ISOEN 2026

Chongqing, China

May 17-20, 2026

https://www.isoen2026.org/

International Symposium on Olfaction and Electronic Nose

SPECIAL SESSION 02

Heterogeneous Robotic Systems for Environmental Monitoring

Mobile Robot Olfaction (MRO) has emerged as a key interdisciplinary field integrating robotics, environmental sensing, and artificial intelligence. As environmental monitoring demands increasingly sophisticated data collection in challenging, unstructured environments, robotic platforms with gas sensing capabilities offer unprecedented opportunities for autonomous, real-time chemical detection and analysis.

This special session addresses fundamental challenges and recent advances in deploying mobile robots for olfactory-based environmental monitoring. Despite significant progress in robotics and sensor technologies, real-world gas sensing applications face inherent challenges: turbulent gas dispersal, rapidly fluctuating concentration levels, limited environmental control, and the complexity of open sampling processes. These challenges require innovative approaches integrating signal processing, machine perception, autonomous navigation, and pattern recognition.

Scope and Topics

The session welcomes contributions across ground-based and aerial platforms, single-robot systems, multi-agent coordination, and heterogeneous sensor networks. Topics include, but are not limited to:

Systems & Sensing: Platform design, chemical sensor integration, electronic nose technologies, multi-sensor arrays, and sensor fusion approaches.

Algorithms & AI: Gas distribution mapping, source localization, plume tracking, odor discrimination, concentration estimation, adaptive sampling, machine learning for odor analysis, and intelligent decision-making.

Validation & Applications: Performance evaluation in realistic conditions, human-robot interaction, and field deployment studies.

This session facilitates the exchange of ideas on overcoming the unique challenges of autonomous chemical sensing and advancing MRO capabilities for critical applications in environmental protection, disaster response, and ecological research.

Special Session Organizers

Patrick P. Neumann

Bundesanstalt für Materialforschung und -prüfung (BAM), Germany

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*The accepted papers after proper registration and presentation will be included in the conference proceedings, which will be published in **IEEE Xplore**. The proceedings will be submitted to be indexed by **EI Compendex** and **Scopus**.

* Paper Submission Closes: **19 January 2026**

Conference Sponsors

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Organizers

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