Deliverable 6.3

# List of labs/institutions dedicated to application of artificial intelligence for G2P prediction infrastructure

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**Confidential: No**

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**Table of Content**

## 1. Summary of results

The survey collected responses from 38 participants across 26 European institutions, providing an updated overview of artificial intelligence (AI) or machine learning (ML) expertise in genotype-to-phenotype (G2P) research for farmed animals including both terrestrial and aquatic. Academic institutions accounted for the majority of respondents (55%), with less participation from breeding companies and umbrella organisations (9%), indicating that AI/ML expertise remains primarily concentrated in public research bodies and a few private companies.

The main areas of technical strength were automated phenotyping (12 institutions) and computational methods and techniques (9 institutions), followed by genomic prediction (7 institutions). Expertise in functional annotation, multi-omics integration, and variant–trait association (GWAS) was less common, suggesting that integration of diverse data types into predictive G2P pipelines is still limited. Many groups focus exclusively on either genomic or phenotypic data, with relatively few combining both into integrative G2P approaches.

Geographically, AI/ML expertise appears mostly distributed across EU countries. In terms of species focus, cattle, pigs, and fish were the most represented (8 institutions each). The strong presence of aquaculture research highlights its growing adoption of AI/ML, likely driven by the advantages of automated phenotyping in species where traditional data collection is difficult.

Finally, several institutions, particularly academic ones involved in the GenoPhenix Research Infrastructure, host multiple researchers working on AI/ML for G2P, underscoring internal clustering of expertise within individual organizations.

## 2. Introduction

The EuroFAANG Research Infrastructure project under the EU Horizon Europe programme (HORIZON-INFRA-2022-DEV-01) has the aim to consolidate and optimize the pan-European infrastructure for genotype-to-phenotype (G2P) research in farmed animals. A critical component of this effort is the integration of artificial intelligence (AI) and machine learning (ML) to analyse complex genomic and phenomic data and predict phenotype outcomes based on genotype.

Artificial intelligence (AI) and machine learning (ML) are computational approaches that enable systems to recognize complex patterns in large datasets and to make predictions or decisions with minimal explicit modelling or programming. These techniques have rapidly gained interest across diverse fields of research, ranging from image and speech recognition, to medical diagnostics, climate modelling, and drug discovery. In the life sciences, AI and ML have already been applied successfully to predict protein structures, identify genomic variants associated with disease, and optimize crop breeding strategies. For livestock research, and specifically for efforts to link genotype to phenotype (G2P), these methods offer great potential to integrate genomic, environmental, management, and sensor-derived data in order to improve the prediction of complex traits, accelerate breeding progress, and improve animal health and welfare.

AI and ML offer powerful tools for uncovering biological patterns across several levels (from molecular networks to organism-level traits) using high-dimensional, multi-omics and phenotypic data. Integrating these approaches into EuroFAANG RI will enhance predictive models, accelerate breeding and welfare outcomes, and allow Europe to maintain leadership in sustainable animal agriculture.

This deliverable (D6.3) is part of the work aimed at building the foundational network of AI/ML-expert labs for functional G2P research. The objective is to identify and map these actors across Europe, assess the existing expertise, and lay the groundwork for their integration into a transnational infrastructure.

The aim of deliverable 6.3 was to create a consolidated list of all institutions using AI/ML in their research in Europe. Creating this list will help determine the geographical spread of research and application of AI/ML across Europe. It will also explain how the EuroFAANG research infrastructure could provide transnational access (TNA) and the expertise required.

## 3. Methodology

The first part of this deliverable involved a comprehensive search on websites and manuscripts to identify the G2P research areas where AI/ML is applied.

### 3.1 Survey development and target audience

A short survey was designed to identify researchers, labs, and companies that currently use or develop AI/ML tools for G2P applications in livestock, including terrestrial and aquatic species. Respondents were asked to confirm whether their work involves the use of AI/ML in any of the following areas:

- Genomic prediction using machine learning
- Computer vision for automated phenotyping
- AI for genome-wide association studies (GWAS)
- Multi-omics integration using AI/ML
- Other data-driven approaches for G2P inference

The target audience included academic research groups, private companies, public research institutes, and consortia partners known to work in animal genomics, breeding, phenotyping, or computational biology.

