



Flanders
State of the Art

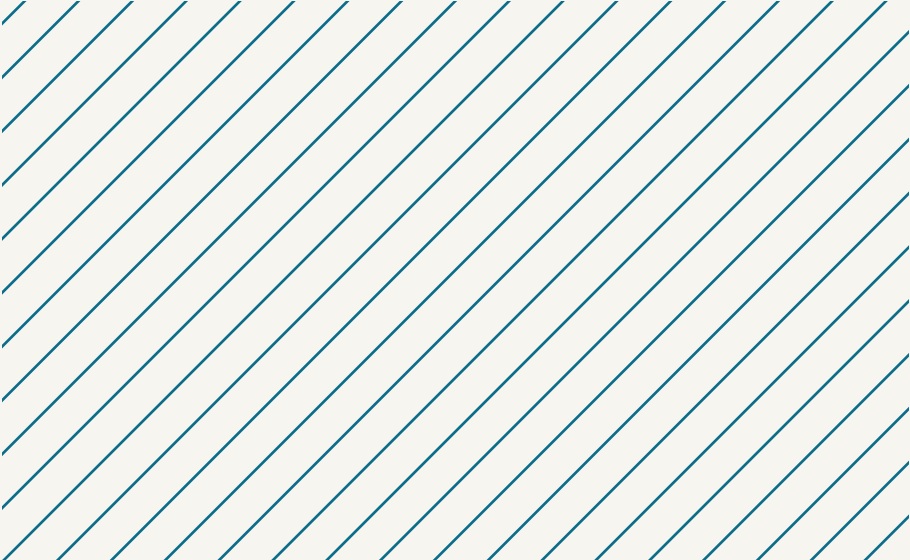
RESEARCH INFRASTRUCTURE IN FLANDERS

AND PARTICIPATION IN INTERNATIONAL
RESEARCH INFRASTRUCTURES 2025

DEPARTMENT OF
WORK, ECONOMY
SCIENCE, INNOVATION &
SOCIAL ECONOMY

fwo

departementwewis.be



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Innovation & Social Economy

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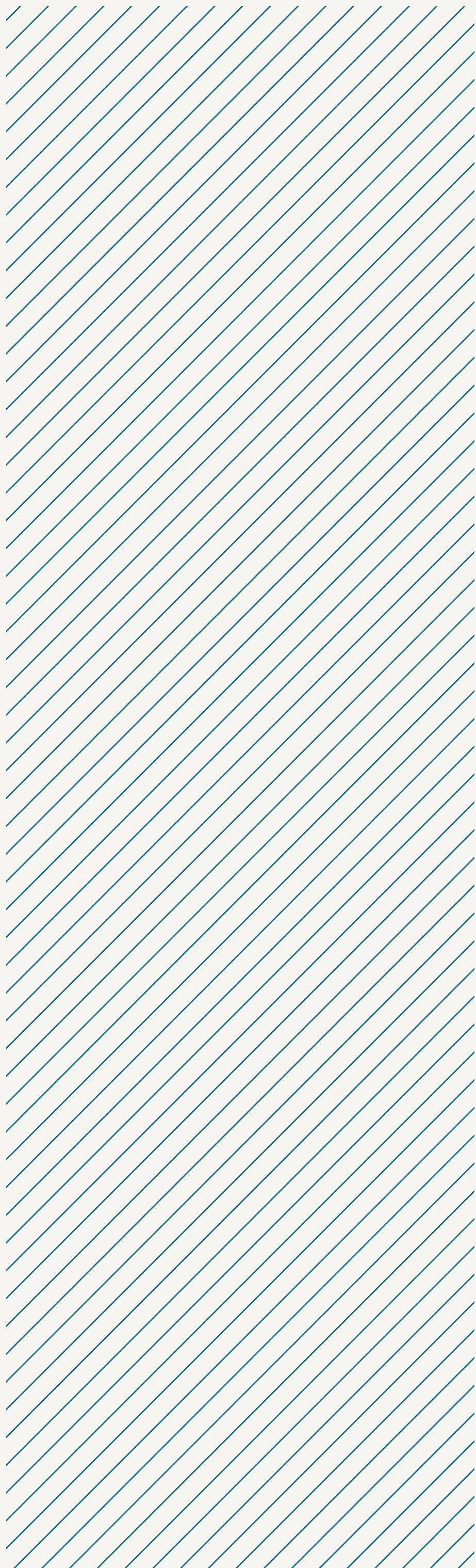
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Content
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the situation at that time.

