

The Chancellor of Ghent University has the honour of inviting you to attend the public defense of the doctoral dissertation of

Ing. Gerlinde De Vogeleer

Title of the doctoral dissertation:

Reduced measuring strategies to assess ventilation rates in naturally ventilated animal houses

The public defence will take place on 21 April 2017 at 17:00 in the room E2.009 at Campus Coupure, Coupure links 653, 9000 Ghent.

There will be a contiguous reception to which you are heartily invited.
Please confirm your attendance before 16/4 to: gerlindedv@gmail.com or 0496245688

Dissertation supervisors

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Abstract of the doctoral research

A well-designed ventilation system is essential to ensure optimal animal production in agricultural buildings. This, because animal welfare is strongly related to the quality of the air in animal houses. Beside controlling the quality of the indoor air by removing hazardous components as e.g. NH_3 and CH_4 , airflow (rate) assessment is also important to estimate the emissions of these hazardous gases from the buildings.

This PhD research studied the feasibility of reduced measuring strategies using direct velocity measurements to assess ventilation rates in naturally ventilated animal houses. There exists a need for accurate and simple measurement techniques in order to determine emissions from animals cost-efficiently and to improve ventilation control. The possibility of using simple (regression) models using wind velocity measurements at the meteorost and local values in the vents, was investigated to predict the airflow rate through the building and the velocity distribution in the vents. Insight was gained on the influence of reduced sampling locations and varying wind conditions on the accuracy and precision of airflow rate measurements.

It was concluded that no general rule could be applied to reduce sampling locations in the side vents without exceeding an accuracy level of $\pm 20\%$. The airflow distribution in the vents changed too much depending on wind direction, velocity and obstacle surrounding. Results for the ridge vent were satisfying due to its more constant airflow pattern for different wind conditions. Predicting the airflow distribution in the side vents was possible after calibration the velocities in the vent for different wind conditions. However, care should be taken for complex distributions caused by curtains, internal obstacles and the occurrence of velocity values close to the accuracy level of the anemometer.

Brief Curriculum Vitae

Gerlinde De Vogeleer was born in Ghent on 13 November 1985. She holds a master degree in environmental engineering (2009) from the polytechnic P.I.H., association of Ghent University. After finishing her master degree, she worked in the environmental sector as an engineer in agricultural projects for heat recovery, manure mining and air scrubbers (Linea Trovata Eco) and residential and industrial projects for application of renewable energy sources (Linea Trovata Suntec). She also served at the VREG handling expertise files for application of CHP and green power certificates. In October 2012 she started her doctoral research in the Bioprocess Engineering unit of Prof. Jan Pieters, department of Biosystems Engineering, Ghent University. The research of Gerlinde was supported through a Ph.D. fellowship by the Institute for Agricultural, Fisheries and Food Research, and a project funded by the Agency for Innovation by Science and Technology (IWT). Gerlinde is the (co)author of 5 scientific publications in high-level peer reviewed journals (Q1). Currently, Gerlinde is working at the Institute for Agricultural, Fisheries and Food Research as the energy coordinator.