RÉPUBLIQUE FRANÇAISE
Liberté Égalité Fraternité

INRAE AgroParisTech

UMR **1313 - GABI**

Animal genetics and integrative biology (GABI)

Genomics, Biodiversity, Bioinformatics, Statistics Team,

GiBBS

Team leader
Tatiana Zerjal
Xavier Rognon

Global theme
The team's activities aim to offer a holistic approach to the study of diversity, combining genetic analysis of animal populations with the development of advanced methodologies for integrating complex data. This work improves our understanding of genetic and functional diversity and supports optimised management of genetic resources, responding to the challenges of agroecological transition and climate change.

université PARIS-SACLAY

Attached to **Université Paris-Saclay**

Attached to the **ABIES doctoral school** (Agriculture, Biology, Environment, Health)

SAPS Sciences Animales PARIS SACLAY

SAPS member
Sciences Animales Paris-Saclay

CARNOT France Futur Élevage

Member of Institut Carnot
France Futur Elevage

Scientific questions

1- Characterisation of neutral and functional genetic diversity

Work on characterising 'neutral' diversity is fundamental to understanding the evolutionary history of species and the impact of selection or other breeding practices, and forms part of our research activity. However, beyond this 'neutral' diversity, our work leads us to approach diversity from different angles, combining "neutral" and 'functional' diversity in the context of agroecological transition. This involves, for example, (1) combining phenomic, genetic and epigenetic approaches to the landscape, (2) studying the diversity and role of the intestinal microbiota in responses to heat stress, and (3) studying the genetic and epigenetic signatures of stress. Finally, the team is continuing its research into the genetics of plumage colouration and morphology.

Related projects: AgroDiv (PEPR) ; SCALA MEDI (Europe H2020), GEroNIMO (Europe H2020), Chickstress (ANR), ChickMetaT.

2- Development of methods for integrating diverse and complex data

Our team has acquired significant, internationally recognised expertise in the field of complex and heterogeneous data integration, and many opportunities will open up in this area in the coming years. We are continuing our work on the development of a wide range of approaches in biostatistics and bioinformatics for multi-omic data, ranging from exploratory analyses to explicit modelling of complex inter- and intra-omic dependencies (Bayesian statistics, network inference, machine learning), the development of software and pipelines (variant calling, annotation, SV detection) for x-omic data analysis, integration and interpretation. We also provide statistical and bioinformatics support and advice to biologists, both within and outside the unit.

Related projects: HOLOBIONTS (PEPR ANR)) ; PRATREG (Apis Gene) ; GEroNIMO (Europe H2020), Réseau EuroFAANG

Centre
Île-de-France - Jouy en Josas - Anthony

Domaine de Vilvert
78350 Jouy en Josas

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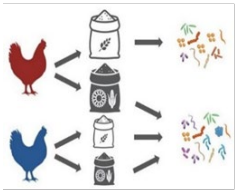
Facilities
- National databases and data collected in the field.
- Poultry experimental unit (PEAT, Nouzilly).
- Network of Biological Resource Centres (CRB-CRB-Anim, Infrastructure project).

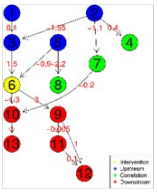
Highlights
- Integration of multi-omic data for the identification of bovine fertility biomarkers (2024);
- Seminar on rustic breeds, held in Paris (2023)
- Feed efficiency in laying hens and intestinal microbiota (2024);
- Creation of comic strips on the cryopreservation of genetic resources and their use (2024)

3- Conservation and mobilisation of genetic resources

Our team conducts research using both experimentation and simulation to propose conservation and resource mobilisation strategies aimed at improving resilience and robustness. This work is carried out in collaboration with stakeholders in the animal sector, particularly managers and users of animal populations. Drawing on its expertise, the team provides support for public policies on genetic resources at the national (Ministry of Agriculture), European (ERFP) and global (FAO) levels.

Related projects: RAGEMO 2, AGROBIODIV (PEPR), Co-breeding (PEPR), SCALA MEDI (Europe H2020).





Expertise

Population genetics and genomics; biostatistics; data analysis; bioinformatics; methods for managing genetic resources in situ and ex situ; animal experimentation.

Partner

- Europe : projet GEroNIMO sur la diversité génétique et épigénétique en lien avec la capacité adaptative des volailles et des porcs ;
- Europe, Maghreb : projet Scala Medi sur l'adaptation climatiques des volailles et des ovins ;
- Europe, Taiwan : Etudes de génétique et génomique des populations sur la volaille (poulet, cailles) ;
- Afrique, Inde : Etudes de génétique des populations sur des populations locales de bovins, poules, pintades.

Publications

https://gabi.jouy.hub.inrae.fr/les-equipes/gibbs/publications-de-l-equipe-gibbs

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