European Network on Livestock Phenomics (EU-LI-PHE): an international initiative aimed at facilitating the application of phenomics in animal breeding

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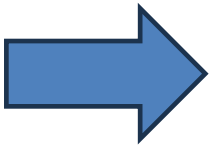
Animal and Food Genomics Group

Set the scene

Major bottleneck in Animal Breeding and Selection

Phenotyping is increasingly being recognized as a limiting factor in all applications of animal science



We need:

i. new phenotypes
ii. new ways to measure phenotypes
iii. new ways to use phenotypes

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EUROPEAN NETWORK ON LIVESTOCK PHENOMICS

CA22112

2023-2027

What is a COST Action ? (I)

What is a COST Action ? (I)

- A COST Action is an **interdisciplinary research network** that brings researchers and innovators together to investigate a topic of their choice for 4 years.

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The content

Overcome the major bottleneck in Animal breeding and Selection

Phenotyping is increasingly being recognized as a limiting factor in all applications of animal science

We need:

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ii. new ways to measure phenotypes
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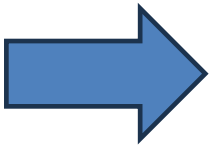
Overcome the major bottleneck in Animal breeding and Selection

Phenotyping is increasingly being recognized as a limiting factor in all applications of animal science



We need:

i. new phenotypes
ii. new ways to measure phenotypes
iii. new ways to use phenotypes

...by exploring synergies with PLF

Action challenge

Foster the development, integration, organisation and practical implementation of technologies, tools, methods, approaches, models, expertise and resources useful to scan and interpret the **animal phenome** to paving the way for **novel scientific knowledge** and **applications** in the **livestock production sectors.**

Animal phenome

The physical and molecular traits of an animal.

Broad heterogeneity in phenotype classes

A wide array of scientific approaches and technologies can be used to capture and manage phenotypic information.

- **8 Research Coordination Objectives**
- **4 Capacity Building Objectives**

Research Coordination objectives (I)

1. Advancing state-of-the-art high-throughput technologies and protocols required for deep phenotyping which can describe phenotypic information at multiple levels in farmed animals (**WG1**)

2. Providing cross-disciplinary knowledge to develop new standards in phenotyping technologies, phenome data descriptors, phenotype ontologies, databases, data structures, storage and sharing, in line with open science policies (**WG1** and **WG3**)

3. Evaluating available software and bioinformatic tools and defining methods for effective data mining, processing, summarisation, integration and visualization of genome/epigenome to phenome data in livestock (**WG2** and **WG3**)

4. Exploring integrative dynamic responses and adaptations of animal phenomes to variable environmental factors (**WG2**)

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The structure

Structure

Chair of EU-LI-PHE: Luca Fontanesi

Animal and Food Genomics Group
Department of Agricultural and Food Sciences,
University of Bologna

