Role of individual decision-making processes on infectious diseases spread

A Postdoctoral Research Associate is available at the Claude Bernard University – Lyon 1 (France) for modelling the impact of farmers' behaviour on the spread of infectious diseases in livestock and its implication on disease mitigation strategies.

Position information:

Position title	Postdoctoral Research Associate
Location	Lyon, France
Salary	2,009 € - 3,096 € per month
Contract Type	Fixed-Term/Contract
Funding body	IDEX university de Lyon
Expected starting date	September 2022
Position term	18 months
Hours	Full Time
Submission deadline	Applications received by 30 June 2022 will be considered in the initial review process. Applications will continue to be accepted after the initial screening date until the position is filled.
How to apply	Please submit current CV, academic qualification certificates and cover letter addressing the requirements above, by email to: thibaud.porphyre@vetagro-sup.fr
Contacts for more information	Dr. Thibaud Porphyre (VPH Team lead, UMR 5558 LBBE) thibaud.porphyre@vetagro-sup.fr

Scientific context:

Foot-and-mouth disease (FMD) and African swine fever (ASF) are highly contagious transboundary animal diseases that are caused by viruses and spread across multiple countries. Both FMD and ASF are listed as notifiable terrestrial animal diseases by the OIE and are regarded as major challenges for livestock industry and economic growth globally due to their associated production losses and trade restrictions to disease free markets.

In Europe, incursions of FMD and ASF results in all animals in the infected farms to be culled within 24h. In addition, a movements' restriction zone (MRZ) is immediately enforced within 10km around each infected farm, prohibiting all movements of animals coming in and out the MRZ to limit the spread of the disease while, at the same time, allowing farms outside the MRZ to keep trading to limit the economic impact of epidemics on the industry. Although actions of animal owners whose herds are inside the MRZ are limited, those outside the MRZ still need to trade and act according to restrictions in place as well as their own perception of the risk of being infected at short, medium and long term. In contrast, control strategies in

resource-limited countries, where these diseases have often reached endemicity, are restricted to herds that have been detected infected. In both situations, the decision process of individual animal owners will impact on the spread of these diseases by generating new potential transmission pathways and affect the robustness of mitigation strategies.

Summary of Duties:

The primary focus of this transdisciplinary (epidemiology, economics) project is to develop an epidemiological simulation model aiming to 1) better understand how the spread of notifiable infectious diseases in the livestock industry is affected by farmers' decision-making; 2) assess how accounting for farmers' trading behaviours may impact industry-wide mitigation strategies; and 3) identify optimisation strategies to control infectious diseases. Ultimately, this project will improve our capacity to respond to notifiable livestock diseases and reduce their impact on both trade and animal health.

To support this work, the successful candidate will have access to data from laboratory, field or lab-in-the-field experiments looking at farmer's decision-making in increasing risk situations that are being currently collected as part of a PhD project.

Job environment:

The successful candidate will be recruited by the Biometry and Evolutionary Biology Laboratory (UMR 5558 LBBE; https://lbbe.univ-lyon1.fr/) under the supervision of CNRS, UCBL and VetAgro Sup. Built around three pillars consisting of biometry (understood as the set of informatic, statistical and mathematical formalisation tools of biological problems), evolutionary biology and health, this laboratory offers an ideal environment for the development of interdisciplinary projects at the methodology/biology interface in eco-infectiology. The laboratory is also co-holder of the Labex Ecofect.

The candidate will work in the newly created Veterinary Public Health (VPH) Team within the Department of Evolutionary Ecology, one of the unit's four departments. The VPH Team is based on the Industrial Chair in Veterinary Public Health supported the CNRS, Claude Bernard Lyon 1 University (UCBL), VetAgro Sup and Boehringer Ingelheim. As such, he/she will be able to rely on the expertise in epidemiology, vaccinology, risk assessment, mathematical modelling, and network analysis and modelling available in the unit as those available at partners institutions in France and Great Britain.

This project is carried out in close partnership with the GATE (Groupe d'Analyse et Théorie Economique) which is widely recognized in the field of experimental and behavioral economics (individual and group decision, social norms, neuroeconomics) and offers opportunities to collaborated and integrate data collected from behavioural experiment studies.

This project has the potential to directly influence policy in both France and the UK, and inform decisions of industry stakeholders in the design of their surveillance and control programmes against infectious diseases.

Required Qualifications:

Have a PhD in either an epidemiological, statistical, mathematics, economics or data science background, a proven interest in animal health, and an ability to programme simulation or mathematical models using R / python / C++ / java.

Ability to write and speak English to a high standard.

Ability to speak French to a good standard.

Must be comfortable and motivated to work in a predominantly French-speaking environment.