### 3.2 Dissemination strategy

An initial contact list was compiled through web searches, EuroFAANG and AquaFAANG network, and EFFAB contacts reaching 260 people. The survey was shared with this list and distributed more broadly via relevant mailing lists, including AnGenMap and QGDG, to reach a wider international audience. The survey was opened from 1st July to 3rd October 2025.

### 3.3 Final survey of AI/ML in G2P research of terrestrial and aquatic farmed animals

The survey included the following sections:

1. Name of the organization
2. Type of organization (academic, industry, other)
3. Scope of research (e.g., genomic prediction, phenotyping, GWAS)
4. Key AI/ML researcher(s) in your organization and species focus (aquatic, terrestrial)
5. Website/contact information

Specifically, the survey disseminated included the following questions:

1. *Name of the organization (group, institution, or company) [_____]*

2. *Organization type (select one option)*
    - *Academic institution*
    - *Private company*
    - *Government/public research institute*
    - *Breeding organization*
    - *Other, namely [_____]*

3. *Research areas of the organization where Artificial Intelligence (AI)/ Machine Learning (ML) is applied (select multiple)*
    - *Sequencing techniques*
    - *Functional annotation*
    - *Variant-trait association (e.g. GWAS)*
    - *Genomic prediction*
    - *Multi-omics data integration*
    - *Automated phenotyping (e.g. computer vision or image analysis)*
    - *Dimension reduction*
    - *Computational methods and techniques*
    - *Other, namely [_____]*

4. *Key AI/ML researcher(s) in your organization (multiple input fields, two columns)*

    | *First and last name** | *Research area (expertise)* | *Species* |
    |---|---|---|
    | *[_____]* | *[_____]* | *[_____]* |

    **This information will remain private*

5. *Links to relevant publications or websites (optional) (multiple input fields) [_____]*
    *[_____]*
    *[_____]*
    *[_____]*
    *[_____]*

## 4. Results

The survey was answered by 38 respondents. Repeated institutions and affiliations were merged to avoid double counting. This resulted in 26 different research institutions, which are included in Annex 1 (without associated contact information).

### 4.1 Overview of survey outcomes

Most survey responses came from academic institutions (55%), with the fewest from breeding companies or umbrella organizations (9%) (Figure 1).

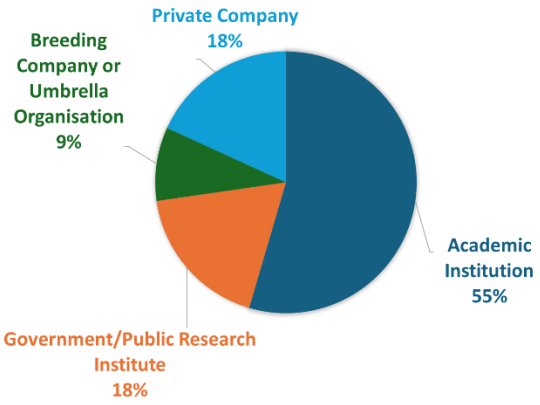


*Figure 1. Pie chart of the different types of organizations that responded the survey and their involvement in AI/ML.*

Respondents were from eleven different countries from Europe, including the UK, and some respondents from outside EU (specifically from USA and New Zealand) (Figure 2). Non-European respondents were omitted from later analyses.

