia and China to provide an opportunity for member researchers to present and discuss findings, workshop future initiatives and exchange information.

The 3rd Annual Conference of the ACC-AQSM was held in Beijing from the 4-5th November 2017, and was hosted by the CRAES. We proposed a new format for the conference, namely focused on working together, and on outcomes, namely on a Special Issue for the journal of *Science*.

Overall, the Annual Meeting has further refined our research collaborations, longer term opportunities for staff and student exchange, professional development collaborations, and research developments that combine the expertise of a number of Chinese and Australian Universities and Institutes.

6. Visits and Exchanges (Staff and Students)

November

- Professor Lidia Morawska (QUT), hosted by Jinan University in Guangzhou, November 2017
- Professor Lidia Morawska (QUT), hosted by HK PolyU, November 2017
- Professor Zoran Ristovski (QUT), hosted by Jinan University in Guangzhou, November 2017

October

- Professor Yan Cheng (Xi'an Jiaotong University), hosted by QUT, October 2017 – October 2018
- Professor Xulong Wang (Institute of Earth Environment, Chinese Academy of Sciences), hosted by QUT, October 2017 – April 2018
- Professor Shenfa Huang (SAES) hosted by QUT, October 2017
- Ms. Lihong Wang, Mr. Hao Tang, Ms. Jun Lu, and Ms. Jinghua Su (SAES) hosted by QUT, October 2017

July

- Associate Dean and Professor Xuemei WANG (Sun Yat-sen University), Professor Xinming WANG (Guangzhou Institute of Geochemistry, Chinese Academy of Sciences), Professor Jun ZHAO Professor Junyu ZHENG (South China University of Technology), Associate Professor Yanli ZHANG (Guangzhou Institute of Geochemistry, Chinese Academy of Sciences), and Lecturer Shengzhen ZHOU (Sun Yat-sen University), hosted by QUT, July-August 2017

June

- Professor Lidia Morawska (QUT), hosted by the Hong Kong Government Environmental Protection Department (EPD) together with the HK CityU, June 2017
- Professor Lidia Morawska (QUT), hosted by HK PolyU, June 2017
- Professor Lidia Morawska (QUT), hosted by CRAES, June 2017
- Professor Lidia Morawska (QUT), hosted by Peking University, June 2017

May

- Professor Lidia Morawska (QUT), hosted by Xi'an Jiaotong University, May-June 2017

April

- Professor Hai Guo (HK PolyU), hosted by QUT, April 2017

March

- Ms Xiaoting Liu (QUT), hosted by the CRAES in March 2017.

February

- Dr. Wenjie Li (Chongqing University of Science and Technology), hosted by QUT, February-December 2017

7. Special Issue, Science of the Total Environment (STOTEN)

The Special Issue titled, ***Air Quality in China: Current and Emerging Challenges*** is a virtual SI, which brings together papers on all the aspects relating to Air Quality in China.

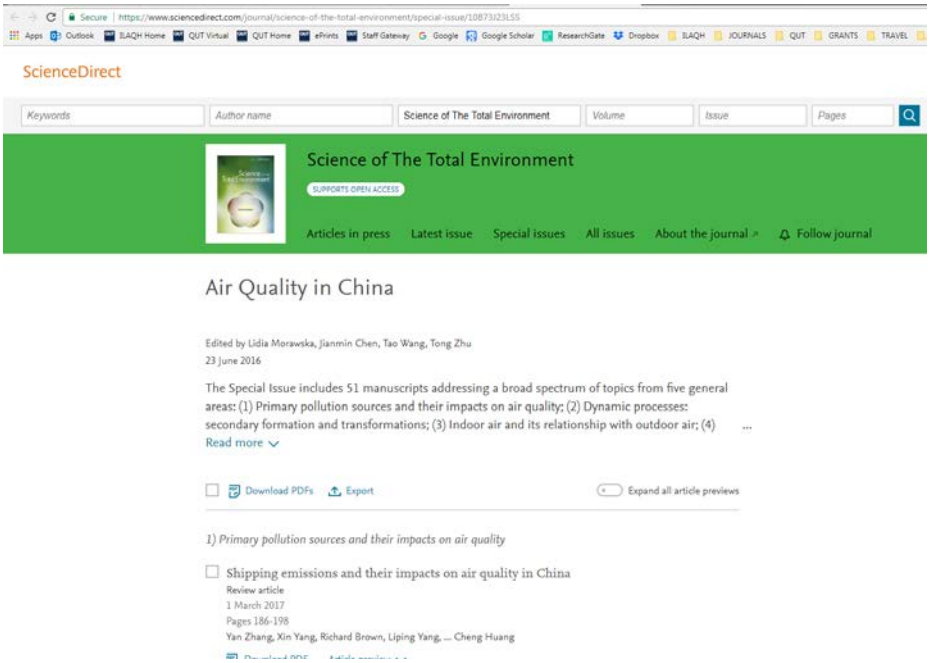
Guest Editors for the SI:

Professor Lidia Morawska
QUT, Brisbane, Australia
Email:
l.morawska@qut.edu.au

Professor Jianmin Chen
Fudan University, Shanghai, China
Email:
jmchen@fudan.edu.cn

Professor Tao Wang
HK PolyU, Hong Kong, China
Email:
tao.wang@polyu.edu.hk

Professor Tong Zhu
Peking University, Beijing, China
Email: tzhu@pku.edu.cn



The Special Issue ***Air Quality in China: Current and Emerging Challenges,*** was initiated in 2015. Submissions to the Special Issue opened in the STOTEN EES in February 2016, and the original deadline for submissions was identified as the 30th June 2016. At the end of June, an extension was granted by STOTEN to the 31st July 2016, to allow a little more time for the remaining papers to be submitted. Submissions have closed and the Special Issue was finalized and placed on the STOTEN website in early 2017.

