Launch of New Research Project "AIRIS": Developing an AI Research Collaborator to Advance Biomedical Research

AIRIS unites 21 partners from Europe, Canada and the US to develop generative AI models that integrate biological knowledge and clinical data. AIRIS' main goal is to deliver an AI collaborator that helps researchers better understand disease progression and advance personalised medicine.

Athens, Greece, 9 July 2026 – Patients with the same diagnosis can experience very different disease courses and treatment outcomes, shaped by a complex interplay of biological and environmental factors. However, current generative AI systems aimed at modelling such diseases primarily learn statistical correlations from their training data rather than the underlying biological mechanisms that cause disease. As a result, their predictions can be unreliable and difficult for researchers to interpret and trust. This is especially true for diseases whose mechanisms are not yet fully understood, even by medical practitioners.

To address this fundamental challenge, the new research project AIRIS (*Mechanism-Informed Multimodal Generative AI for Causal and Dynamical Modelling in Biomedical Research*) brings together the multidisciplinary expertise of 21 research and industry partners from nine European countries, the United States, and Canada. Over the next four years, the consortium will receive €16.9 million in funding from the European Union's Horizon Europe Programme to develop a generative AI platform that builds and reasons with mechanistic models of disease, rather than relying solely on statistical patterns. The goal is to design a platform that assists researchers in identifying previously unknown disease pathways and developing novel scientific hypotheses.

An AI Research Collaborator Built on Biological Knowledge

The AIRIS platform will integrate diverse biological and clinical data, such as medical scans, lab tests, genomic data and patient records, while linking molecular and cellular processes to patient-level outcomes via simulated Virtual Cells. AIRIS will support researchers at every stage of the research cycle, from harmonising complex, multimodal data to identifying unknown disease pathways and generating new hypotheses.

"Moving beyond today's AI systems, our new tool will act as a virtual collaborator capable of helping scientists access and harmonise data, explore disease mechanisms, generate and test hypotheses, and design rigorous studies," explains Christos Diou, Associate Professor and project coordinator. By integrating and automatically harmonising heterogeneous multi-modal biomedical data sources at scale, a challenge that remains even in state-of-the-art systems, AIRIS will address the fragmentation of valuable data across formats, systems, and institutions.

Through combining multimodal data with existing biomedical knowledge and scientific literature, the AIRIS AI agents will help researchers uncover previously unknown disease pathways and translate them into testable research hypotheses. These may lead to the discovery of new biomarkers, opportunities for drug repurposing, and more personalised treatment strategies. Unlike existing biomedical AI systems that often operate as black boxes, each hypothesis generated by the system will be checked for plausibility, novelty, and supporting evidence before being refined together with human researchers.

The AIRIS consortium places a strong emphasis on transparency, robustness, explainability, bias detection and mitigation, and ethical oversight, in order to develop AI technologies that are aligned with European values and health priorities: "Through this approach, we seek to catalyse a new paradigm in biomedical discovery: one that is predictive, personalised, mechanistically grounded, and powered by trustworthy, ethical, and explainable AI," Diou continues.

Funded by
the European Union

Five Use Cases: From Computational Models to Experimental Validation

To demonstrate its scientific value and applicability across different medical domains, the platform will be evaluated in five complementary disease areas in which biological mechanisms are not yet fully understood: Pulmonary Fibrosis (PF), Steatotic Liver Disease (SLD), Cardiovascular Disease (CVD), Chronic Kidney Disease (CKD), and Inflammatory Bowel Disease (IBD). Key findings generated by the platform will be independently validated through laboratory testing and computational studies. These will help better understand why individuals with the same diagnosis can experience different trajectories, predict treatment responses, and identify promising opportunities for therapeutic intervention.

In the years ahead, AIRIS seeks to transform how scientists investigate complex diseases by providing a trustworthy AI collaborator that supports every stage of the research process – moving past black-box predictions and grounding its reasoning in biological knowledge.

Project Key Facts

Title: Mechanism-Informed Multimodal Generative AI for Causal and Dynamical Modelling in Biomedical Research (AIRIS)

Project Number: 101289094

Start Date: 1 June 2026

Duration: 48 months

Budget: €16.9 million

Coordinator: Athina-Erevnitiko Kentro Kainotomias Stis Technologies Tis Pliroforias, Ton Epikoinonion Kai Tis Gnosis (ATHENA)

Website: https://airis-ai.eu/

LinkedIn: https://www.linkedin.com/showcase/airis-ai-eu/

Bluesky: https://bsky.app/profile/airis-ai.bsky.social

Project Partners

Belgium

- Katholieke Universiteit Leuven (KU Leuven)
- Timelex (TLX)

Canada

- The Research Institute of the McGill University Health Centre (McGill)

Germany

- European Research and Project Office GmbH (EURICE)
- Forschungszentrum Juelich GmbH (FZJ)
- Technische Universitaet Muenchen (TUM)
- Universitaetsklinikum Aachen (UKA)

Funded by the European Union

Greece

- A. Persidis & Sia Oe (Biovista)
- Athina-Erevnitiko Kentro Kainotomias Stis Technologies Tis Pliroforias, Ton Epikoinonion Kai Tis Gnosis (ATHENA)
- Charokopeio Panepistimio (HUA)

Italy

- Alma Mater Studiorum - Universita Di Bologna (UNIBO)
- Azienda Usl Della Romagna (AUSL Romagna)

Netherlands

- Elsevier BV (Elsevier)
- Universiteit Van Amsterdam (UVA)

Spain

- Institut Catala De La Salut (ICS-HUB)

Sweden

- Linkopings Universitet (LiU)

Switzerland

- Centre Hospitalier Universitaire Vaudois (CHUV)
- Universitaet Bern (UBERN)

United Kingdom

- The University of Manchester (UOM)
- University College London (UCL)

United States

- MLCommons Association (MLCommons)
- Yale University (Yale)

Contact

Project Coordinator

Christos Diou
Athina-Erevnitiko Kentro Kainotomias Stis Technologies Tis Pliroforias, Ton Epikoinonion Kai Tis Gnosis (ATHENA)
christos.diou@athenarc.gr

Project Management

Francesca Vaccaro
European Research and Project Office GmbH (EURICE)
f.vaccaro@eurice.eu

Funded by the European Union