E-mail: luca.fontanesi@unibo.it

Vice-chair of EU-LI-PHE: Tomas Norton

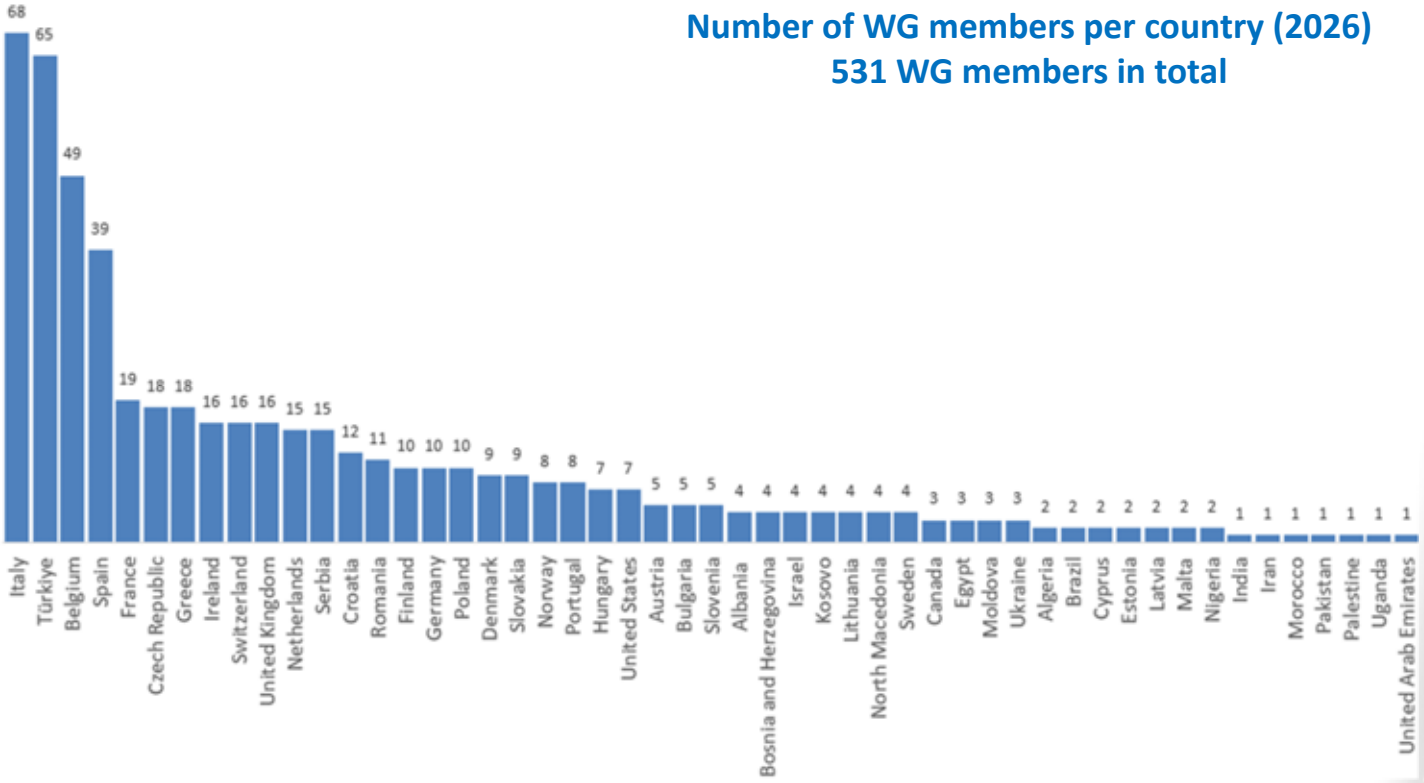
Animal and Human Health Engineering (A2H)
Department of Biosystems (BIOSYST), KU Leuven

E-mail: tomas.norton@kuleuven.be

- **5** Working Groups
- **64** Management Committee members from **36** countries
- **531** Working Group members from **51** countries
  - **293 males + 237 females**
  - **212 from ITC**
  - **279 are YRI**