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MATTHIAS DIEPENDAELE

As we all know, we are facing a variety of societal and economic challenges. The question, however, is how Flanders and its government can respond to them most effectively. In my view, this is achieved by fully leveraging our own strengths, and for Flanders these lie in research and innovation, two areas in which we excel. In turn, these are strong drivers of productivity and competitiveness. They benefit our prosperity and therefore the future of Flanders.

Flanders invests with a long-term vision. From this perspective, the policymakers of the 1980s deserve recognition. They believed in a Flanders that is genuinely able to shape the future. For instance, an amazing initiative such as Flanders Technology International gave birth to imec. This was later followed by the establishment of the Flemish research centres VITO, VIB and Flanders Make. Today, all three are global players.

Flanders builds on policies that drive innovation and whose economic benefits only become apparent at a later stage. This is the choice we make today as well, for our children and grandchildren. We explicitly choose to strive for excellence. Flanders may not be the biggest or the strongest, but in carefully selected domains we can definitely be the very best.

Society rightly expects research and innovation to generate broad scientific, economic and societal added value for the widest possible audience. It also expects today's investments in research and innovation to have a strong economic component and benefit future generations.

Researchers and innovators, in the broadest sense, also seek the optimal environment in which to conduct the highest quality research and achieve the strongest results possible. It is for the government, within the available budget, to make targeted and bold strategic choices in key technologies, knowledge infrastructure and human capital. Decisions must be made on where best to invest and how to create an environment in which researchers can excel, today, tomorrow and in the long term. This brings us to the fundamental basis, namely top-notch research infrastructure – or as I like to describe it, the engine room of the future.

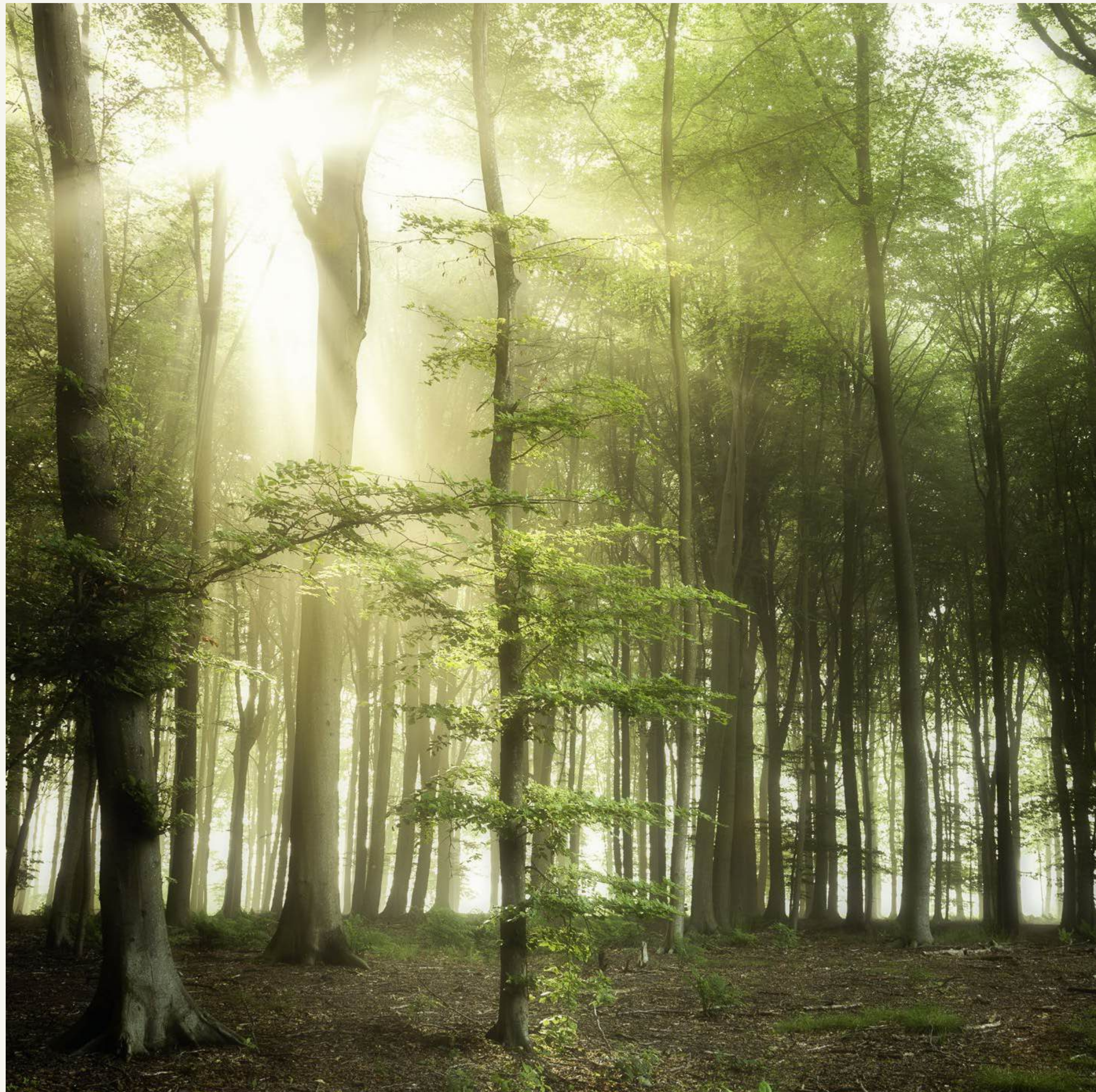
This includes investments in computing power, artificial intelligence, quantum technology, data spaces, and secure, sustainable and shared infrastructure for Open Science, as well as specific data infrastructure. It also includes unique infrastructure, for example in agro-biotechnology, enabling start-ups, companies and researchers to continue to fulfil Flanders' role as an innovation hub, service centre and international coordinator. It further encompasses state-of-the-art (testing) infrastructure that individual companies or knowledge institutions cannot realise on their own. The Einstein Telescope is, of course, an excellent case in point.

