

WELCOME TO



Development of novel assessments for indoor air quality monitoring and impact on children's health



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What is LEARN?

LEARN is a European Project meant to control and evaluate the **quality of indoor air** and the **impact it has on children's health**.

Its cornerstone is to learn about the state of quality indoor air in **schools around Europe** and the **cognition impact** it can suppose on children doing compulsory education.

DURATION

May 2022 – April 2026
(48 months)

EU FUNDING

€ 7,550,974 million
under Horizon Europe

DATA

GA 101057510
Call: HORIZON-HLTH-2021-ENVHLTH-02

What is LEARN?



We want to overcome the barriers of the currently existing technologies and use **new scientific methods** and **state-of-the art equipment**.

We will develop and deploy **novel sensors** to detect the presence of **possibly harmful air pollutants** such as volatile organic compounds and ultrafine particles.

How will LEARN achieve so?

- We will measure and characterize indoor and outdoor **air pollutants** and evaluate the presence of **biomarkers of exposure** and their effect on children's cognition while trying to recapitulate those effects using *C.elegans* as a biosensor.
- **Novel remediation strategies** will be explored to improve air quality and promote children's quality of life and life expectancy. For that, we will mobilize a group of **twelve leading research teams**, unrivalled in their respective fields (environmental epidemiologists, toxicologists, air quality specialists, systems biology, engineers, and citizen/social scientists).
- We will use advanced human-based **in vitro models of lung and skin** coupled with a revolutionary **multi-sensing device** to investigate their mechanisms of toxicity in real-time.

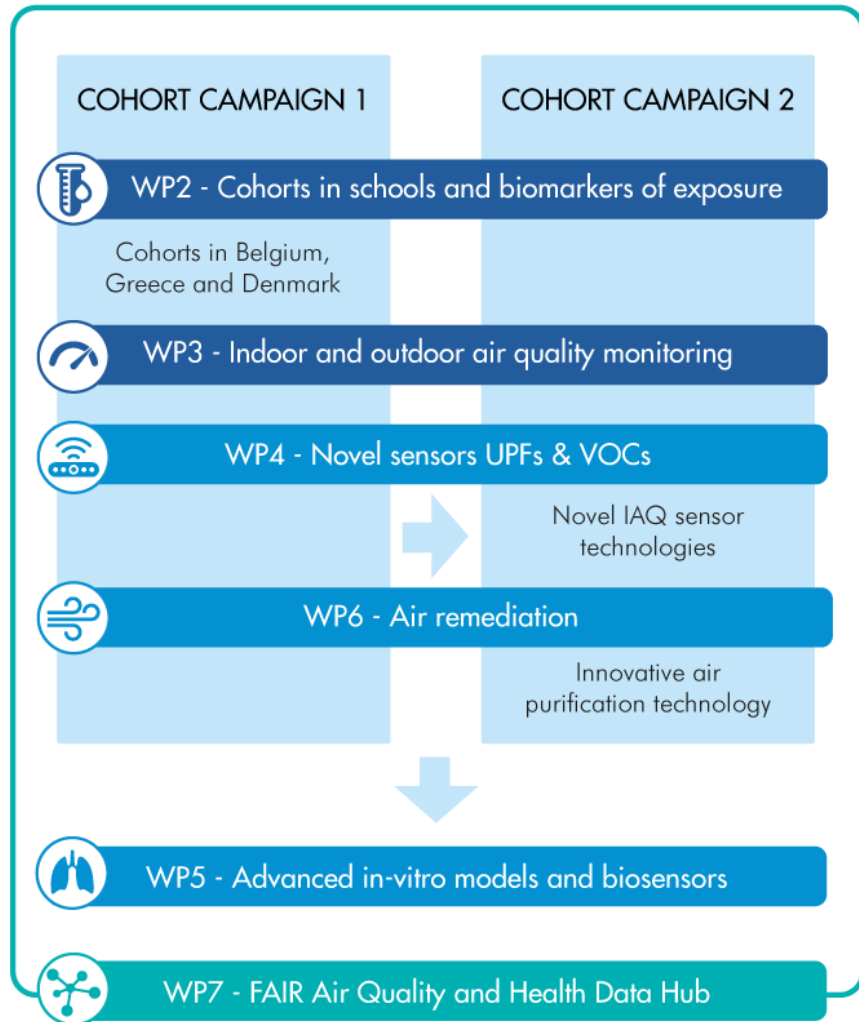
The scientific achievements expected to result from LEARN will unlock a **large technology potential in IAQ** for decades to come, leading to disruptive societal and economic impacts steaming from a radical improvement in the **quality of life of children in Europe**.

