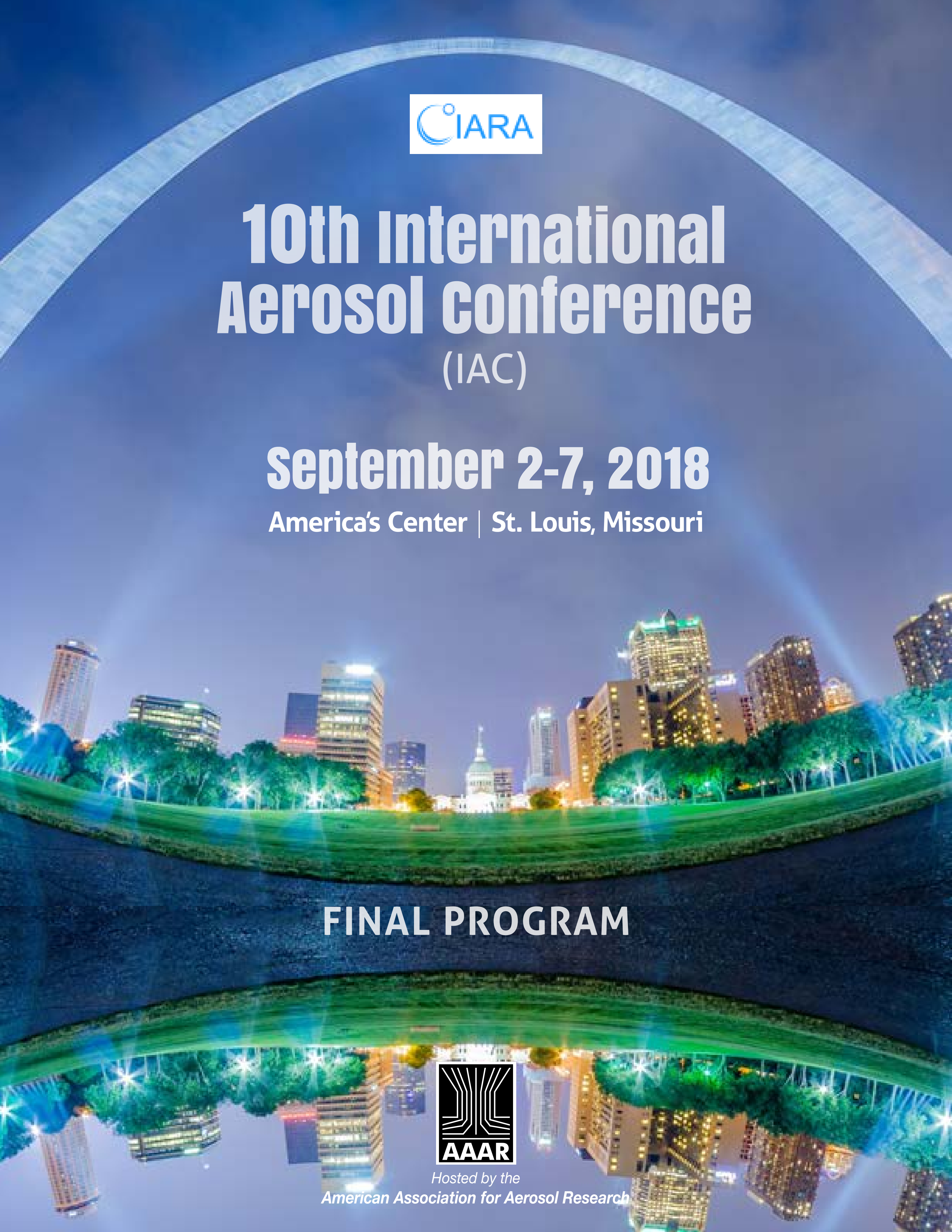

IARA

10th International Aerosol Conference

(IAC)