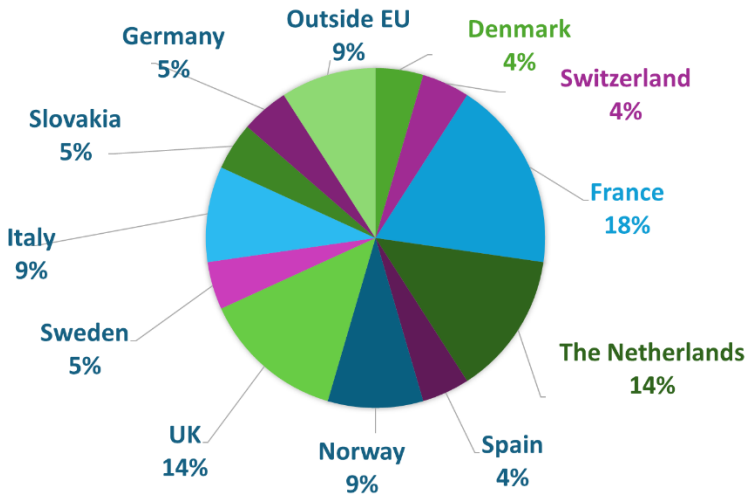


*Figure 2. Pie chart of the geographic origin of the different organizations using AI/ML.*

The research areas that were reported the most were automated phenotyping (e.g., computer vision or image analysis), reported by 12 institutions, and computational methods and techniques, reported by 9 institutions (Table 1). Other research interests include genomic prediction (7 institutions), functional annotation (5 institutions), and sequencing techniques (4 institutions). When asking for other expertise non mentioned in the survey, researchers also mentioned the fields of prediction of new phenotypes from mid-infrared spectral data from milk, VIS-NIR spectroscopy, multispectral, and hyperspectral analysis.

*Table 1: Research areas where institutions are applying AI/ML*

| RESEARCH AREA | NUMBER OF INSTITUTIONS |
|---|---|
| **SEQUENCING TECHNIQUE** | 4 |
| **FUNCTIONAL ANNOTATION** | 5 |
| **VARIANT-TRAIT ASSOCIATION (E.G. GWAS)** | 4 |
| **GENOMIC PREDICTION** | 7 |
| **MULTI-OMICS DATA INTEGRATION** | 4 |
| **AUTOMATED PHENOTYPING (E.G. COMPUTER VISION OR IMAGE ANALYSIS)** | 12 |
| **DIMENSION REDUCTION** | 5 |
| **COMPUTATIONAL METHODS AND TECHNIQUES** | 9 |
| **OTHERS** | 1 |

We also evaluated which livestock species the responding institutions focused on in AI/ML research (Table 2). The most studied species include cattle (8 institutions, both beef and dairy), pigs (8 institutions), and fish (8 institutions). Fish species specified include Atlantic salmon, European sea bass, gilthead sea bream, and Arctic charr.

*Table 2: Research species in which institutions are applying AI/ML*

| SPECIES/ANIMALS | NUMBER OF INSTITUTIONS |
|---|---|
| CATTLE | 8 |
| PIG | 8 |
| SHEEP | 2 |
| GOATS | 1 |
| FISH | 8 |
| CHICKEN | 2 |
| TURKEY | 2 |
| POULTRY* | 2 |
| INSECTS (BLACK SOLDIER FLY, HONEY BEE) | 2 |
| HORSES | 1 |
| HUMANS | 1 |
| BACTERIA | 2 |
| VARIOUS LIVESTOCK | 3 |

*Poultry is used when no specific species is given and can include chicken and turkey.

When asked about the researchers' fields of expertise, two major blocks of knowledge appeared: methodological/technological and biological/animal science.

**Methodological / Technological:** Genomic selection, Breeding management, Precision livestock farming, AI-assisted phenotyping, Statistics and Genomics, Mid-infrared spectroscopy, Quantitative genetics, Data sciences, Modelling, Digital phenotyping, Probabilistic Machine Learning, AI and Machine Learning in Livestock Genomics, Image and sensor based phenotyping, Functional Genomics, Simulation, Digital Twins, LLMs, Bioinformatics, Machine Learning, Digitalization, AI/ML Computational Modeling, AI-integrated automated phenotyping for selective breeding, Big Data and Computer Vision, Infection and 3D Imaging.

**Biological / Animal Science:** Genetics, Genomics, Reproduction, Microbiology, Ophthalmology, Medicine, Epigenetics, 3D genome organization, Microbiome Research, Welfare and Behaviour from Video, Genotype, Disease association, Veterinary Sciences, Behaviour, Animal husbandry and production, Animal breeding and genetics, Animal Orthopaedic Diseases, Adaptation Physiology

### 4.2 Detailed information on labs

For each responding institution, information on the species that they work with and their research area is summarized in Appendix 1.

