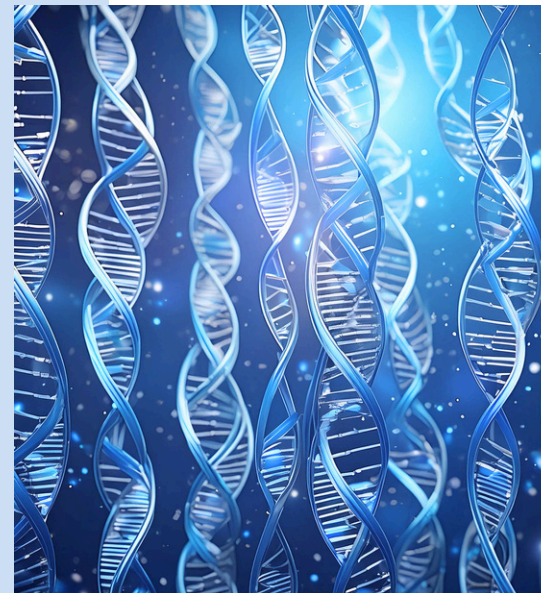




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## EDITORIAL

By Klaus Wimmers and Emily Clark

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**The EuroFAANG research infrastructure (RI)** concept development project, funded by the Horizon Europe INFRA-DEV funding stream has now been running for 18 months (half of the total duration of the project). During that time, we have performed many of the planned activities and successfully progressed through our first reporting review.

Highlights from the first year and a half of the project include a very exciting **EuroFAANG workshop** and industry panel discussion at the *EAAP meeting in Lyon in August 2023* and presentation of the EuroFAANG RI project during the *European Biobanking Week Congress in Vienna*. Further afield we also ran global networking events at the *Plant and Animal Genomes Conference in San Diego* and took part in the *FAANG workshop at AGBT-Ag in Phoenix Arizona*.

These global events were hugely useful in building capacity for G2P research in farmed animals with collaborators in Europe, the US and globally to establish shared goals to consolidate research and infrastructure activities going forwards. The last 18 months also saw the establishment of *the European Think-Tank on Genome Editing* which brought together experts from a range of disciplines to discuss key topics, including clarifying definitions and exploring the potential of high-throughput CRISPR screens.



## EDITORIAL

In parallel a think-tank focussed on in vitro cellular models was established and we also completed a successful survey exploring biobanking capabilities and capacity across Europe. These activities have helped the **EuroFAANG RI consortium** considerably as we build concepts for transnational access and complete our design study and business plan. Overall, the first 18 months have been very exciting, and we feel the project is really gathering momentum, largely thanks to participation and support from the community.

Thank you for taking the time to read the newsletter and we hope you'll be able to join us for some of the activities over the coming year, the continued support of the farmed animal G2P research community is essential for the success of the EuroFAANG RI project and we greatly appreciate all the participation to date.







## ONE YEAR OF THE EUROFAANG RESEARCH INFRASTRUCTURE

The **EuroFAANG Research Infrastructure (RI)** project held its Annual Meeting in Brussels on 16 February 2024. Bringing together all seven partners in a hybrid format, the event showcased the project's first-year results.

The meeting commenced with a discussion focusing on the presentation of goals and milestones achieved during the inaugural year from each Work Package. Participants engaged in conversations, highlighting the progress made in various areas of concept development for the research infrastructure. Three of the key highlights of the meeting were the *successful submission of all deliverables expected for the year 2023, a summary of links explored with other RI projects, and discussions around the establishment of the European think-tank on genome editing in year one.*

The **EuroFAANG RI Project Consortium**, comprised of research institutions and organisations, remains committed to global collaboration and facilitating advancements in the European research infrastructure space. The Annual General Meeting provided a platform for partners to share valuable insights, exchange ideas, and solidify plans for the upcoming second year of the EuroFAANG RI project.



## **FABRE TP AM World Café 2023**

### **SHAPING THE FUTURE OF ANIMAL BREEDING**

The **Farm Animal Breeding and Reproduction Technology Platform (FABRE TP)** held its Annual General Meeting (AGM) in Brussels on May 30-31, 2023. This event served as the platform for the first stakeholder workshop of the EuroFAANG RI project, aimed at identifying the barriers and opportunities associated with genome editing in farmed animals.

FABRE TP, a key contact point for farm animal breeding and reproduction organizations in Europe, fosters research and innovation for sustainable animal breeding and reproduction. The AGM brought together academic researchers and industry stakeholders, making it an ideal venue for the workshop.

The workshop was conducted in a World Café format, organized by EuroFAANG RI project partners EFFAB, INRAE, and UEDIN. Participants were divided into two groups, each discussing a different topic: biobanking and genome editing. After a brief introduction to the EuroFAANG RI project and the topics, the groups swapped discussions.



The World Café session led to the identification of several **barriers and opportunity to adopting genome editing** in farmed animals. These insights from the FABRE-TP AGM World Café undoubtedly contributed to the ongoing discussions and research on genome editing in farmed animals.

