5 PhD positions available at Wageningen University & Research Animal Breeding and Genomics within the Breed4Food programme

We are looking for

5 PhD positions are offered within the Breed4Food programme: 2 are in the research area ‘Utilizing DNA information’ and another 3 are in the research area ‘precision phenotyping’. The overall aims are: 1) to optimally utilize DNA information and other data in selection to increase the accuracy of (a)cross breed genomic predictions in the nucleus and in the production chain, and 2) to enable the implementation of broader breeding goals for livestock which more efficiently improve sustainability traits.

Breed4Food is a consortium established by Wageningen University & Research and four international breeding companies: CRV (cattle), Hendrix Genetics (turkeys, layers, pigs, aquaculture and traditional poultry), Topigs Norsvin (pigs), Cobb Europe (broilers) http://breed4food.com. The PhD student will be based at Wageningen University & Research Animal Breeding and Genomics, and depending on the subject partly at another group of Wageningen University & Research (e.g., Behavioural Ecology, Quantitative Veterinary Epidemiology,
Animal Health Management).

For more information, and to apply, see (note that we only consider applications that are filed through our online system):


Job descriptions
The PhD-candidates will work on timely topics that are important for the animal breeding industries:

1. You will explore variation in whole genome sequence and their consequences for phenotypes. The objective is to identify copy number variations, DNA rearrangements, and other structural DNA variations to investigate their impact on phenotypes of livestock species. Potentially whole genome sequence data contains all the information to explain the genetic variance of a phenotype. Recently, the role of single nucleotide polymorphisms and short insertions and deletions have been explored, however, there is still a part of the genetic variance that remains unexplained. A hypothesis is that other types of variation in the DNA play a role. This will involve bioinformatics, statistical and genetic analysis. This PhD-candidate will be supervised by Aniek Bouwman, Mirte Bosse, Martien Groenen and Roel Veerkamp.

2. You will investigate the impact of pre-selection based on genotypes or phenotypes on the validity of the results of genomic prediction models. Phenotypes (dairy cattle) or genotypes (poultry & pigs) used in genomic prediction may not represent the underlying distributions of phenotypes and genotypes in the entire population, due to pre-selection on either source of data. As a consequence, variance components and estimated breeding values may be biased, possibly leading to incorrectly estimated genetic trends. Thus, this project will focus on development of both robust models and data designs to obtain unbiased estimates of variance components, breeding values and genetic trends. This PhD-candidate will be supervised by Mario Calus, Jérémie Vandenplas and Jan ten Napel.

3. You will investigate the optimal method to track, identify and monitor individual animals kept in (large) groups or under commercial circumstances. Livestock species are more and more kept in large groups. Identifying and following animals in large groups is a challenge. With the use of sensor technology it is possible to track and monitor individual animals in groups. Important elements will be to compare different
tracking devices in the four livestock species (broilers, layers, pigs and cattle), to identify the most promising sensor technologies for commercial situations, to monitor specific behaviors, to define new phenotypes based on sensor technologies, and to apply these new phenotypes in commercial breeding programs. This will involve experimental work, behavioral observations (for standard setting), combining different data sources, statistical analysis of spatial data on commercial livestock populations, and genetic analysis. This PhD-candidate will be supervised by Bas Rodenburg, Esther Ellen and Yvette de Haas.

4. You will develop resilience indicators for breeding using big data, genomics and mathematical modelling and its use in breeding programs. Although in breeding there is substantial emphasis in breeding goals on health and longevity of animals, there is a need for better phenotypes related to resilience. Resilience is defined in animals as the ability to adapt to a changing environment with minimal loss of function. With the advent of data of sensors, automatic milking systems and electronic feeding stations, many traits are recorded many times per animal creating excellent opportunities to develop resilience indicators. This will involve developing resilience indicators based on mathematical modelling of various longitudinal data and validate them with physiological and health indicators, estimating genetic and genomic parameters for resilience indicators and their relationships to health and longevity, and developing genomic breeding programs to optimal use resilience indicators. This PhD-candidate will be supervised by Han Mulder, Roel Veerkamp, Claudia Kamphuis and Henk Hogeveen.

5. You will explore the mammary microbiome in a population of dairy cows across lactation and across the dry period. This knowledge will have to lead to developing phenotyping and analytical tools for large scale microbiome data sampling and interpretation. The objective of the study is to evaluate the impact of the dry period, the impact of antibiotic therapy during dry period and lactation and the predictive value of the healthy mammary microbiome with regard to the absence of intra mammary infections with pathogenic bacteria. This will involve experimental work, combining different data sources, statistical analysis of microbiome data, and genetic analysis. This PhD-candidate will be supervised by Ynte Schukken, Yvette de Haas, Dirkjan Schokker and Roel Veerkamp.