Overview of the CA

Number of WG members per country (2026)
531 WG members in total



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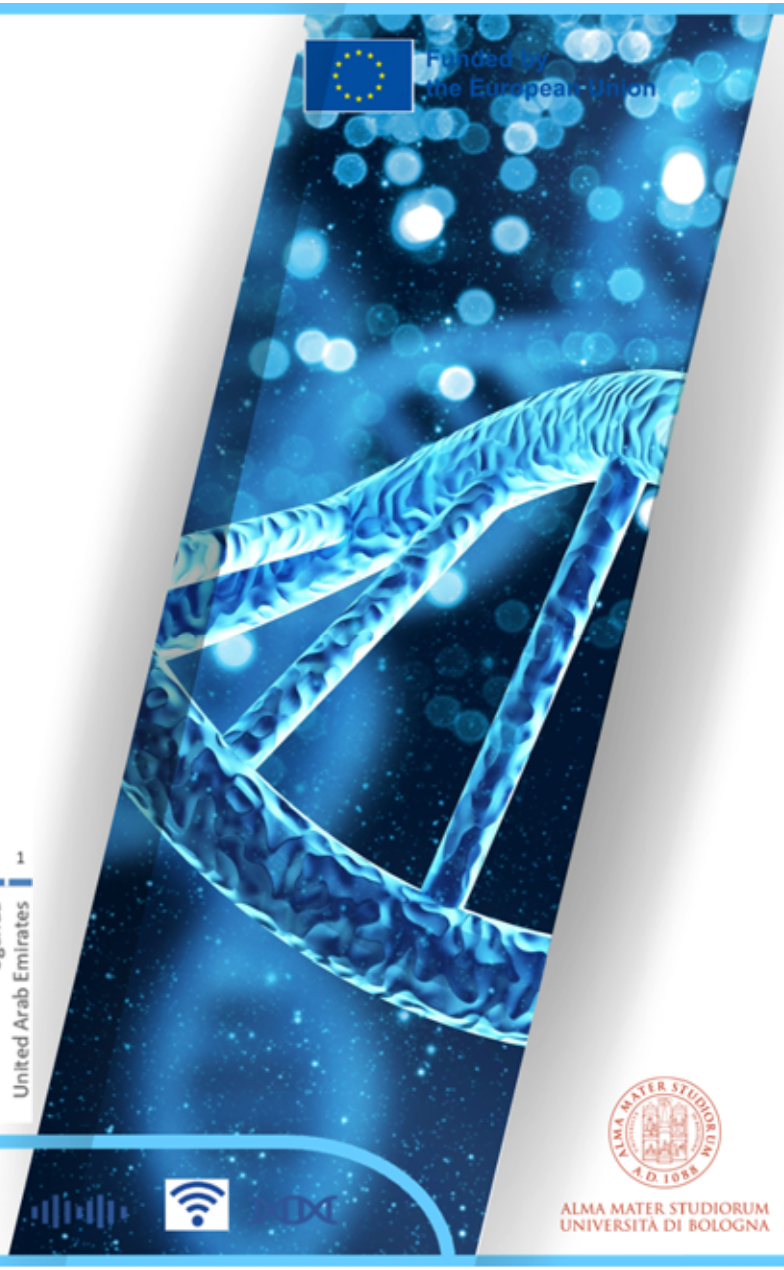

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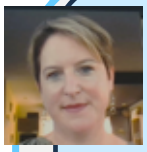
Hélène Soyeurt



WG1
Phenotyping technologies

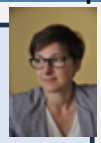
Jarissa Maselyne

Emily Clark

Andreia Amaral

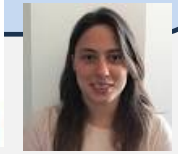
David MacHugh

Claudia Kasper



WG2
Genome to phenome integration

WG3
Computational resources and methodologies for data analyses



Cristina Casto-Rebollo

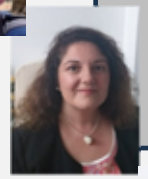
Michael J. Toscano

Elma Zanaj

Cristina Casto-Rebollo

Fabio Abeni

Livia Vidu



WG4
Economic impact, regulations, policies, and society

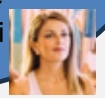
Geena Cartick

Tomas Norton

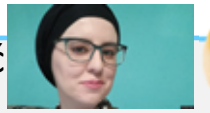
Young Researchers & Innovators Committee