## 5. Discussion

The survey responses (38 respondents, merged to 26 institutions) provide an up-to-date overview of European expertise in AI/ML applied to genotype-to-phenotype (G2P) research for farmed animals. Yet, it should be noted that general results and recommendations should be taken with caution as there may be additional groups in the EU performing AI G2P research that did not respond to the survey. From our results, we identified that academic institutions represent the majority of respondents (55%), while contributions from breeding companies and umbrella organisations are limited (9%). This confirms that AI/ML expertise is primarily concentrated in public research institutions, as well as private companies (e.g. Hendrix Genetics, AquaGen AS or Topigs Norsvin, among others).

In terms of technical focus, the strongest clusters of expertise are in automated phenotyping (12 institutions) and computational methods and techniques (9 institutions). Genomic prediction (7 institutions) also features prominently, whereas other areas such as functional annotation, multi-omics integration, and variant–trait association (GWAS) appear less widespread. This distribution suggests that while there is a strong foundation for handling high-dimensional data and images, integration of diverse data modalities into predictive pipelines is still limited. It can either be because of general lack of expertise or non-interest among the community of molecular researcher, or lack of models to overlap all the different -omics data generated.

A clear gap on integration of data is also visible. While ideally, we wanted to focus on the use of AI in true G2P research (i.e., research that seeks to link genome to phenome data), we realized that this would be a too narrow scope. For this reason, the survey also included G- or P- only expertise. We indeed identified that many groups specialise either in genomics (sequencing, GWAS, prediction) or in phenotypes (imaging, sensor data, spectroscopy), but fewer combine both streams into full G2P workflows. Aside from genomic prediction, integrative approaches are rare. This fragmentation highlights a significant opportunity for EuroFAANG or future consortiums to support methodological integration and cross-disciplinary collaboration, especially since multi-omic and sensor data integration is increasingly recognised as necessary to improve predictive accuracy.

Geographically, the use of AI is quite evenly distributed among the EU countries. Yet, we could not reach researchers in Portugal, Czech Republic, Greece, Austria, Poland, Ireland, among others. We hypothesise this imbalance may partly due to differences in national

investment and strategy of focus in livestock AI or varying institutional capacity, such as lack of computational resources or expertise.

Species representation reveals that cattle, pigs, and fish are equally frequent focal species (8 institutions each). This is notable, as it suggests aquaculture is as active as major terrestrial livestock in adopting AI/ML tools. We hypothesize that this may be due to the benefits that can be gained by adopting automated high-throughput phenotyping in fish, where collection of phenotypes using traditional methods is challenging, time consuming, and costly. Reported fish species include salmon, sea bass, sea bream, and Arctic charr, reflecting aquaculture's rapid digitalisation and reliance on genomic and imaging technologies. Chickens, sheep, and insects are less represented.

Interestingly, it is also worth to mention that while some institutions were counted as a single unit, they have several researchers working on AI for G2P. This has not only seen in Academia but also Private companies. Most of these academia institutions are also partners for the GenoPhenix Research Infrastructure.

## 6. Recommendations

There are few recommendations in which future consortium initiatives as GenoPhenix could lead:

- Strengthen integrative G2P pipelines. Encourage collaborations between genotype-focused and phenotype-focused groups, particularly by supporting pilot projects that combine computer vision/sensor data with genomic prediction. This could come from short stay in others institutions or curses.

- Promote COST Action networking. Actively participate in current COST Action (e.g. CA22112 EU-LI-PHE, CA22149 Insect-IMP) or future ones to develop training schools, harmonisation of methods, and mobility opportunities for early-stage researchers, with particular emphasis on underrepresented regions.

- Establish Services, TNA and Training within the Research Infrastructure of GenoPHEnix. Establish working groups or formal collaboration channels with GenoPHEnix to build niche expertise in AI/ML within the members of the RI and respective communication structures. We envision that this could also help to address geographic gaps as an ERA-based research strategic approach. Moreover, develop outreach and training specifically aimed at smaller or underrepresented institutions.