Part of the IDEAL cluster

LEARN is one of the 6 projects that take part in the Indoor Air Quality and Health (IDEAL) cluster, whose aim is to optimise synergies, avoid overlaps and increase the impact of the projects selected for funding from the call HORIZON-HLTH-2021-ENVHLTH-02-02.



LEARN's work packages



 **WP1 - Management and coordination**

 **WP8 - Communication, dissemination and exploitation**

WP 1 – Management and coordination

WP1 supports the implementation of a sound project and financial management plan including:

- **reporting** to the European Commission
- ensuring **delivery of results** on time and within budget
- maintaining a high level of **quality of the deliverables**

DURATION

May 2022 (M1) – April 2026 (M48)

LEADER



WP 2 – Cohorts in schools & biomarkers of exposure

WP2 generates **evidence** of indoor air quality in schools across different parts of Europe, including:

- Chemical determinants
- Microbiological determinants

We will conduct 3 pilots in countries with different levels of social development:
Denmark, Belgium and Greece.

DURATION

May 2022 (M1) – April 2026 (M48)

LEADER



WP 3 – Indoor&Outdoor air quality monitoring

WP3 aims to identify and quantify the exposure to specific chemical, physical and biological agents based on:

- **ambient air** measurements
- **modelling** in the schools and at their homes

DURATION

May 2022 (M1) – Feb 2026 (M46)

LEADER

KU LEUVEN

WP 4 – Novel sensors UFPs & VOCs

WP4 aims to research, design, develop and prototype **innovative sensor technology** for continuous, real-time and cost-effective indoor air quality monitoring.

The novelty introduced in this WP is **technological** and also on the target **environmental parameters**.

DURATION

July 2022 (M3) – April 2026 (M48)

LEADER



WP 5 – Advanced in-vitro models & biosensors

WP5 concerns the development of **advanced models** and the improvement of **methodologies** to study the **toxicological effects** of the specific air pollutants.

We will conduct this analysis in **Portugal** and **Switzerland**.

DURATION

July 2022 (M3) – Jan 2026 (M45)

LEADER



WP 6 – Air remediation

WP6 aims to improve indoor air quality by optimizing **filtration and adsorption technology** to remove particles and to adsorb gases.

This comprises innovation on **microscale level** (filter media) up to enhanced designs of an **added smart connectivity** for air purifiers.

DURATION

Ago 2022 (M4) – Jan 2026 (M45)

LEADER

MANN+
HUMMEL

WP 7 – FAIR Air Quality and Health Data Hub

The main objectives of the WP are:

- The **centralized handling of the data** collected and created during the project according to the FAIR data principles.
- The **data provision** through an API and a user interface to different user types.

DURATION

May 2022 (M1) – Dec 2025 (M44)

LEADER



ENVIROMETRICS
Business Consultants & Engineers

WP 8 – Exploitation, Communication and Dissemination

The goal of this WP is to design and implement:

- The **exploitation** of LEARN's results after the project has ended.
- The **dissemination** of LEARN's results for the scientific community.
- The **communication** of LEARN's goals, activities and results to society.
- Define **policy recommendations for IAQ standards**, in a participatory way.