Grant Awarding Coordinators

- Ivona Djurkin Kusec
- Despoina Karatosidi



Adna Ašić



Geena Cartick

WG5
Stakeholder engagement, communication, and dissemination

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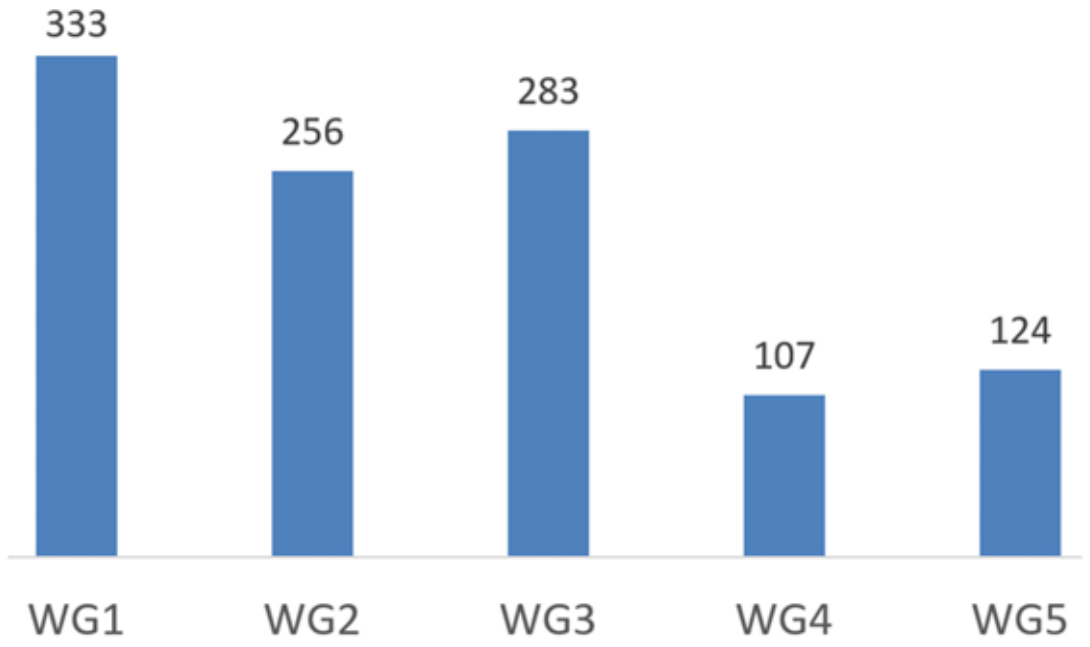
Overview of the CA

Number of Members divided by WG (2026)



EU-LI-PHE Networking tools

- Meetings, Workshops
- Grants to attend third party conferences
- Training schools (WG1-WG4)
- Short Term Scientific Missions (STSMs)
- Virtual mobility grants
- Dissemination activities (social media)

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- Job placement/announcement service
- Midterm stakeholder meeting
- Support service from the Enterprise Europe Network (EEN)
- Demonstration activities

