



Scientific position

Engineer, post-doctoral fellow or researcher

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VoIAER project

Establishment of a proof of concept: The analysis of Volatile Organic Compounds profile of non-invasive matrices allows to decipher rumen (dys)functioning in dairy cows

WORK ENVIRONMENT

Hosting facilities

The applicant will be hired by INRAE Clermont-Ferrand-Auvergne-Rhone-Alpes, however, the work will be conducted on 3 different sites belonging to each of the partners of the project: at the UMRH for the experimental part on dairy cows (INRAE, Theix, 25% FTE), at the INP-Purpan for the analytical part in SIFT-MS (Toulouse, 25% FTE) and at the private partner Phileo-Lesaffre for the data aggregation and valorisation (Toulouse, 50% FTE).

The applicant will be hired via action 4 of the ANR's Recovery Plan, on a 24-month contract.

INRAE- UMRH :

The Mixed Research Unit on Herbivores (UMRH, 1213) associates INRAE and VetAgroSup. It is located in Theix, near Clermont-Ferrand, in the centre of France, in one of the main agricultural mountain regions in Europe. The UMRH employs about 120 permanent staff and 80 temporary staff and students. It is linked to the Herbipôle Experimental Unit, located on 3 sites in Auvergne (Theix, Laqueuille, Marcenat). The UMRH conducts research on cattle and sheep and their production systems. The Unit has strong expertise in animal health, digestion and methane emissions, animal welfare, feed value and animal product quality. Its work contributes to the design of sustainable farming systems for herbivores, which seek to reconcile production efficiency, product quality and socio-economic viability with environmental protection and enhancement and animal welfare.

INP-Purpan

With more than 200 graduates per year, the PURPAN School of Engineering is now the second largest French training organization for engineers in life sciences, agriculture and agribusiness. In September 2020, the School opened an AGROBACHELOR program. Students (Engineers and Agrobachelors) are recruited after the BAC. The teams of permanent teacher-researchers work with the professional world by developing an educational project that combines a passion for service with a spirit of enterprise. The School and its 4,500 active engineers assert their difference through a close relationship not only with the scientific community but also with the socio-economic world, thanks to teaching that is close to the realities of business life.

Phileo-Lesaffre

A world renowned player in the field of fermentation, Lesaffre designs, produces and provides innovative solutions for bread-making, taste & food pleasure, well-being & health and biotechnology. A family group, born in the North of France in 1853, today multi-local and multicultural, Lesaffre is committed to doing business with confidence to better feed and protect the planet.

Close to its customers and partners, Lesaffre employs 11,000 people in more than 80 subsidiaries located in some fifty countries. Lesaffre achieves a turnover of more than 2.2 billion euros, of which more than 40% in emerging countries.

Within Lesaffre, there are different BUs including Phileo. Thus, with 30 years of experience and 170 employees worldwide, Phileo is considered a major player in the animal nutrition, health and well-being market.

By working at the crossroads of nutrition and animal health, Phileo designs, develops and provides innovative nutritional solutions that improve animal health and performance.

Its capacity for innovation and its mastery of manufacturing processes allow it to meet the highest requirements of industry and animal production. Its global presence gives it proximity to the field and strong adaptability to the needs of its customers.



▪ **Background**

This project is being carried out in the context of the sustainability of breeding systems (social acceptability, economic viability and respect for the environment). The VoIAER project aims to demonstrate that Single Ion Flow Tube - Mass Spectrometry (SIFT-MS) analysis of the fingerprint of Volatile Organic Compounds (VOCs) in the air exhaled by ruminants can be a biomarker of interest for monitoring the appearance of ruminal digestion disorders in lactating cows. Thus the VoIAER project is well placed in a context of maintaining the health of farm animals, as well as in a context of precision breeding or feeding, since it will involve monitoring the appearance of ruminal disorders on an individual basis, but also in a context of research into alternative methods to the use of experimental animals.

The objectives of the work will be to

1- to demonstrate that a volatolomic SIFT-MS analysis of ruminant exhaled air can be a non-invasive indicator of rumen health by discriminating between two contrasting dietary situations in terms of energy density: a ration based on forages representing a non-intensive diet Vs a ration based on cereals characteristic of an intensive diet.
2- to identify, from among other non-invasive matrices that are easier to collect than exhaled air, the combination(s) of matrices that make it possible to simply discriminate in the field the state of digestive health of animals subjected to the above-mentioned nutritional situations. The four other matrices considered in addition to exhaled air are: faeces, urine, milk and hair (containing sweat).

▪ **Work programme**

The applicant will have to manage the whole project in relation with the referents of each of the structures. He/she will have to finalise the design of the animal experimentation and then take charge of the follow-up of the trial to ensure that it runs smoothly in order to meet the objectives set. This part of the project will require the applicant to be located in Clermont-Ferrand throughout the animal experiment (25% FTE) with trips between the experimental site (Theix) and the analytical site (Toulouse) for the methodological development of the analysis of the different matrices in SIFT-MS. Then, the applicant will participate in the SIFT-MS analyses of the matrices envisaged on the ToAST platform of INP-Purpan. Finally, the applicant will have to aggregate all the zootechnical and SIFT-MS data from the experiment to synthesise the results. This part of the work will require the applicant to be located in Toulouse (75% FTE).

This work will be carried out in close interaction with the various researchers involved in the development of this proof of concept in Theix and Toulouse. The applicant will be expected to write one or more scientific publications based on the main results of this work and to make presentations at national and/or international conferences.

- UMRH website: <https://umrh-bioinfo.clermont.inrae.fr/Intranet/web/UMRH>
- INP-Purpan website: <https://www.purpan.fr/recherche/equipes-de-recherche/>
- Phileo-Lesaffre website: <https://phileo-lesaffre.com/fr/>

QUALIFICATION & SKILLS REQUIRED

A high-level scientific background (PhD or engineer) in Animal Science, Veterinary Science, Animal physiology and experience in farmed ruminant zootechnics is required as well as a good knowledge of multivariate statistics. A particular sensitivity to analytical chemistry and/or mass spectrometry would be a plus. The applicant should be motivated to be trained in the use and interpretation of SIFT-MS data on the ToAST platform. The applicant must be able to work independently but must be able to work in a collaborative network. Good writing skills in English are also required in order to report the results in the form of a scientific publication. The applicant may be of foreign nationality as long as he/she is fluent in English.

↳ Hosting conditions

- Location: UMR Herbivores (Theix, 25% FTE), INP-Purpan (Toulouse, 25% FTE) et Phileo-Lesaffre (Toulouse, 50% FTE).
- Contract: Fixed-term.
- Duration: 24 months since 1st Oct. 2022.
- Recruitment body: Engineer or researcher.
- Experience: 0 to 5 years of experience desired.
- Gross salary: depending on experience, from 2300 to 2700€/month.
- Driving licence mandatory.

✘ deadline for application: 15 June 2022 (interview last week of June).

↳ How to apply

- Send a letter of application and CV to:

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