- Promote reproducible AI methods. Researchers should support the development of open, annotated datasets and reproducible ML pipelines that can be shared across institutions and species.

- Regularly update the survey. Repeat the survey periodically, with expanded outreach to breeding companies and industry partners, to track adoption and identify emerging expertise.

## 7. Conclusions

This survey confirms that AI/ML applications in G2P research are expanding across Europe, with notable activity in automated phenotyping, computational modelling, and genomic prediction. The results highlight a persistent division between genotype-only and phenotype-only research, with integrative G2P approaches still limited outside of genomic prediction. Addressing this gap should be a priority for GenoPHEnix through different activities. Aquaculture species emerge as a particularly active field, on par with cattle and pigs, underscoring the importance of including fish in GenoPhenix's strategic planning. EuroFAANG community, and now, GenoPhenix, is well-positioned to act as a hub for integration, capacity building, and knowledge sharing. By linking the community we envision that it can accelerate the development of niche AI expertise, foster pan-European collaboration, and ensure that its infrastructure serves as a foundation for future innovations in animal genomics and phenomics.

## 8. Annex 1

List of institutes that filled the survey alphabetically ordered:

**Aarhus University**

Country in which the lab is based: Denmark

Funding type: Public

Type of organisation: Academic Institution

Address: Aarhus University, Denmark

Website: https://international.au.dk/

Expertise: Variant-Trait Association (eg. GWAS), Genomic Prediction, Automated Phenotyping (eg. Computer Vision and Image Analysis); Breeding planning, Precision livestock farming, AI-assisted phenotyping

Species: Cattle, pigs, insect (Black Soldier Fly)

**Agroscope**

Country in which the lab is based: Switzerland

Funding type: Public

Type of organisation: Government/Public Research Institute

Address: Agroscope, Switzerland

Website: https://www.agroscope.admin.ch/agroscope/en/home.html

Expertise: Automated Phenotyping (eg. Computer Vision and Image Analysis); Mid-infrared spectroscopy, Genetics

Species: Cows, honey bee

Additional information:

Topic: Mid-infrared spectral analysis, Link: https://doi.org/10.3168/jds.2020-19576

Topic: Mid-infrared spectral analysis, Link: https://doi.org/10.3168/jds.2021-20812

Topic: Agricultural resilience and sustainability, Link: https://www.alexandria.unisg.ch/entities/publication/6669af23-6638-4ded-90f7-d36cfe26770f

**AquaGen AS**

Country in which the lab is based: Norway

Funding type: Private

Type of organisation: Private Company

Address: AquaGen AS, Norway

Website: https://aquagen.co.uk/

Expertise: Functional Annotation, Variant-Trait Association (eg. GWAS), Genomic Prediction, Automated Phenotyping (eg. Computer Vision and Image Analysis), Computational Methods and Techniques

Species: Salmon

**Axiom**

Country in which the lab is based: France

Funding type: Private

Type of organisation: Breeding Company or Umbrella Organisation

Address: Axiom, France

Website: https://www.axiom-genetics.com/en/

Expertise: Automated Phenotyping (eg. Computer Vision and Image Analysis), Dimension Reduction, Computational Methods and Techniques; Quantitative genetics, Phenotyping, Data sciences, Modelling, Genomic prediction

Species: Pig

**Federal Research Institute for Animal Health, the Friedrich-Loeffler-Institut**

Country in which the lab is based: Germany

Funding type: Public

Type of organisation: Government/Public Research Institute

Address: Friedrich-Loeffler-Institut, Germany

Website: https://www.fli.de/en/startpage/

Expertise: Automated Phenotyping (eg. Computer Vision and Image Analysis), Sequence Techniques; Infection and 3D Imaging

Species: Livestock, bacteria

Additional information:

Topic: 3D imaging, Link: https://doi.org/10.1016/bs.aivir.2023.06.003

Topic: SARS-CoV-2 lung infection, Link: https://doi.org/10.1128/spectrum.02469-23