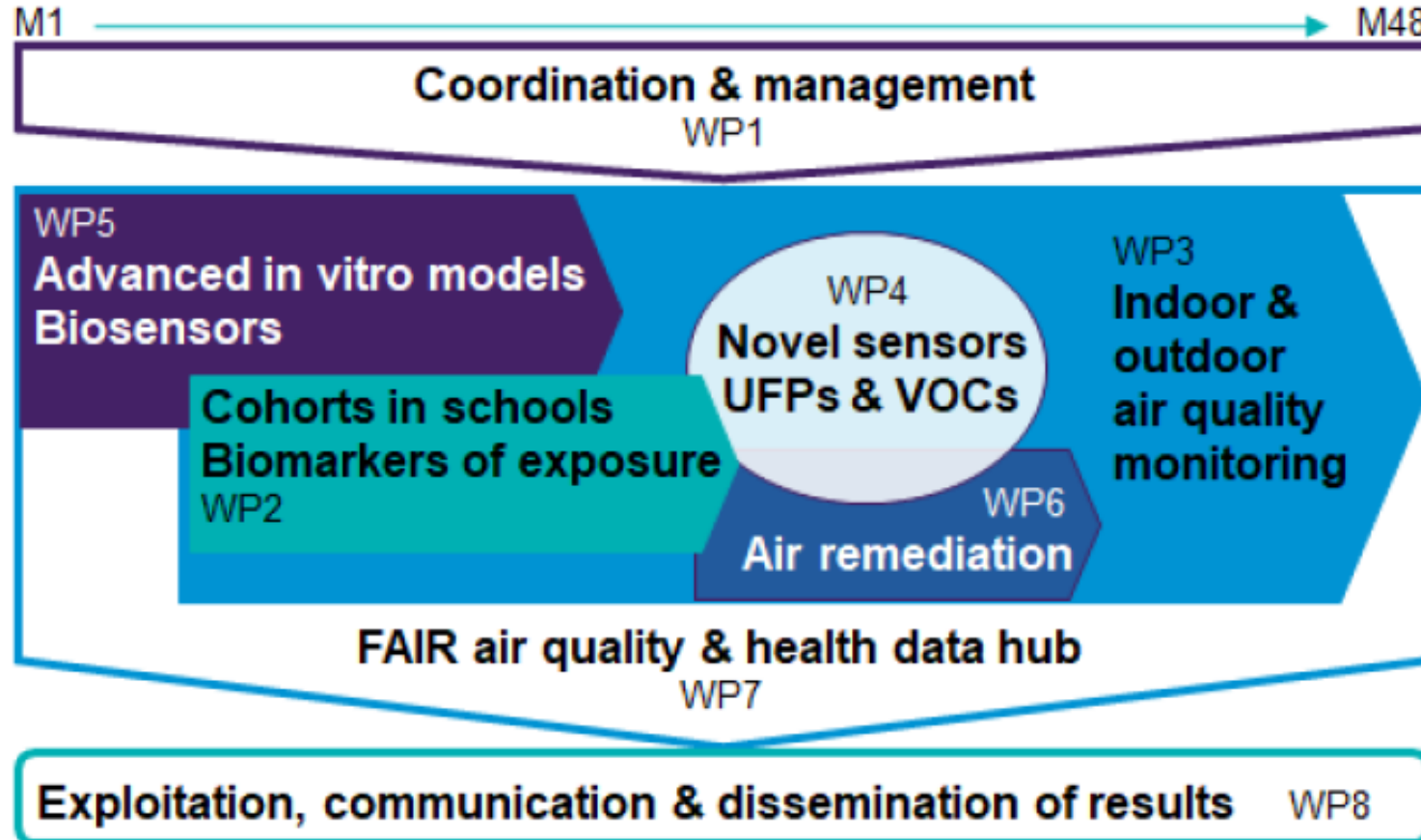
DURATION