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The objectives

Deliverables

WG	Deliverable no.	Deliverable name	Delivery date - semester=sem	Deliverable no.	Month
1	D1.1	A document/report with a list of phenotyping technologies/approaches that can be used in livestock phenomics	2nd sem, year 1	1	12
1	D1.2	A document/report with (a) proposal(s) to establish standardization rules and/or systems in livestock phenomics	2nd sem, year 2	6	24
1	D1.3	A document or report with a list or map of R&D infrastructures in different countries	2nd sem, year 1	2	12
2	D2.1	A document/report including information of initiatives and projects focused on genome to phenome integration in livestock species. This list is updated regularly every year.	Every year, updated regularly	3	12
2	D2.2	A document/report with (a) proposal(s) to establish genome annotation systems with phenome data and information	2nd sem, year 2	8	24
2	D.2.3	A review on the current and potential applications by integrating genome and phenome information	1st sem, year 3	10	30
3	D3.1	A document/review including an overview of computational models and methods needed to explore/exploit livestock phenomics	1st sem, year 2	5	18
3	D3.2	A document/report including proposals to establish standardized databases and computational procedures useful for livestock phenomics	1st sem, year 3	9	30
3	D3.3	A document/report with information of the existing cyberinfrastructures and computational capabilities available and those needed over the next decades, useful for livestock phenomics	2nd sem, year 3	11	36
4	D4.1	A report or a review on the expected impacts and applications of livestock phenomics	1st sem, year 4	14	42
4	D4.2	A review of the regulatory framework including the major issues of concerns in livestock phenomics	1st sem, year 4	15	42
4	D4.3	A survey structure and a report obtained using the analysed and evaluated data and opinions on livestock phenomics	2nd sem, year 3	12	36
1, 2, 3, 5	D1.4, D2.4, D3.4, D5.4	A white paper focused on research gaps and priorities in livestock phenomics	2nd sem, year 4	16	48
5 (1, 2, 3, 4)	D5.1, D5.6	A special themed issue/section of a scientific journal for submission of Action manuscripts and reviews	2nd sem, year 3 (and every year)	13	36
5	D5.2	A periodic newsletter	Every year	na	-
5	D5.3	A report or document that summarizes the outputs, activities, results and discussions from the stakeholder conference/demonstrations	2nd sem, year 2	7	24
5	D5.5	An Action website containing scientific and dissemination reports, teaching and training documents, the annual newsletters, announcements and list of scientific articles focused on livestock phenomics and related fields. This list is updated every year.	Every year, updated regularly	4	12
5	D5.7	A book on livestock phenomics that will include basic and advanced chapters to benefit both experts and non-specialists	2nd sem, year 4	17	48

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WG1. Phenotyping technologies

Main aims:

i) Provide an overview of current phenotyping technologies and infrastructures that can be used for applications in livestock phenomics;

ii) Define a roadmap of the research needs to capture high-dimensional phenotypic information on an animal-wide scale.

Task 1.1. Phenotyping technology mapping.

Task 1.2. Standardization of phenotyping systems and information.

Task 1.3. R&D infrastructures.

Task 1.4. Identification of technology gaps and research needs.

Task 1.5. WG1 training school, WG1 meetings and STSM.

WG2. Genome to phenome integration

Main aims:

i) Provide an overview of the links between genome/epigenome variation and phenotypic variation at multiple levels in the main livestock species;

ii) identify synergies with related initiatives on functional analyses of livestock genomes (e.g., the FAANG initiative);

iii) identify knowledge gaps and research needs and provide a road map with a clear trajectory to new applications.

Task 2.1. Genome biology and phenome differences.

Task 2.2. Expand genome information with phenome data.

Task 2.3. Applications of genome to phenome information.

Task 2.4. Identification of knowledge gaps and research needs.

Task 2.5. WG2 training school, WG2 meetings and STSM.

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The Events – Activities

Activities for the third year

2026

Training school: Creating Added Value in PLF
4-8 May
Madrid, Spain

YRI meeting
1st July
Ghent, Belgium

Summer school (AI4AS)
2-3 July
Ghent, Belgium

Training school: Artificial Intelligence and Data
31 August – 4 September
Padova, Italy

Summer School: Epidemiology, Genetics and Modelling for Infectious Disease Control
31 August-4 September
Edinburgh, UK

Jan Feb Mar Apr May Jun Jul Aug Sept Oct Nov Dec

Virtual Mobility Grants

COST Connect | Science in Action: Solutions for the Sustainable Development Goals
29 January
Brussels, Belgium

4th EAAP Regional Meeting - Mediterranean Region
20-22 May
Sassari, Italy

ICAR 2026 Annual Conference and Interbull meeting
29 May - 5 June
Verona, Italy

EU-LI-PHE Annual Meeting
10-11 June
Istanbul, Turkey

2nd EAAP Artificial Intelligence 4 Animal Science Conference (AI4AS)
29-30 June
Ghent, Belgium

World Congress on Genetics Applied to Livestock Production
July 12-17
Madison, Wisconsin

77th EAAP Annual Meeting
07-11 September
Hamburg, Germany

STSM – ITC & YRI conference grants – other dissemination events - EULIPHE-Talks

National Hub/WG Meeting(s)
(to be confirmed/planned)

