



OPEN DOORS FELLOWSHIP PROGRAM- APPLICATION TEMPLATE FOR RECEIVING LABORATORIES IN FLANDERS

APPLICATION MODALITY A: This modality has been conceived for research institutions in Flanders' higher education institutions or research centres looking for new scientific partners in Africa and willing to explore new joint research streams with their counterparts.

Objective: The application presented by the candidate ODFP fellow shall align with the scope and the requirements of open slots offered by the Flemish research laboratories and published on the ODFP web page.

Examples of the testimonies and open slots offered by the Belgian research laboratories are published [on the ODFP web page](#).

Information from the hosting institutions in Belgium

Contact details of a focal point	✉: gunther.antonissen@ugent.be ☎: +32 9 264 74 86
Name of the research or academic institution	Ghent University – Faculty of Veterinary Medicine
Name of the research group	Chair Poultry Health Sciences
Website of institution /research group	www.poultryhealthsciences.com

Present the group's research line(s) and activities, including a list of commonly used technologies (e.g. *bioinformatics, genetic engineering, chromatography, sequencing, metabolomics, metagenomics*).

The poultry research of the group of prof. Antonissen is multidisciplinary, focusing on a better understanding of the pathogenesis of infectious and non-infectious diseases, improving diagnostics, improving animal welfare and demonstrating the efficacy and safety of prevention and treatment strategies.

Current research is related to gut health (alternatives to antibiotics, diagnostics), mycotoxins (e.g. impact on animal and human health, interaction of mycotoxins and infectious diseases, mechanism of action and safety of detoxifying agents), host-pathogen interaction, antimicrobial resistance, and poultry welfare (monitoring and interventions).



The following technologies are frequently used: routine microbiology, molecular analyses (PCR, qPCR, 16s sequencing), ELISA, chromatography, sensor-based animal behaviour / welfare monitoring).

Describe the primary hard and soft skills desirable from the awarded ODFP fellow to deliver the task at hand.

Hard Skills (depending on project):

- DNA, RNA extraction + (q)PCR: the candidate should have prior knowledge / expertise on the techniques.
- The use of R software: it is an asset when the candidate has basic knowledge on the use of R.
- LC-MSMS analyses for mycotoxin and metabolite identification: basic knowledge on chromatographic methods is key.

Soft Skills:

Related to soft skills & competencies, the fellow should have excellent communication (verbal and written) in English, interpersonal communication, self-management, teamwork, and problem-solving.

Indicate the short and long-term outputs and synergies the PI in Belgium would like to see arising from this collaboration.

Expected Short-term synergies	Expected Long-term synergies
This project may contribute to: (i) the development of, at least one joint scientific publication.	Opportunity for long-term cooperation in poultry health sciences research, for example through PhD thesis projects and research projects.

Summarise (between 400 - 800 words approx.) the research project(s) or activities where the ODFP fellow would contribute to her/their research.

- **Project 1: ATHLETIC CHICKS "Health and welfare effects of early feeding in broiler chickens"**

Early life events are key for the development of healthy and productive poultry particularly with broiler birds. The starter phase is a key stage in the production cycle. The first days of life are a transition stage associated with important physiological changes because of the development of various organ systems, such as the development of the digestive system, the immune system and thermoregulation. In addition, during this period nutrient uptake evolves from a high-fat egg yolk to nutrient uptake from solid food, and birds come into contact with bacteria that colonize the gut. Early nutrition is creating an opportunity for modern broiler



industry to further advance and improve the overall performance, health status and welfare of commercial fast and slow growing broiler chickens, as well as further reduce antimicrobial usage.

The general goal of this project is to develop scientifically validated protocols for the optimal implementation of early feeding in on-farm hatching systems and as well in conventional hatching systems in the hatchery. The goal is to optimize protocols for both fast growing and slow growing broiler chickens breeds. These protocols will be established based on the impact on animal-based indicators for animal production, welfare, gut health, nutrient metabolism, immune system, occurrence of production diseases and antimicrobial usage, linked with the economic impact and social added value.

- **Project 2: Myco-Soldier “Mycotoxin metabolism by black soldier fly (*Hermetia illucens*) as bioconvertor of low value *Fusarium* mycotoxin contaminated organic waste into high value edible feed products”**

Among the most important safety risks for the feed industry and security of the feed supply chain are mycotoxins. Nowadays, hundreds of different types of mycotoxins are known, with deoxynivalenol, T2-toxin, zearalenone, and fumonisins as the best-known *Fusarium* mycotoxins. Recent research has shown great potential environmental benefits of rearing insects for poultry and pig feed, because insects are efficient bioconvertors that can turn low value organic waste into high value edible feed products. Among the insect species used for the waste bioconversion process, the most frequently used is the black soldier fly (BSF - *Hermetia illucens*). In this research project, the aim is to explore the potential of BSF as the next-generation bioconvertor for low value *Fusarium* mycotoxin contaminated organic waste into high value edible feed products. Therefore, the metabolism pathways and detoxification of different well-known *Fusarium* mycotoxins (deoxynivalenol, zearalenone and fumonisins) and emerging *Fusarium* mycotoxins (enniatins and beauvericin) by BSF. Following feeding a diet contaminated with one or multiple mycotoxins to BSF, samples of BSF larvae and frass will be analysed by in-house developed and validated Ultra-Performance Liquid Chromatography (UPLC) - Tandem Mass Spectrometry and UPLC - High-Resolution Mass Spectrometry methods to detect different toxins and their phase I and II metabolites (metabolomics approach, based on De Paepe et al. (2019)). Besides, the effect of single and multi-mycotoxin exposure on performance of BSF larvae and the nutritional composition of BSF larvae will be determined.

Are there additional resources relevant to the work/project related to the short research stay (e.g. articles, videos, project documents and summaries, repositories) that would help the fellow have a broader background of the intended project? If so, please list them below.



Belgium
partner in development



An official letter from the Principal Investigator of the Belgian receiving group confirming the collaboration with the ODFP should be sent together with this form duly filled.

Applications can be submitted electronically to IPBO@vib-ugent.be (The application form must be named as follows: "**ODFP_ModalityA_name of research group**"). Please send the application form and supporting letter as a **single PDF file**.