September 2-7, 2018

America's Center | St. Louis, Missouri

FINAL PROGRAM

AAAR

Hosted by the

American Association for Aerosol Research

7LC.14 6:15	**Investigating the Performance of a Low-Cost PM Monitor (Dylos) against Dusttrak DRX for Different Indoor and Outdoor PM Sources.** **MEHDI AMOUEI TORKMAHALLEH, Obaidullah Mohiuddin, Fatemeh Mohammaddezashibi, Madina Obaidullah, Hamed Sharifi,** Chemical and Aerosol Research Team, Nazarbayev University
7LC.15 6:15	**CFD Analysis of Flow and Particle Behavior in the Performance Evaluation Chamber System for PM Sensor.** **SUNG-MIN SHIM, Jae-ho Cho, Hyeok Chung, Ki-tai Kang,** Aerosol Research & Technology Plus
7LC.16 6:15	**Toward a More Reliable Optical Smoke Detector: Scattering Matrix Analysis of Fire and Non-fire Aerosol for Classification.** **QIXING ZHANG, Jia Liu, Jie Luo, Feng Wang, Jinjun Wang, Yongming Zhang,** University of Science and Technology of China
7LC.17 6:15	**The Development of Low-Cost Particle Sensor for Air Quqlity Monitoring.** **JINHONG AHN,** InocipIe Co., Ltd.
7LC.18 6:15	**Using Commercially Available Low-Cost Monitors to Estimate the Hourly Spatial Variability of Particulate Matter Concentrations across a Metropolitan Area.** **MAURO MASIOL, Stefania Squizzato, David C. Chalupa, Andrea R. Ferro, David Q. Rich, Philip K. Hopke,** University of Rochester Medical Center
7LC.19 6:15	**Measurements of Atmospheric Aerosol Vertical Distribution Using Multi-Rotors Unmanned Aerial Vehicle (UAV) and Portable Aerosol Instruments.** **ZHIJUN WU, Yishu Zhu, Yong-Hee Park, Kang-Ho An, Min Hu,** Peking University, Beijing, China
7LC.20 6:15	**A Guideline for the Application of the Shinyei PPD24NS Low-Cost Dust Sensor for Air Quality Monitoring.** **Michael Canu, BORIS GALVIS, Ricardo Morales Betancourt, Omar Ramirez, Malika Madelin,** Universidad De La Salle, Colombia
7LC.21 6:15	**Continuous Field Calibration of Low-Cost PM2.5 Sensor Networks.** **Kyle Alberti, GEOFF HENSHAW, Georgia Miskell, Hamesh Patel, Jonathan Taylor, David Williams,** Aeroqual Ltd
7LC.22 6:15	**Assessing Ambient Levels and Personal Exposures in Baltimore: The SEARCH Project.** **MISTI ZAMORA, Kirsten Koehler, Fulizi Xiong, Drew Gentner, Branko Kerkez,** Johns Hopkins Bloomberg School of Public Health
7LC.23 6:15	**An Experimental and Modeling Study of Interferences in Low-cost Air Quality Sensors.** **YUANYUAN ZHANG, Suresh Dhaniyala, Shunsuke Nakao,** Clarkson University
7LC.24 6:15	**Fine-scale Spatio-temporal Variation in Particulate Matter in a Small Wood-burning Town Revealed by a Network of Continuous Low-cost Sensors.** **Ian Longley, Gustavo Olivares, Sam Edwards, GUY COULSON,** National Inst of Water and Atmospheric Research, New Zealand
7LC.25 6:15	**Theoretical Analysis of a High-Pass Electrical Mobility Filter.** **NIC SURAWSKI, Spyros Bezantakos, Konstantinos Barmpounis, Andreas Schmidt-Ott, George Biskos,** University of Technology Sydney
7LC.27 6:15	**The Performance Evaluation System of Low-Cost Air Quality Sensors in Taiwan.** **Yen-Ting Li, CHIA-WEI CHANG, Yi-Cyun Yang, Jiunn-Haur Shaw, Yeuh-Bin Wang,** Industrial Technology Research Institute

7MG AIR QUALITY IN MEGACITIES: FROM SOURCES TO CONTROL I: POSTERS

EXHIBIT HALL 5

Amara Holder and Hector Jorquera, chairs

7MG.1 6:15	**Study of the PM2.5 Growth Processes in Two Key Regions of China.** **Jinjin Sun, Mingjie Liang, JIANLIN HU, Qi Ying, Hongliang Zhang,** Nanjing University of Information Science & Technology
7MG.2 6:15	**Mercury Stable Isotope Compositions of PM2.5 in Chinese Cities.** **HONGMEI XU, Ruoyu Sun, Junji Cao,** Xi'an Jiaotong University
7MG.3 6:15	**Size-segregated Chemical Components of Aerosol Particles in Hefei, China.** **ANNA LI,** Laboratory of Atmospheric Physico-Chemistry, Anhui Institute
7MG.4 6:15	**Primary Sources and Secondary Formation of Organic Aerosols in Diadema, São Paulo, Brazil.** **DJACINTO MONTEIRO DOS SANTOS, Luciana Rizzo, Patrick Schlag, Samara Carbone, Paulo Artaxo,** University of São Paulo
7MG.5 6:15	**Contributions of the N2O5 Heterogeneous Hydrolysis Reaction to the Nitrate Formation in the North China Plain (NCP) During Wintertime: A Case Study.** **LANG LIU, Guohui Li, Institute of Earth Environment,** Chinese Academy of Sciences
7MG.6 6:15	**Lahore Smog – Componential Analysis, Causes and Effects.** **ZULFIQAR ALI, Irfan Zainab, Zona Zaidi, Komel Ahmad, Syed Turab Raza, Saira Khan, Rida Ahmad, Khadija Aziz, Mubashir Ahmad, Sidra Safdar, Zaheer Ahmad Nasir, Ian Colbeck, Nimra Afzal,** University of the Punjab, Lahore, 54590, Pakistan