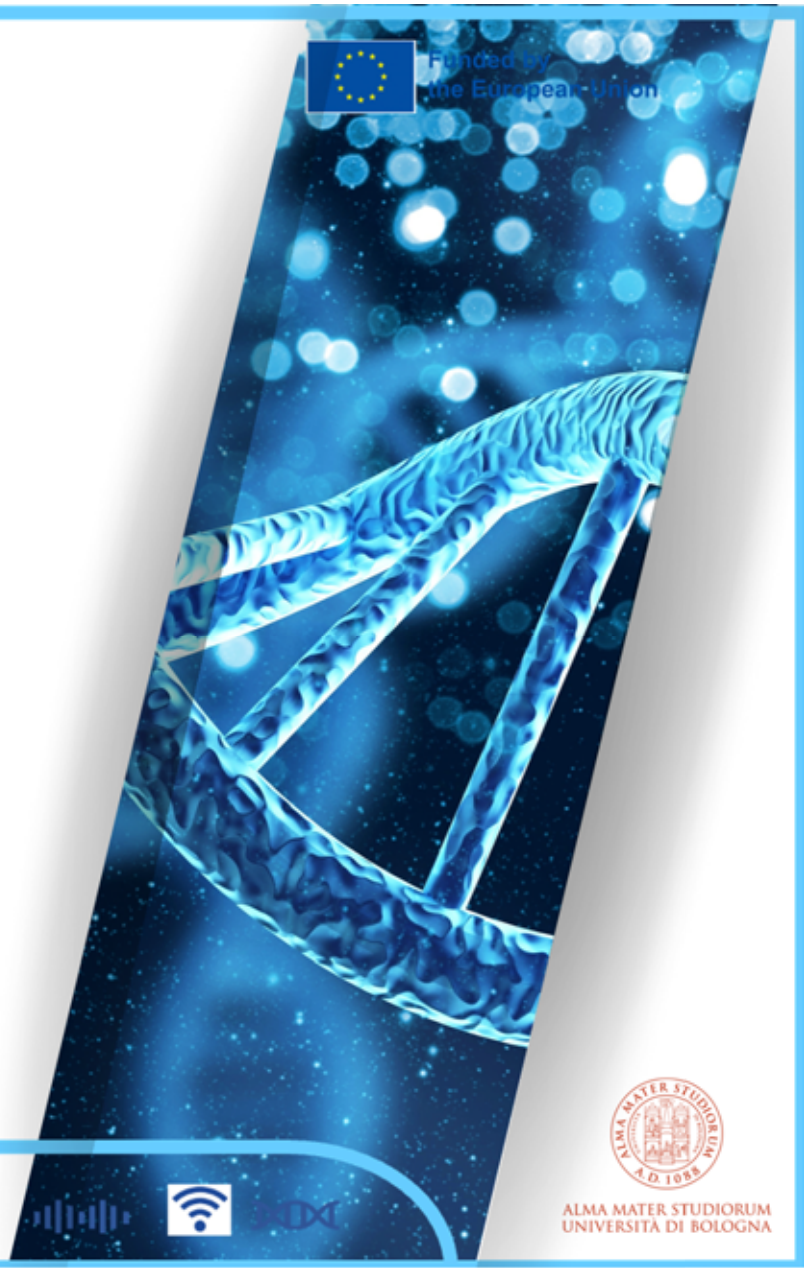
National hubs and related events

- National hubs constituted, planned or under discussion (2024-2025)

