# Non-confidential information in ovo sexing at MeBioS

Today, 12 billion chicks from layer lines are yearly hatched worldwide with only 50% raised as laying hens for egg production. Whereas the remaining 50% are males with inefficient growth for meat production. Billions of healthy animals are killed at birth, raising substantial ethical concern. Therefore, an alternative method is required to pre-select males during embryonic development. This method is called in ovo sexing and allows more humane male culling.

The MeBioS division at KU Leuven has a long history in working on sensor technologies for agrofood applications and works on sensing technologies for egg quality assessment for more than 25 years. In 2011, the division started to work on in ovo sexing technologies and showed that using NIR spectroscopy an accuracy of 98% can be obtained for brown shelled eggs only, after 13 days of incubation. Through financing from the Flemish Government, the system was further developed and validated in 2016 and several discussions with important industry partners took place. Ultimately, the technology did not reach the commercial stage due to the main drawbacks of working only on brown shelled eggs and the rather late detection (a high accuracy was obtained at day 13 of incubation).

The division started working on alternative paths to remove the bottlenecks of the NIR solution. The Research Foundation – Flanders (FWO) granted the group a PhD scholarship aimed at investigating the use of volatiles escaping from the egg during early incubation. To this end, fast volatile measurement principles are developed. The research also attracted the interest from the Foundation for Food and Agriculture Research (FFAR) to use a gender specific volatile detection technique to determine sex in ovo. We are thus well equipped to develop a non-invasive ovo sexing technique that registers volatile organic compounds passing through the eggshell during incubation. Specialized sensor technologies based on mass spectroscopy are used as a basis to analyze the VOCs, and advanced data analytics are used to interpret the signals. The volatiles that are identified to play a crucial role in gender discrimination will be used to develop proprietary, lower-cost sensing technology.

Seen the large need for having an accurate in ovo sexing solution and the strong expertise of the MeBioS division in developing microscopic sensing arrays, we started on March 1st 2021 to develop a new in ovo sexing method for gender identifying chicken embryos. This research forms the subject of a new PhD position at the Biosensors research group within MeBioS. Part of the research is funded by the Flemish Government through a 2 year project. The technology will allow to sample and identify/measure relevant biomarkers during embryological development through a minimally invasive principle.