Top-level research infrastructure acts as a catalyst for knowledge creation, knowledge sharing, talent cultivation and, crucially, valorisation. It is also a lever for sustainable growth, but only if strong and intelligent collaboration is ensured. By bringing together

leading researchers from knowledge institutions and R&D&I-intensive companies, and by fostering shared use of infrastructure, the scientific, societal and economic impact can be maximised.

In addition to collaboration and shared use, flexibility is also a key concept, whereby new technologies, disciplines and societal needs must be continuously integrated into the existing research infrastructure landscape. All these different approaches come together in an overarching policy framework. In this publication, these are explained and illustrated with concrete examples of how Flemish investments in a robust and future-oriented research infrastructure landscape help shape the knowledge-driven economy of the future, how they strengthen scientific excellence and contribute to increased productivity, greater resilience and enhanced strategic autonomy.

Dear reader, explore this publication and discover the wide range of research infrastructures, both within Flanders itself and those in which Flanders invests at European level. Flanders is the knowledge region par excellence where research and innovation thrive. It is thanks to the outstanding facilities presented in this publication that excellent and pioneering technologies and insights are developed, and that Flanders itself shapes the future.



A DIVERSE PORTFOLIO OF RESEARCH INFRASTRUCTURES IN FLANDERS



Flanders invests heavily in research infrastructure: advanced laboratories, testing facilities, pilot installations, databases and digital platforms that are at the foundation of innovation and technological progress. These infrastructures are not only crucial for scientific research, but also offer concrete opportunities for companies that wish to innovate, experiment, or develop new products and services.

Research infrastructure is a cornerstone of excellence in scientific research, innovation and societal progress. Flanders boasts a diverse portfolio of research infrastructures, developed within and across research institutions and anchored in strong international collaborations. The availability of high-performance, sustainable and accessible infrastructure increasingly determines the appeal of Flanders as a research and innovation region. These research infrastructures are an important asset for researchers, companies and the wider innovation ecosystem, and reinforce Flanders' international positioning as a research region.

The aim of this brochure is to make the Flemish research infrastructure portfolio visible and accessible to researchers and companies, including Flanders' participation in international research infrastructures. It specifically highlights the opportunities they offer for shared use, collaboration and valorisation.

An important guiding principle in this regard is accessibility and shared use. For this reason, the brochure includes references to the access modalities for each infrastructure. This should enable researchers and companies to connect faster and in a more targeted way with existing infrastructure and available expertise.