Topic: Bacterial Genotyping, Link: https://link.springer.com/article/10.1186/s12864-025-11793-6

Topic: Bacterial Genotyping, Link: https://www.nature.com/articles/s41467-025-59246-8

Topic: Bacterial Genotyping, Link: https://link.springer.com/article/10.1186/s12864-023-09343-z

**French Poultry and Aquaculture Breeders' Union (SYSAAF)**

Country in which the lab is based: France

Funding type: Private

Type of organisation: Breeding Company or Umbrella Organisation

Address: SYSAAF, France

Website: https://www.sysaaf.fr/

Expertise: Variant-Trait Association (eg. GWAS), Automated Phenotyping (eg. Computer Vision and Image Analysis); Genomics, Phenotyping, Reproduction

Species: Fish, Poultry

Additional information:

Topic: SEPIAA program, Link: https://www.sysaaf.fr/les-programmes-de-r-d/programmes-r-d-aqua-en-cours/sepiaa

**Hendrix Genetics**

Country in which the lab is based: The Netherlands

Funding type: Private

Type of organisation: Private Company

Address: Hendrix Genetics, The Netherlands

Website: https://www.hendrix-genetics.com/en/

Expertise: Variant-Trait Association (eg. GWAS), Genomic Prediction, Automated Phenotyping (eg. Computer Vision and Image Analysis), Computational Methods and Techniques, Dimension Reduction; Digital Phenotyping, Genomic Selection

Species: Chicken, turkey, pigs, fish

Additional information:

Topic: Multi-species animal breeding, genetics, and technology company, Link: www.hendrix-genetics.com

**Incubateur Initium Universite de Montpellier**

Country in which the lab is based: France

Funding type: Public

Type of organisation: Academic Institution

Address: Incubateur Initium, Universite de Montpellier, France

Website: https://incubateur-initium.edu.umontpellier.fr/

Expertise: Sequence Techniques, Functional Annotation, Genomic Prediction, Multi-Omics data Integration; Microbiology, Ophthalmology, Medicine

Species: Homo sapiens

Additional information: N/A

**INRAE**

Country in which the lab is based: France

Funding type: Public

Type of organisation: Academic Institution

Address: INRAE, France

Website: https://genphyse.inrae.fr/poles

Expertise: Sequence Techniques, Functional Annotation, Multi-Omics data Integration, Dimension Reduction, Computational Methods and Techniques; Epigenetics, 3D genome organization, Probabilistic Machine Learning, Multi-omics

Species: Pig, bovine

Additional information:

Topic: Sequence determinants for 3D genome organization, Link: https://www.mdpi.com/2673-9976/33/1/1; https://hal.inrae.fr/hal-04651656v1

Topic: Applied statistics, Link: https://mcour.github.io/index.html

**Institute of Agrifood Research and Technology (IRTA)**

Country in which the lab is based: Spain

Funding type: Public

Type of organisation: Government/Public Research Institute

Address: IRTA, Spain

Website: https://www.irta.cat/en/

Expertise: Multi-Omics data Integration, Dimension Reduction, Computational Methods and Techniques; AI and Machine Learning in Livestock Genomics, Multi-omics, Microbiome Research

Species: Pigs, Cows

**Norwegian University of Life Sciences**

Country in which the lab is based: Norway

Funding type: Public

Type of organisation: Academic Institution

Address: Norwegian University of Life Sciences, Norway

Website: https://www.nmbu.no/en

Expertise: Sequence Techniques, Functional Annotation, Genomic Prediction, Automated Phenotyping (eg. Computer Vision and Image Analysis); Image and sensor based phenotyping, Functional Genomics, Simulation, Digital Twins, LLMs, Welfare and Behaviour from Video

Species: Atlantic salmon, Sheep, Dairy Cattle

Additional information:

Topic: Feed intake phenotyping X-ray in salmon, Link: https://www.sciencedirect.com/science/article/pii/S0044848625006015

Topic: Feed intake interactance NIR, Link: https://www.sciencedirect.com/science/article/pii/S0044848625008920

