



Postdoc or engineer temporary position at INRAE Toulouse, France

Estimating the effectiveness of the genetic queen fertilisation control in honey bees through large-scale sequencing and genomic analysis

Background You will be welcomed into the GenPhySE unit at INRAE in Toulouse, as part of the BeeGees team working on the genetic diversity and genomics of honey bees (<http://genphyse.inrae.fr/poles>). Your work will focus on analysing sequencing data as part of the FecDist project, which studies bee fertilisation in the natural environment with a view to controlling the male pathway in selection schemes.

Project Reproduction in the honeybee *Apis mellifera* has characteristics that are unique among farmed species. The queen, the only fertile female in a colony, makes one or more nuptial flights a few days after her birth and mates in flight with several males — the drones — whose sperm she stores in her spermatheca. In order to select the genetic strains they are interested in, breeders saturate the environment by placing drone hives, producing large numbers of drones with the desired genetics. However, as many beekeepers use the same strategy at the same time, with different genetic backgrounds and breeding interests, the effectiveness of this practice is questionable. In order to test the effectiveness of queen fertilisation control, we have placed drone hives at various distances around a fertilisation apiary. The detection of alleles specific to different males will be carried out by sequencing complete genomes with 'short reads', both by sequencing worker bees from fertilised queens and males from male hives. Two approaches will be considered: (i) the search for diagnostic alleles at SNP markers and (ii) the analysis of alleles of the sex-determining gene in honey bees, *complementary sex determiner* (*csd*), for which more than 100 different coding alleles are known.

You will be specifically responsible for analysing massive sequencing data. Data available in the laboratory for more than 1,000 haploid drone genomes will be used to refine our knowledge of the hypervariable *csd* locus. Analysis of the FecDist project's mixed sequencing data will enable the identification of SNP alleles specific to each male origin and their detection in the sequences of worker daughters of fertilised queens.

TRAINING AND SKILLS REQUIRED

- Minimum degree required: Master's degree /Engineering degree or PhD
- Knowledge required: bioinformatics
- Appreciated experience: Experience with high-throughput sequencing data processing and the use of Linux computing clusters. Experience with reproducible workflow systems

(Nextflow, Snakemake or equivalent) and an interest in bees/beekeeping would be an advantage.

↳ Reception modalities

- Unit: GenPhySE
- Postal code + city: 31326 Castanet Tolosan
- web site : <https://genphyse.toulouse.inra.fr/>
- Type of contract: CDD (fixed-term)
- Duration of the contract: 22 months
- Starting date: April 2026
- Remuneration: 1800 – 2300 €, according to experience

↳ How to apply

Send a motivation letter and a CV to :
Alain Vignal: alain.vignal@inrae.fr

✖ Deadline for applications: 15th February 2026

See also:

In French: <https://jobs.inrae.fr/en/ot-28112>
In English: <https://jobs.inrae.fr/ot-28111>