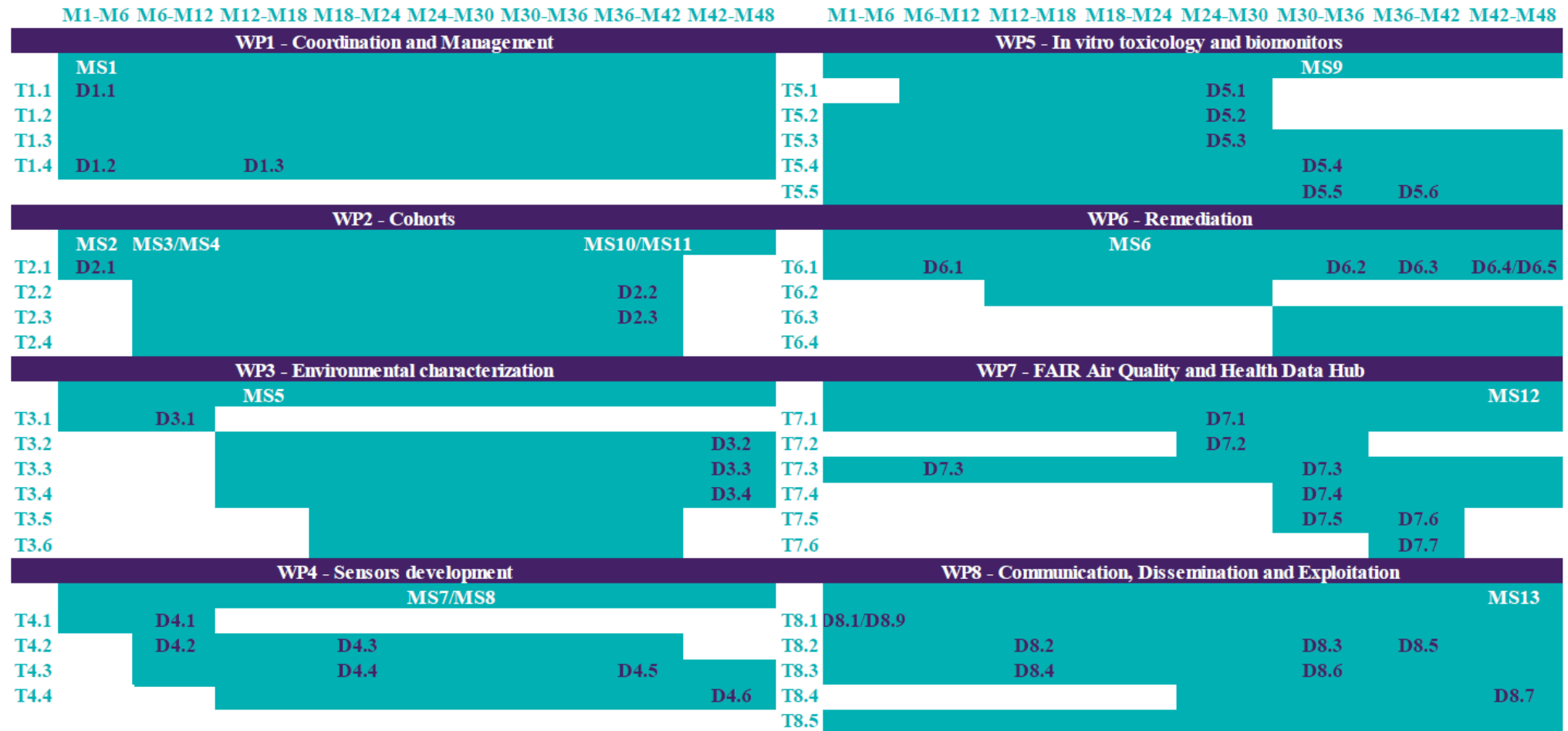
May 2022 (M1) – April 2026 (M48)