Topic: UAV imagery wheat, Link: https://acsess.onlinelibrary.wiley.com/doi/full/10.1002/ppj2.70004

**Scotland's Rural College**

Country in which the lab is based: UK

Funding type: Public

Type of organisation: Academic Institution

Address: Scotland's Rural College, UK

Website: https://www.sruc.ac.uk/

Expertise: Genomic Prediction, Automated Phenotyping (eg. Computer Vision and Image Analysis), Computational Methods and Techniques, Prediction of new phenotypes from mid infrared spectral data from milk; Genomics, Bioinformatics, Machine Learning

Species: Dairy, beef, sheep, goats

**Slovak University of Agriculture in Nitra**

Country in which the lab is based: Slovakia

Funding type: Public

Type of organisation: Academic Institution

Address: Slovak University of Agriculture in Nitra, Slovakia

Website: https://www.uniag.sk/en/main-page

Expertise: Dimension Reduction, Genomic Prediction, Computational Methods and Techniques; Population genetics, Breeding programmes

Species: Livestock

**Swedish University of Agricultural Sciences**

Country in which the lab is based: Sweden

Funding type: Public

Type of organisation: Academic Institution

Address: Swedish University of Agricultural Sciences, Sweden

Website: https://www.slu.se/en/

Expertise: Variant-Trait Association (eg. GWAS), Automated Phenotyping (eg. Computer Vision and Image Analysis), Dimension Reduction, Genomic Prediction, Computational Methods and Techniques, Sequence Techniques, Functional Annotation; Genetics, Digital Phenotypes, Genotype, Disease association, Veterinary Sciences, Digitalization

Species: Horses, cattle, pig, poultry, Arctic charr

Additional information: N/A

**Topigs Norsvin**

Country in which the lab is based: The Netherlands

Funding type: Private

Type of organisation: Private Company

Address: Topigs Norsvin, The Netherlands

Website: https://topigsnorsvin.com/

Expertise: Computational Methods and Techniques; Quantitative Genetics, Machine Learning, Behaviour

Species: Pigs, Cows

Topic: Indirect genetic effects, Link: https://doi.org/10.1186/s12711-025-00988-w

Topic: Machine learning, Link: https://doi.org/10.3168/jds.2020-18320

Topic: Genomic prediction, Link: https://doi.org/10.1038/s41467-021-27258-9

Topic: Poultry bone phenotypes, Link: https://doi.org/10.1016/j.psj.2024.104214

Topic: Genomic prediction, Link: https://doi.org/10.1016/j.aqrep.2024.102468

Topic: Image analysis, Link: https://doi.org/10.1016/j.psj.2024.104214

**Università degli Studi della Tuscia**

Country in which the lab is based: Italy

Funding type: Public

Type of organisation: Academic Institution

Address: Università degli Studi della Tuscia, Italy

Website: https://www.unitus.it/

Expertise: Automated Phenotyping (eg. Computer Vision and Image Analysis), Computational Methods and Techniques, VIS-NIR, multispectral, hyperspectral analysis; Animal husbandry and production

**University of Edinburgh**

Country in which the lab is based: United Kingdom

Funding type: Public

Type of organisation: Academic Institution

Address: Roslin Institute, University of Edinburgh, United Kingdom

Website: https://vet.ed.ac.uk/roslin

Expertise: Functional Annotation, Variant-Trait Association (eg. GWAS), Genomic Prediction, Multi-Omics Data Integration, Automated Phenotyping (eg. Computer Vision and Image Analysis), Computational Methods and Techniques; Genomics, Statistics

Species: Livestock, cattle/chicken, microbes

Topic: Engineering biology, Link: https://ddi.ac.uk/5m-hub-to-aid-precision-breeding-of-future-farm-animals/

**University of Padova**

Country in which the lab is based: Italy

Funding type: Public

Type of organisation: Academic Institution

Address: University of Padova, Italy

Website: https://www.unipd.it/en/bca

Expertise: Genomic Prediction, Multi-Omics data Integration, Automated Phenotyping (eg. Computer Vision and Image Analysis); Animal breeding and genetics

