Background

Over the past decade the emergence of new technologies in general, and for atmospheric sensing in particular, has evolved at astonishing rates and application than previously anticipated. Stationary and dynamic networks of low cost sensors for air pollution monitoring are being established, sensors for air pollutions monitoring are being delivered through mobile phones, drones and retrofitted cars that service as mobile monitoring stations. New sensor technologies are commercialized in large numbers, promising a revolutionary shift in air pollution monitoring and assessment of human exposure to air pollution. With their cost significantly lower than that of standard/reference instruments, many avenues for applications have opened up and the landscape of monitoring air pollutant being reshaped through innovative application of sensor technology. In particular, broader participation in air quality discussion and utilisation of information on air pollution by communities has become possible, denser monitoring networks that compliment regulatory monitoring are now possible and have shown cost effective utility in identifying pollution hot spots, tracking pollution in harsh environments and offering rapid identification of possible pollution sources. Some studies have concluded that, when tested appropriately and used with a full understanding of their capabilities and limitations, low cost sensors can be an unprecedented aid in a wide range of air quality applications, including the emerging field of citizen science. However, many questions have also been asked about the actual benefits of these technologies, ranging from their performance (accuracy, precision, drift with time or robustness) to the utilisation and interpretation of the vast amounts of data generated by the sensors. The proposed workshop will explore the challenges in application of mini and nano sensors for air quality and personal exposure monitoring. Further, it will discuss the likely future scenarios for how we will use these, and the new generations of sensors.
Target audience:
Academia, government, NGOs, community, industry

Language:
Presentations and materials provided will be in English; the working language will also be English.

Workshop Program

8.30-9.00 Registration
9.00-9.10 Welcome address by WHO (S. Gumy) and WMO (O. Tarasova)
9.10-9.50 Presentation of the WMO report on the low-cost sensors for the measurement of atmospheric composition: overview of topic and future applications (R. Peltier, 30 mn presentation & 10 mn Q&A)
9.50-10.30 Low-cost sensor network and their application for public health (L. Morawska, 30 mn presentation & 10 mn Q&A)
10.30 - 11.00 Coffee break
11.00 - 11.45: Selected applications of low-cost sensors (7 mn presentation & 4 mn QA per speaker):
   - Alena Bartonova – City Sense and beyond
   - Anne Stauffer – HEAL program experience
   - Zhi Ning/Wenwei Che – sensor networks in China
   - Dietrich Schwela – Expanding the air quality network in Bosnia Herzegovina
11.45- 12.30 Panel moderated discussion on the four questions:
   i. Feasibility of establishing common protocols/guidelines for sensor evolution, and minimum performance requirements in relation to specific applications;
   ii. Development of machine learning and other advanced data processing approaches for sensor/monitor data quality assessment, analysis and interpretations;
   iii. Utilization of low cost sensors by communities (citizen science), and consideration regarding ethics, access to data, as well as political and social impacts;
   iv. Inclusion of information generated by low-cost sensors in WHO databases (eg Global Platform), and utilization by WHO of this information towards global advancement in health from improved air quality.
12.30 Closing remarks

For successful conduct of the Workshop a cross-disciplinary panel of moderators would be established, with the panelist expertise including sensing techniques, data and statists, public health, policy, community outreach, etc. The panel would develop a detail program for the workshop, including a set of short introductory presentations, background material for the participants and a set of specific questions to be discussed to address the Workshop topics. The panel will be responsible for preparing a report from the Workshop to the WHO outlining the outcomes of the Workshop.
**Workshop lecturers:**

Prof Lidia Morawska, Queensland University of Technology, Brisbane, Australia.

Prof Richard Peltier, University of Massachusetts, Amherst, USA.

Dr Alena Bartonova, Norwegian Institute for Air Research, Lillestroem, Norway.

Ms Anne Stauffer, Health and Environment Alliance (HEAL), Heidelberg, Germany.

Prof Zhi Ning, The Hong Kong University of Science&Technology, Hong Kong, China.

Prof Wenwei Che, The Hong Kong University of Science&Technology, Hong Kong, China.

Dr Dietriech Schwela, Stockholm Environment Institute at the University of York, Essen, Germany.

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**Participant registration**

The workshop is open and a registration form is provided on the website:


Registration: [https://extranet.who.int/datacol/survey.asp?survey_id=3914](https://extranet.who.int/datacol/survey.asp?survey_id=3914)

Deadline for registration is 21 October 2018.