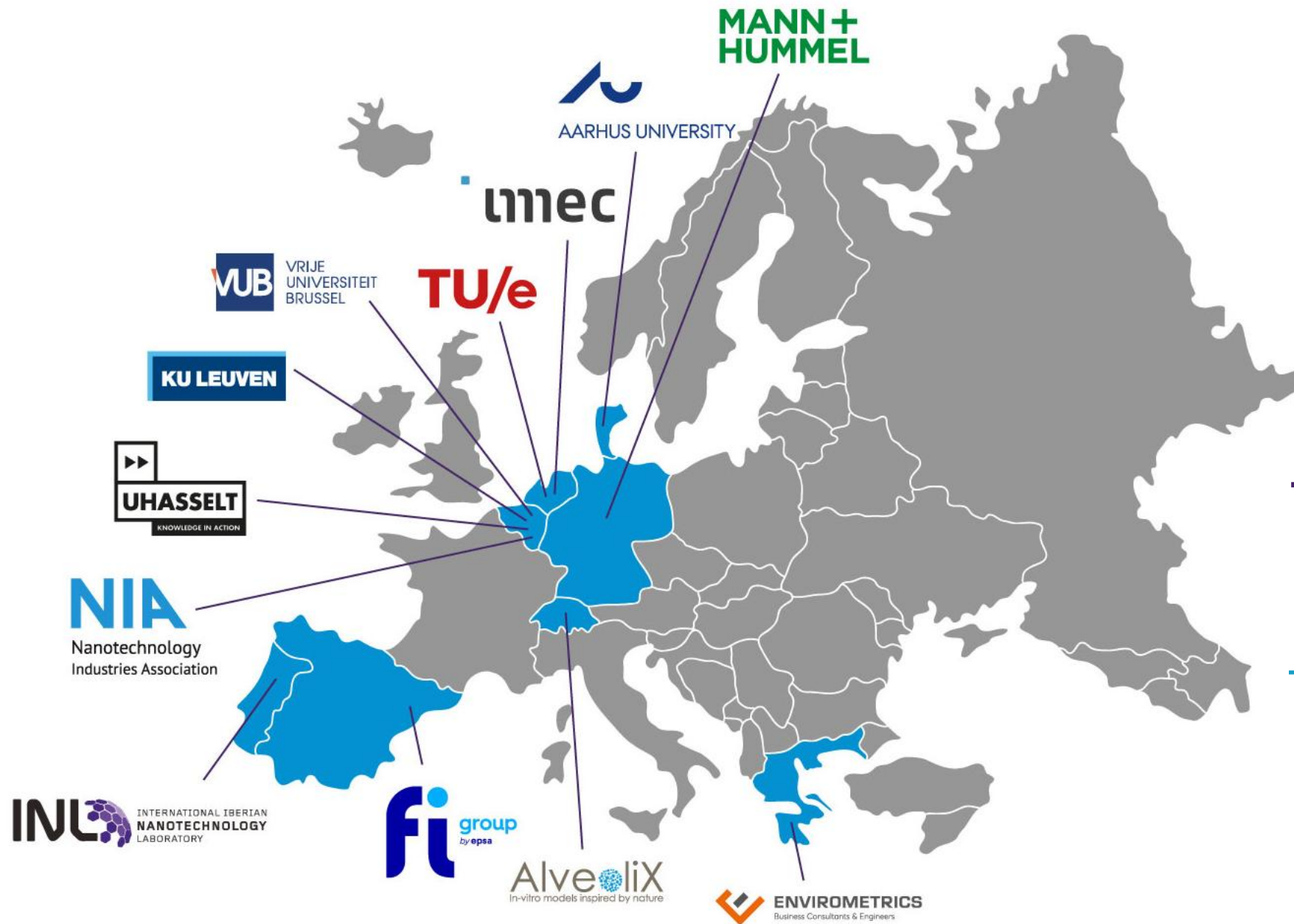
LEADER



LEARN's timeline







The LEARN Consortium

The LEARN Consortium



The LEARN Consortium

AlveoliX is a **Swiss-based start-up** founded in 2019 with a young and multidisciplinary team of 14 people united under the same goal: **“Make organs-on-chips the new standard for preclinical decision-making and the leading alternative to animal experiments”**. We aim to improve fundamental research and accelerate drug development, by replacing animal studies and decreasing any potential risks for patients during clinical testing and after approval. In the future, we also hope to be able to develop individual and preventive therapy thanks to personalized medicine.

AlveoliX' Organs-on-Chip is used to better predict human responses in preclinical drug development and to gain more insight into human biology. They mimic organ-specific microenvironmental cues such as mechanical forces and 3D multicellular structure to simulate the in vivo situation. Thanks to this technology, we can build healthy, diseased, and personalized models to test molecule safety (drugs, pollutants, cosmetics, etc.) and drug efficacy helping to replace poorly predictive and ethically questionable animal models.



AARHUS UNIVERSITY

The LEARN Consortium

AU is a public research university with the main campus located in Aarhus, Denmark, and other campuses located in Jutland and Seeland. It is the **second largest and second oldest university in Denmark**. The **Department of Environmental Science**, located at Risø near Roskilde, conducts problem-oriented research, spanning environmental ecology, chemistry, and physics, as well as interactions between the environment and society in economic, political, and social terms. The Department also performs research-based public administration and provides research-based advice. The Section of Atmospheric Environment, **Group for Atmospheric Measurements**, carries out work in the field of physical and chemical processes that control the level and trend of air quality development and atmospheric deposition.