The Special Issue includes 51 manuscripts addressing a broad spectrum of topics from five general areas:

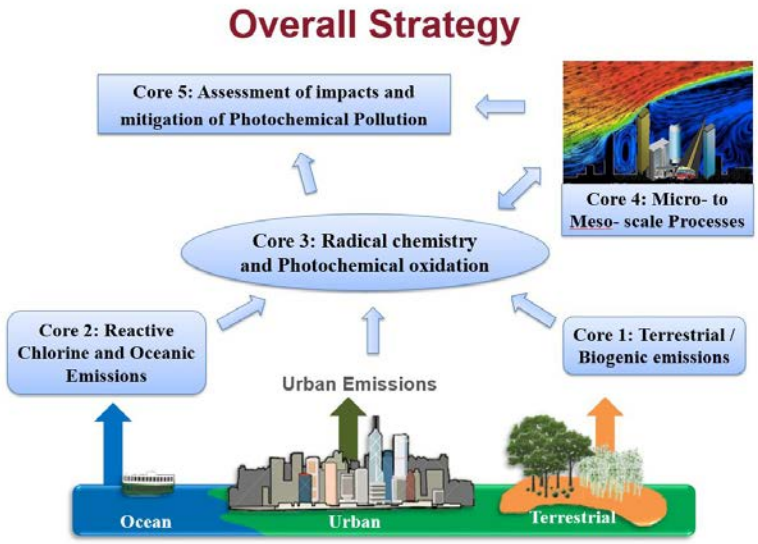
(1) ***Primary pollution sources and their impacts on air quality;***
(2) ***Dynamic processes: secondary formation and transformations;***
(3) ***Indoor air and its relationship with outdoor air;***
(4) ***Health and exposure;***
(5) ***Mitigation: New technologies, policies and strategies.***

From the Special Issue Preface: "*14 of the manuscripts are reviews, which were conducted by large multidisciplinary, multi-organization teams, and 38 manuscripts report findings from new studies. Even a quick browse through the titles of the manuscripts reveals the complexity of the problem that the experts are collectively undertaking to understand - and to fix, as an ultimate goal. The Special Issue holistically encompassing all the angles of air pollution in China, their impacts and mitigation, is a gold mine of information. We trust that our readers will find this volume not only interesting, but inspiring in further work in pursuit of good air quality in China and beyond.*"

8. Grant Applications

Successful

- Hong Kong Research Grants Council Grant 2017 titled, ***Photochemical Air Pollution in Highly Urbanized Subtropical Regions: from Micro Environments to Urban-Terrestrial-Oceanic Interactions***. Prof Tao Wang (HK PolyU), Prof Guy Brasseur (Max Planck Institute, also a distinguished chair professor at HKPU), Prof Hai Guo (HK PolyU), Dr Kin-fai Ho (Chinese University of HK), Prof Alexis Lau (HKUST), Prof Shuncheng Lee (HK PolyU), Dr Chun-ho Liu (UHK), Dr Peter Louie (Environment Protection Department (EPD) of the Hong Kong Government), Prof Xinming Wang (CAS), Dr Zhe Wang (HK PolyU), Dr Kenneth Leung (HK's EPD), and Dr Yingjun Liu (University of California at Berkeley). More than HK $33 million for his collaborative five-year project.



- Commercial Project application to the Chinese company, *Plantower* (100,000RMD for half a year), titled, ***Harnessing the emerging sensing and data science to protect cities of tomorrow from air pollution***, for Plantower PM_p Sensors Development.

Applied / Pending

- Australian Academy of Science - Regional Collaborations Programme led by Lidia Morawska (QUT), titled: ***Harnessing the Emerging Sensing and Data Science to Protect Cities of Tomorrow from Air Pollution.*** Main Participants: Lidia Morawska (QUT), Matthew Dunbabin (QUT), Matthew Dunbabin (QUT), Dian Tjondronegoro (QUT), Phong Thai (QUT), Congrong He (QUT), Fahe Chai (CRAES), Hai Guo (HK PolyU), Quang Tran (Vietnam National U)

In Preparation, to be submitted in the next round

- Hong Kong Research Council 2017 application in preparation led by Hai Guo (HK PolyU), titled: ***Re-examining the contribution of volatile organic compounds to photochemical formation of secondary organic aerosols under the influence of mesoscale circulation in subtropical Hong Kong***

- NSFC application led by Jianmin Chen (FDU), titled: ***Toxicity and health assessment exposure to atmospheric fine particles.*** Project Investigator Australia: Prof Lidia Morawska (QUT); Main Participants: Dr Dan Li (FDU); Dr Rohan Jayaratne (QUT), Dr Mandana Mazaheri (QUT)

- MOST: International applications expected to open.