

AARHUS UNIVERSITY
DEPARTMENT OF ENVIRONMENTAL SCIENCE
Frederiksborgvej399, 4000 Roskilde
EXTERNAL SEMINAR

29 August 2018, 10:00 –11:00

Venue: The Pavilion

Title: *Two tasks in environmental monitoring – calibration and characterization of gas sensors and remote sensing with multicopter platforms*

Speakers: Dr.-Ing. Matthias Bartholmai, Head of Division and Dr. Carlo Tiebe, Scientific Employee, Bundesanstalt für Materialforschung und -prüfung (BAM), Germany

Abstract: Emissions of ammonia into the environment are mainly caused by agriculture, but also by waste combustion and road traffic. Even at low concentrations, this substance is not only an odour nuisance, but has also ecological and climatic relevance. Therefore, BAM tested commercial electrochemical and metal oxide based sensors, which have limited suitability for measuring in the environmental molar fraction range. Alternatively, own developments for measuring ammonia in the trace range were implemented based on fluorescence detection. A test gas generator was developed for on-site calibration of ammonia sensors and measuring instruments at concentrations below 1000 nmol/mol based on the permeation method according to ISO 6145-10.

Leaking methane from infrastructures, such as pipelines and landfills, is critical for the environment but can also pose a safety risk. To enable a fast detection and localization of these kind of leaks, BAM developed a novel robotic platform for aerial remote gas sensing. Spectroscopic measurement methods for remote sensing of selected gases with mini copters offer the advantage of minimizing the influence of the copter on the measured gas plume. Here, we present the Unmanned Aerial Vehicle for Remote Gas Sensing (UAV-REGAS), which combines a novel lightweight Tunable Diode Laser Absorption Spectroscopy (TDLAS) sensor with a 3-axis aerial stabilization gimbal. The proposed system can be deployed in scenarios that cannot be addressed by currently available systems and thus constitutes a significant step forward for the field of Mobile Robot Olfaction (MRO). It enables tomographic reconstruction of gas plumes and a localization of gas sources. We also present first results showing its performance under realistic conditions.

Host: Ole Hertel DSc, PhD, Professor, Head of Section for Atm. Chem. & Physics, Head of Section for Atmospheric Modelling

External guests interested in attending the presentation should e-mail Christel Ege-Johansen cej@envs.au.dk