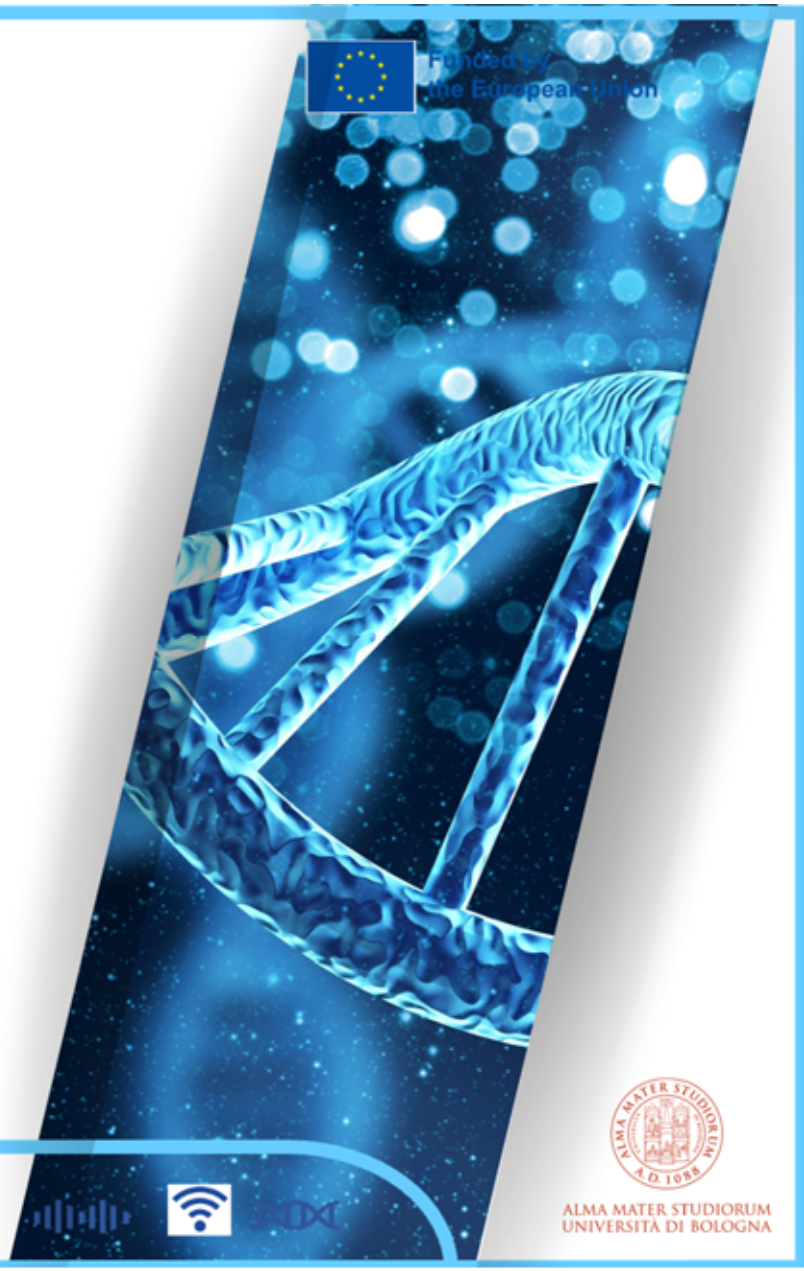
1.	Italy	ASPA Commission on Animal Phenomics
2.	Czech Republic	meeting - Sept. 19th, 2024 Prague
3.	Slovakia	meeting – May 25th, 2025 Nitra
4.	Belgium	under discussion
5.	UK & Ireland	under discussion
6.	Balkan regional	under discussion
7.	Turkiye	under discussion
8.	Switzerland	in preparation
9.	….	

- Inclusion in the EU-LI-PHE website

- General Plans/Guidelines



Calls open all over the budget period



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September 27th 2023, Kick-off meeting in Brussels

First Annual Meeting: 11-12 June 2024, Bologna, Italy

WG1 Training School: 18-21 June 2024

First EU-LI-PHE Young Researchers & Innovators Meeting – 5th & 6th Sept. 2024, Florence, Italy