## **EAAP 2023**

# **GENOYPTE-2-PHENOTYPE RESEARCH ACROSS EUROPE & BEYOND**

The EuroFAANG session at the [EAAP 2023 Conference](#) was a vibrant platform for discussing genotype-to-phenotype research in farmed animals. The panel comprised of esteemed experts:

- Abe Huisman from [Hypor](#), a voice for the swine breeding industry.
- Romain Morvezen from [SYSAAF](#), an expert in aquaculture genetics.
- Olivier Demeure from [Groupe Grimaud](#), representing poultry, aquaculture, and biotechnology.
- Clotilde Patry from [Valogene](#), specialising in cattle genetics.

*The panel discussion shed light on several key areas:*

- 1.Genetic Diversity and Climate Change Adaptation**
- 2.Integration of New Information**
- 3.Phenotyping Methods**
- 4.Cost Efficiency and Tool**
- 5.Basic Research and Knowledge Gap**
- 6.Industry-Research Collaboration**
- 7.Global Challenges**
- 8.Volume and Market Development**

In conclusion, the EuroFAANG session underscored the significance of genetic diversity, the integration of new information, basic research, cost-efficient tools, and industry-research collaboration in advancing genotype-to-phenotype research in farmed animals. The panelists viewed these elements as crucial for addressing the challenges and opportunities in the field of animal breeding.



[READ MORE](#)



## **SUMMER SCHOOL 2023**

### **A JOURNEY INTO THE CELLULAR WORLD OF ANIMAL SCIENCE**

The first summer school training *“Innovative Cellular Models for Animal Science – Support the 3Rs through the use of organoids”* led by the PHASE Division of INRAE (BREED Unit) was held on the 11th to 15th September 2023 in Jouy-en-Josas, France in lines with the objectives of work-package 4.

The school was attended by 23 participants from France, Germany, Belgium, the Netherlands, Italy and Spain. The lectures focused on the development of **organoids** and their applications for farm animals, such as nutrition, host-pathogen relationships, and embryo and reproductive biotechnologies. More methodological aspects were also presented and discussed, such as genetic modification by genome editing, imaging and “organ-on-chip” technologies, and microfluidic approaches.

Finally, we held two seminars on the ethical issues surrounding the development and use of these new 'tools'. Plenary lectures were given by overall twenty speakers from UK, France, Germany, Netherlands and Italy, representing both academia and industry. The final discussion pointed to the interest of jointly developing new guidelines and to build shared standards for the further use of these models in farm animal research.

The responses of the participants to our satisfaction survey were flattering and, above all, gave us previous suggestions for our future initiatives, such as our forthcoming **“G2P in a dish”** theoretical and practical workshop.

**Save the date to attend it on February 3-7, 2025!**



Summer School 2023 group on *“Innovative Cellular Models for Animal Science – Support the 3Rs through the use of organoids”*



## Advancing Genome Editing in Farmed Animals

### A COLLABORATIVE APPROACH

**The European think-tank (WP5)**, a collaborative initiative, is dedicated to fostering responsible genome editing research and its application in farmed animals. This platform, which was strategically formed and launched on October 5th, brings together experts in genome editing, ethics, and animal breeding from across Europe, serving as a hub for informed dialogue and strategic collaborations on critical topics.

*Our 1st think-tank event*, organised as part of this project, has provided valuable insights into the complex landscape of gene editing in farmed animals. It revealed a setting characterised by both substantial opportunities and significant challenges. Gene editing holds the potential to revolutionise the agricultural sector by improving animal health, welfare, and sustainability.

However, it also faces hurdles such as limited understanding of genome function, phenotypic uncertainty, societal perceptions, regulatory divergence, market acceptance, off-target effects, resource and testing gaps, legislative ambiguity, historical trust issues, and concerns about genetic diversity.

We have identified key priority areas, including consumer and stakeholder engagement, educational outreach, genomic variant testing, health traits development, animal welfare improvement, and scalability enhancement. Concentrating on these areas will be crucial in harnessing the full potential of gene editing.

As we move forward, we plan to establish a dedicated volunteer subgroup to refine the terminology related to genome editing in farmed animals. While our think-tank event was engaging, it has become clear that more comprehensive discussions are necessary. The positive feedback we have received underscores the importance of such initiatives. We intend to use the insights gained from the think-tank to plan our next event in Spring 2024. To further enhance its effectiveness, we will distribute a questionnaire to participants to gather their feedback.

Our ultimate aim is to promote responsible gene editing practices that benefit both the agricultural sector and society at large. We look forward to continuing our work in this exciting and important field.



### **WP4** Advancements in Cellular Models and Biobanks for Animal Science

#### **INNOVATIVE CELLULAR MODELS FOR ANIMAL SCIENCE**

The use of in vitro cellular models represents an important asset for fundamental and pre-competitive G2P research in terrestrial and aquatic farmed species, fully in line with the 3Rs principles. To facilitate the development and sharing of these models among the European community is one of the main objectives of EuroFAANG. Indeed, the widespread use of advanced cellular models in G2P research is hindered by the need to adapt existing and rapidly evolving methodologies across different species, to improve their reproducibility and achieve in time adequate standards for their production, biobanking, quality control, characterisation, and manipulation. In work package 4 we are implementing several activities to promote a widespread and harmonised use of these models.