The group undertakes national air quality monitoring, and it is active in the area of research, consultancy, monitoring, and teaching. The research focuses on the impact of air quality on human health, nature, the aquatic environment, and interaction with climate. The Department of Public Health, located in Aarhus, works to promote public health, conducting research into the health challenges facing society – to promote health and to prevent, treat and alleviate disease. The research unit Environment, Occupation, and Health investigate the interactions between humans and the environment, indoors and out, and by identifying factors that may contribute to the development of e.g., allergies and respiratory ailments.

The LEARN Consortium



Envirometrics specializes in the field of **environmental protection and sustainable development**, in **11 countries**, providing consulting services to the private and public sectors, since 2002. The main areas of activity are environmental monitoring and measurements, climate change mitigation and adaptation, health and safety at work, and management systems. The constant investment in developing our workforce qualifications and in acquiring state-of-the-art equipment is the competitive advantage of the company.

Today, ENVIROMETRICS has an experienced multidisciplinary team, many of whom obtain master's degrees and Ph.D., to respond on time to the increased demands of the industry. Furthermore, is cooperating with Research Institutes and Universities and participates in the implementation of research proposals and projects in national and European programs (HORIZON2020, GSRT). In addition, is a member of the most important business and commercial chambers.

The LEARN Consortium

We **advise companies on the management of their R&D&I financing**, through the design and implementation of actions aimed at boosting their technological and economic development.

These actions focused on the integral treatment of R&D&I tax incentives and the management of calls for public grants and subsidies, resulting in an improvement of the companies' profit and loss accounts.

Our eagerness to achieve excellence in all our services has led us to assume the leadership of the sector, both at the national and European levels, thus promoting an ambitious internationalization plan with a clear objective: to help our clients in the generation of value.

The LEARN Consortium



At IMEC The Netherlands it is our mission to **develop targeted innovations with a real impact on people's lives**. Here, IMEC joins forces with research institutions, governments and businesses to leverage its world-leading R&D for high-impact projects in nano- and digital technology. The international IMEC organization boasts more than 5,000 expert scientists, a unique infrastructure that includes a 2.5-billion-euro 300mm semiconductor pilot line, and an ecosystem of more than 600 world-leading industry partners, and a global academic network. At IMEC the Netherlands a team of more than 200 researchers from 25 different nationalities work together on the latest innovations.

The activities of IMEC the Netherlands are spread over two research centers with specific objectives.

Holst Center This independent research and innovation center is jointly operated by IMEC and TNO. It develops technology that responds to global societal challenges and contributes to new micro-electronical and sensor technology solutions in the fields of health & vitality, energy & climate, mobility & industry 5.0.

OnePlanet Research Center This multidisciplinary collaboration of Wageningen University & Research (WUR), Radboud University, Radboud university medical center, and IMEC uses the latest chip and digital technologies to create a society in which everyone can live a healthy life and has access to healthy and sustainable food.

The LEARN Consortium



Located in Braga (North of Portugal) was founded by the governments of Portugal and Spain under an international legal framework to **perform interdisciplinary research, deploy, and articulate nanotechnology for the benefit of society**. INL aims to become the worldwide hub for nanotechnology addressing society's grand challenges. The Research and Technology activities are focused on six clusters: Health, Food, Energy, Environment, ICT, and Future Emerging Technologies, which complement each other and provide a base for interdisciplinary interactions between our research. The full-fledged nanotechnology laboratory enables leading research of the highest international standard.

INL facilities allow access not only to their infrastructure and systems but also to microsystems and nanotechnology experts and their knowledge with considerable flexibility. Access is open to both internal and external users. The user facilities provide support throughout all research and development chains in cleanroom processes (device modeling and design, process integration and device fabrication, packaging, and testing) as well as in advanced microscopy and spectroscopy, X-ray diffraction, and scattering techniques, photonics and bioimaging, and magnetic resonance imaging. Another impacting factor is the heterogeneous set of techniques available under the same roof leading to competitive integration of different technologies and rapid prototyping thus paving the way to methods and devices with performances out of reach of a given single technology.

The LEARN Consortium

KU Leuven is a research-intensive university that boasts a rich tradition of education and research that dates back six centuries. Currently, it is the **largest university in Belgium in terms of research funding and expenditure.**

Its **Department of Public Health and Primary Care** is a multidisciplinary department with a focus on community health, best practices, and health policy. In this department, the **Centre of Environment and Health** and its two laboratories for Occupational and Environmental Toxicology and Occupational and Environmental Hygiene are involved in the project LEARN.