Livestock Innovation Event – 20th Sept. 2024 Prague, Czech Republic

WG4 & WG5 Meeting: 25 August 2025, Innsbruck, Austria

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CA22112 – 2023-2027

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SCAN TO JOIN US

HOW TO JOIN

Apply to become a member of the Working Groups:

www.cost.eu/actions/CA22112/

Let's Keep in Touch:

euliphe_costaction@gmail.com

luca.fontanesi@unibo.it

Social media

- LinkedIn
- Facebook
- X

SCAN TO FOLLOW US

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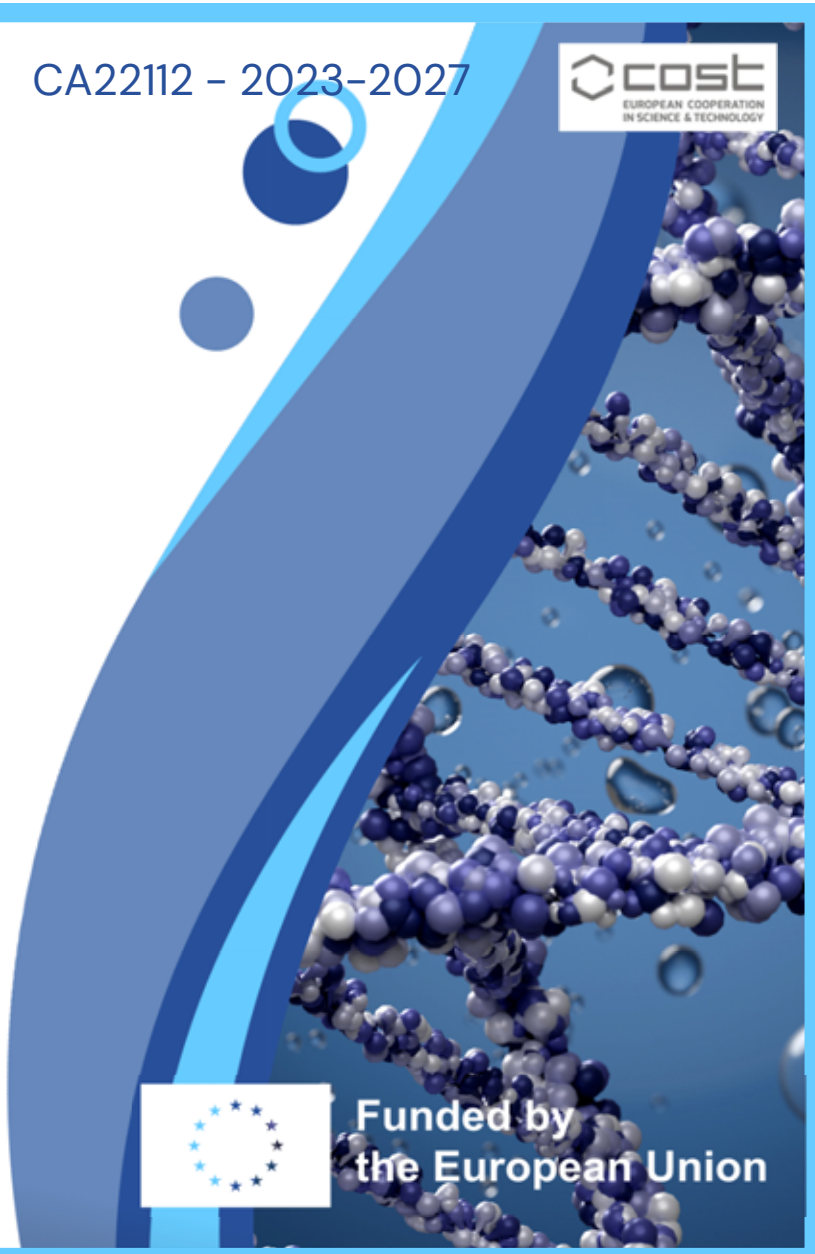

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Outlook/Vision

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To establish a collaborative global network with the aim to overcome the phenotyping bottleneck in animal breeding and selection

#phenomicsisthecentraldogmainanimalscience

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