#### **SURVEY ON ANIMAL BIOBANKS: A STEP TOWARDS ENHANCED G2P RESEARCH**

The survey on animal biobanks launched in 2023 was completed by 31 organizations representing 14 countries. A large range of farm animal species and tissue types is already represented in these 31 biobanks, 24 of them being under the responsibility of a public entity. The answers showed that more than 9 biobanks can already offer a storage service for cellular models to support G2P research in farmed animals, whereas 15 are interested to do so by would need additional training, equipment, budget or space to do it. The percentage of biobanks ready to amplify or generate stem cells or organoids, respectively, was much smaller, 6 and 4 respectively, but a great majority would consider doing it if training and/or equipment can be provided. Indeed, 12 biobanks reported they could use a cell culture lab on their premises or nearby.



### **WP6 Integrating New G2P Technologies and Emerging Species into EuroFAANG**

WP6 focuses on new technologies across the G2P spectrum that will help to improve animal farming systems in Europe. WP6 plays an important role in maximizing the awareness and uptake of such technologies, and the resources they produce, by relevant stakeholders. We are also working towards the incorporation of new and emerging farmed animal species (e.g. insects and marine invertebrates) into the EuroFAANG infrastructure. This will bring many new stakeholders into the field, who previously

have not been represented in the EuroFAANG infrastructure. We have already held meetings with experts in marine invertebrates from The Roslin Institute, University of Edinburgh, and are currently developing a survey to help profile current research activities for various emerging species across Europe.

In Task 6.1 we focus on proposing novel strategies based on cutting-edge technologies to 'bridge the gap' between in vitro cellular models and the classical in vivo phenotyping approaches. This has clear links with WP4, and we are currently planning a meeting with researchers across Europe – including members of the WP4 think tank – to discuss the major challenges and opportunities in this field. This meeting will take place before the summer of 2024, and was preceded by a local meeting of experts from FBN in January 2024 to begin discussions.

WP6 has also developed a webpage on the EuroFAANG website which describes the major goals and strategies of the three WP tasks. This will be expanded over the remainder of the concept development phase as the various deliverables and milestones are reached, particularly those dedicated to profiling research activities in emerging farmed animal species across Europe.





### **WP7 Linking and exploiting synergies with European Research Infrastructures**

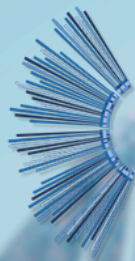
Extensive discussions with ELIXIR and partners from the FAANG community has led to establish a focus group entitled 'Domestic Animal Genomes and Phenomes', which aims at setting the foundation of an ELIXIR Community for Animal Sciences. Connecting researchers and data scientists across species and countries is needed to accelerate genotype to phenotype research in domestic animals and develop a coordinated open and standardised data life cycle. This ELIXIR community will aim at promoting and align tools, databases, standards, and best practices for domestic animal genomics and phenomics research.

In order to facilitate insertion of EuroFAANG in the European landscape of infrastructures, structured interviews were organised with representatives of ESFRI landmarks for biobanking, such as BBMRI, EMBRC and MIRRI, and, also for biological models, with INFRAFRONTIER. Interviews also took place with on-going INFRAIA projects for animal phenotyping, PIGWEB and AQUAEXCEL. Sharing experiences with established biobanking infrastructures provided useful information for EuroFAANG in preparing its biobanking rules and TNA policy. Complementarity between biobanking and phenotyping infrastructures appeared clearly, and further collaboration is needed.



Challenges were identified for connecting biobanks with different scopes or expertise within a large network. Scientific community awareness and data standardisation appeared as key elements for success.

Raising awareness of the scientific community benefited from several events where EuroFAANG RI was presented: the FAANG workshop at EAAP 2023, the 10 years celebration of FAANG at PAG, 2024, and the final meeting of AQUA-FAANG, GENE-SWITCH and BOVREG EU-funded research projects. Networking will be maintained with these consortia and extended to on-going research projects of interest to the FAANG community.



# EuroFAANG

## MEET THE CONSORTIUM



### KLAUS WIMMERS

Prof. Dr. Klaus Wimmers is Director of the Research Institute for Farm Animal Biology (FBN) and Professor of Animal Breeding and Husbandry at the University of Rostock. His main interests are the physiological, genetic and epigenetic basis of trait expression and

differentiation in the context of animal welfare and resource efficiency. His group is involved in FAANG activities and contributes to annotation efforts in pigs and chickens.

### EMILY CLARK

Dr Emily Clark is a research group leader at the Roslin Institute at the University of Edinburgh in Scotland. Her research focuses on understanding how the genome is expressed and regulated in farmed animals and generating new

resources to provide highly annotated genomes for these species. She is co-coordinator of the EuroFAANG research infrastructure concept development project and co-leads work package five which is focused on genome editing.





## EuroFAANG movie and our new flyers



## Events coming up



EAAP 2024, Florence, Italy



*G2P in a dish* - A workshop on genotype to phenotype research in domestic animals: in vitro models and standards

Pre-registration is open until October 1st, 2024.

See more information on how to apply and practical information [here](#).