The KU Leuven team leads the exposure assessment work package and will contribute to the toxicological analysis of indoor air pollutants in school environments.

The LEARN Consortium

MANN+HUMMEL is a leading global company in filtration technology.

Under its two business units, Transportation and Life Sciences & Environment, the Ludwigsburg-based Group (Germany) develop intelligent filtration and separation solutions that enable cleaner mobility, cleaner air, and cleaner water.

Thus, the 1941-founded family-owned company makes an important contribution to clean earth and the sustainable use of limited resources. In 2021, over 23,000 employees at **more than 80 locations** generated a turnover of EUR 4.2 billion.

The LEARN Consortium

NIA is the cross-sectoral, responsible voice for nanotechnology value chains and the global commercial eco-system.

NIA supports innovation and commercialization of the next generation of nanotechnologies and promotes their safe and reliable advancement.

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The LEARN Consortium

UHasselt is a young, innovative, and independent university. At UHasselt, within the Centre of Environmental Sciences at Hasselt University, Prof Dr. Tim Nawrot heads the Environmental Epidemiology research group. In the framework of an ERC grant (2012), he has initiated the ENVIRONAGE birth cohort, which aims to understand human aging and the development of health and diseases and their interaction with the environment by carrying out prospective epidemiological follow-up from the newborn stage. He is part of the EU EXPoSOMICS (FP7), the STOP (H2020), HBM4EU consortium (H2020), AURORA (H2020), and ATHLETE (H2020) projects. He has considerable publications in environmental epidemiology and public health research and is active in several advisory bodies, including the EU summit on air pollution (Vilnius Declaration).

He has fully exploited the arsenal of epidemiology study designs (time-series, case-control, case-crossover, and prospective cohort studies) to answer important questions concerning the etiology and/or pathophysiology of a relatively broad spectrum of outcomes including cardiovascular, respiratory, cancer, and perinatal outcomes. Within the LEARN project, he leads tasks aiming at understanding the relation between indoor air quality in schools, including both chemical and microbiological determinants, and cognition in children by gathering data across different parts of Europe.

The LEARN Consortium

The logo for TU/e, consisting of the letters "TU/e" in a bold, red, sans-serif font.

Eindhoven University of Technology (TU/e) educates students and advances knowledge in science & technology for the benefit of humanity.

It integrates education and research to enable its students and scientists to become thought leaders and to design and achieve the unimaginable.

In close collaboration with its public and private partners, it translates basic research into meaningful solutions.

TU/e embraces and lives its four CORE values: Curious, Open, Respectful and Responsible.

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The LEARN Consortium

The **research group SMIT**, established at the Vrije Universiteit Brussel in 1990, is specialized in fundamental, applied, and contract research in the area of ICT and media, markets, and policy. With currently a staff of an interdisciplinary team of over 100 researchers, SMIT-VUB is a **major research center in Europe for policy and socio-economic research relating to ICT and media**. SMIT-VUB specializes in social scientific research on media and ICT, with an emphasis on innovation, policy, and socio-economic questions. SMIT-VUB research combines user, policy, and business analysis with both quantitative and qualitative research methodologies, focusing on two programs: data & society and media & society. A continuing dialectic between theory and empirical research is one of the center's high-level objectives.

For this specific project, SMIT-VUB has built up a track record in several citizen science projects for the **development of (inclusive) engagement and communication strategies**, collaborative governance with public government, evaluation of citizen science tools in terms of usability and user experiences, and the set-up of participatory policy-making processes (PAR4P-method). In addition, SMIT-VUB is leading the working group on 'engagement and communication' for citizen science projects funded in Flanders (Belgium) within the knowledge center SCIVIL.

LEARN's board game



 2 teams
2-20 players

 children
9-12 years

 Danish, Dutch,
English, Greek

The LEARN project has created a board game to raise awareness among children on indoor air quality in schools.

While playing it, children will learn about the main air pollutants present in the classroom, their potentially damaging effects on health and cognition, and some mitigation measures to prevent them.



**Scan this QR code and get the
LEARN board game for free!**

learnproject-heu.eu/learn-project-board-game-free-download

Thank you!



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projectlearn.heu@gmail.com



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