Species: Swine, European sea bass, gilthead sea bream

Additional information:

Topic: Early disease detection, Link: https://doi.org/10.1016/j.atech.2024.100762

Topic: Precision Forestry, Link: https://doi.org/10.1007/s11676-024-01784-w

Topic: Marine wildlife detection, Link: https://doi.org/10.1016/j.ecoinf.2024.102788

Topic: Agricultural Engineering, Link: https://doi.org/10.1016/j.compag.2023.108536

Topic: Agricultural Engineering, Link: https://doi.org/10.3390/s23020868

Topic: Computer Vision, Link: https://doi.org/10.1017/S0021859623000114

Topic: Hyperspectral Early Disease Detection, Link: https://doi.org/10.1186/s13007-022-00880-4

MANDRACHE-LAB website, Link: https://www.unitus.it/en/departments/dafne/research/research-laboratories/laboratory-of-human-driven-ai-technologies-for-environment-mandrache/

**Wageningen University & Research**

Country in which the lab is based: The Netherlands

Funding type: Public

Type of organisation: Academic Institution

Address: Wageningen University & Research, The Netherlands

Website: https://wur.eu/abg

Expertise: Automated Phenotyping (eg. Computer Vision and Image Analysis), Dimension Reduction, Computational Methods and Techniques, Genomic Prediction; AI-integrated automated phenotyping for selective breeding, Genomic prediction, Big Data and Computer Vision, Adaptation Physiology

Species: Poultry, turkey, cattle, pigs, fish

Additional information:

Topic: Bayesian and Machine Learning Models for Genomic Prediction of ACL Rupture in the Canine Model, Link: https://academic.oup.com/g3journal/article/10/8/2619/6048677

Topic: Leveraging mixed-effects regression trees for analysis of high-dimensional longitudinal data to identify low and high-risk subgroups, Link: https://link.springer.com/article/10.1186/s13040-025-00437-w

Topic: Predictive ability of genome-assisted statistical models under various forms of gene action, Link: https://www.nature.com/articles/s41598-018-30089-2

Topic: Utilizing trait networks and structural equation models as tools to interpret multi-trait genome-wide association studies, Link: https://link.springer.com/article/10.1186/s13007-019-0493-x

Topic: Including Phenotypic Causal Networks in Genome-Wide Association Studies Using Mixed Effects Structural Equation Models, Link: https://www.frontiersin.org/journals/genetics/articles/10.3389/fgene.2018.00455/full

Topic: Cross-species analysis of genetic architecture and polygenic risk scores for non-contact ACL rupture in dogs and humans, Link: https://doi.org/10.1038/s42003-024-07395-9

**Xelect Ltd**

Country in which the lab is based: UK

Funding type: Private

Type of organisation: Private Company

Address: Xelect Ltd, UK

Website: https://xelect-genetics.com/

Expertise: Quantitative genetics

Species: Aqua

Additional information:

Topic: An analytical framework to predict slaughter traits from images in fish, Link: https://www.sciencedirect.com/science/article/pii/S0044848622012935

Topic: Genetic analysis of swimming performance in rainbow trout (Oncorhynchus mykiss) using image traits derived from deep learning, Link: https://www.sciencedirect.com/science/article/pii/S0044848625004934

Topic: Genomic prediction, Link: https://jasbsci.biomedcentral.com/articles/10.1186/s40104-025-01250-5

Topic: Using machine learning to predict deleteriousness of single nucleotide variants in chicken and turkey, Link: https://www.biorxiv.org/content/10.1101/2024.11.01.621569v1

Topic: Using machine learning to predict deleteriousness of single nucleotide variants in pig, Link: https://gsejournal.biomedcentral.com/articles/10.1186/s12711-020-0528-9

Topic: Tracking individual broilers on video in terms of time and distance, Link: https://www.sciencedirect.com/science/article/pii/S0032579123007046

Topic: Cow key point detection in indoor housing conditions with a deep learning model, Link: https://pubmed.ncbi.nlm.nih.gov/37863288/