7LC.18

Using Commercially Available Low-Cost Monitors to Estimate the Hourly Spatial Variability of Particulate Matter Concentrations across a Metropolitan Area. MAURO MASIOL, Stefania Squizzato, David C. Chalupa, Andrea R. Ferro, David Q. Rich, Philip K. Hopke, *University of Rochester Medical Center*

In U.S., the National Ambient Air Quality Standards (NAAQS) set the limit values for six principal “criteria” air pollutants including PM2.5. Data are primarily collected to assess the citywide air pollution concentrations for regulatory purposes. PM2.5 is measured at one or a few urban stations within major cities or in rural locations. This sparse spatial resolution is insufficient to capture the intra-urban spatial variability of air pollution that is driven by the locations and strengths of local sources, the effect of street canyons and complex terrain, and urban heat island effects. Consequently, exposure misclassifications are likely to occur when using these data for epidemiological studies. In addition, NAAQS for PM2.5 requires the attainment of annual or daily limit values. However, recent studies have reported associations between high hourly PM2.5 peaks and mortality/morbidity, particularly cardiovascular events [1]. Consequently, it is important to increase the temporal resolution to capture air pollution peaks responsible of short-term health outcomes.

The accessibility of low-cost sensing for air pollution may be a valuable resource to improve the spatial and temporal resolution of current routine monitoring networks. Low-cost monitors (LCMs) are much less expensive than scientific-grade instruments, physically smaller and lighter (generally portable), collect data with high time resolutions (from few seconds to minutes), require less maintenance, and have low power demands. However, they are not designed to meet rigid performance standards, and they produce data with much less accuracy than scientific-grade instruments. Thus, LCMs require careful calibration and post-processing of data.

Recently, we have used data collected with commercially available LCMs at multiple locations across a metropolitan area of the eastern U.S. (Rochester, NY) during two consecutive winters (2015–2016 and 2016–2017). These monitors (Speck, Airviz Inc., Pittsburgh, PA) were tested under laboratory [2] and field [3] conditions. Data were also used to predict the hourly small-scale variability of PM using sophisticated land-use regression models [4].

The results of a summer/fall sampling campaign (June to October 2017) that essentially completes our dataset to cover all the seasons over three years (2015 to 2017) will be described. Forty-nine LCMs placed in weatherproof cases were deployed outdoors at residential locations in Rochester NY, while another unit was co-located to the NYS DEC air quality monitoring site. Raw data were originally collected at 1 min time resolution. Data were handled to return robust and reliable datasets at 1 h resolution time. Instrumental biases were assessed during 3 days of field co-location with a GRIMM 1.109 aerosol spectrometer pre and post-field deployment. Multiple pairwise analyses were used to investigate the collected data, including coefficient of divergence and signed rank tests of the value distributions.

The data were affected by a large but correctable bias that was caused by the low PM concentrations typically measured in Rochester. However, this main limitation was overcome by a careful instrument calibration and validation of data prior to and after the sampling campaigns to ensure unbiased datasets. Despite the lower accuracy of data, results show that the use of these monitors provides the opportunity for successfully improving the spatial resolution of particulate pollution.

[1] Gardner, B. et al., 2014. Ambient fine particulate air pollution triggers ST-elevation myocardial infarction, but not non-ST elevation myocardial infarction: a case-crossover study. Particle and Fibre Toxicology 11(1), 1.

[2] Zikova, N., et al. 2017. Evaluation of new low-cost particle monitors for PM2.5 concentrations measurements. J. Aerosol Sci. 105, 24–34.

[3] Zikova, N., et al., 2017. Estimating hourly concentrations of PM2.5 across a metropolitan area using low-cost particle monitors. Sensors 17, 1922.

[4] Masiol, M., et al., submitted. Hourly land use regression models based on low-cost PM monitor data.