In addition, Flanders explicitly positions its research infrastructure within a European and international context. With a view to the upcoming update of the ESFRI Roadmap, Flanders aims to showcase its investments, capacities and participations in a clear and transparent way. For researchers and compa-

nies, this opens up additional perspectives, such as access to European networks, international expertise and large-scale facilities that are not available locally. By making the Flemish portfolio visible within a broader European context, the brochure contributes to a well-founded Flemish input and to greater influence on European priority setting and decision-making regarding large-scale research infrastructures.

In short, Flanders not only invests in research infrastructure but also in visibility, collaboration and economic valorisation. This brochure invites researchers and companies to make active use of the research infrastructure portfolio.

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An aerial photograph of a dense forest during sunset. The sun is low on the horizon, casting a warm, golden glow over the trees. The foliage shows a mix of green and autumnal colors. In the center-left, a large white number '01' is displayed. To its right is a rectangular area filled with white diagonal hatching lines.

01

FLANDERS'
POLICY AT
A GLANCE



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FLEMISH POLICY ON RESEARCH INFRASTRUCTURE

Innovation starts with the right tools. That is why Flanders invests strategically in high-performance research infrastructure: from high-tech laboratories and installations to databases and digital platforms. This infrastructure makes it possible to test new ideas, develop technologies and collaborate across disciplines and sectors.

Research infrastructure encompasses everything needed to enable advanced research and is broadly defined as ‘all facilities and resources that foster groundbreaking and strategic basic research across all scientific disciplines’.

In addition to infrastructure, this includes collections, natural habitats, corpora and databases, including their digital accessibility, as well as connections to data platforms.

It may be located at a single site, distributed across multiple sites, or organised in an entirely digital environment. However, this infrastructure is more than just a support tool for research. It also acts as a powerful driver of innovation and collaboration to which companies can actively connect.

RESEARCH
INFRASTRUCTURE
IS INDISPENSABLE
FOR EXCELLENT
RESEARCH AND
INNOVATION,
NOT ONLY FOR
RESEARCHERS,
BUT ALSO FOR
COMPANIES.

For Flanders, it is essential to have infrastructure of international top-grade quality so that our region remains a hub for talent, researchers and innovative companies.

- This ambition is translated into a targeted approach:
- Flanders invests in shared infrastructure that is accessible to multiple users.
 - Collaboration between knowledge institutions and companies is actively encouraged.
 - Infrastructure is deployed as a lever for innovation and economic valorisation.

Flanders prioritises collaboration, including with companies. The purchase and operation of research infrastructure is often beyond the capacity of an individual institution and that is why strategic collaboration is essential. The stronger the collaboration between institutions and/or companies, the greater the level of support: infrastructures with intensive collaboration benefit from a higher funding rate.

Although companies are not eligible for subsidies within these programmes, they do benefit in concrete terms through access to advanced infrastructure and expertise, participation in its development, and collaboration with researchers on high-impact innovation projects.



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CLOSE
COLLABORATION
FACILITATES
ACCESS
TO EUROPE.



Flemish researchers and companies are not limited to the use of research infrastructure in Flanders. Through the International Research Infrastructure programme (IRI), Flanders participates in large-scale European and international facilities.

- This opens up additional opportunities:
- Access to unique infrastructure that is not available locally.
 - Participation in international research networks.
 - Collaboration on a European scale.

The IRI programme supports both new participations in international infrastructures and the continuation and funding of existing participations. The IRI programme guarantees long-term funding for participating researchers. The programme aims to support participation in both ESFRI projects, ESFRI landmarks and other

international infrastructures or international projects in development.

The IRI programme for participation in international research infrastructures therefore makes it possible to accommodate the wide variety of infrastructures within a single framework and, in addition to providing funding, to decide on Flemish participation.

- Flemish policy is administered by:
- The Department WEWIS (Work, Economy Science, Innovation and Social Economy)
 - The FWO (Research Foundation – Flanders)

Together, they are responsible for policy, strategic decision-making and funding relating to research infrastructure.

- Through the FWO, three funding programmes for research infrastructure are organised:
- Medium-scale research infrastructure (up to € 1 million)
 - Large-scale research infrastructure (at Flemish level)
 - International research infrastructure (IRI)

It is important to note that these programmes not only provide funding for the purchase or development of infrastructure, but also for maintenance, upgrades and specialised personnel.





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THE DEPARTMENT WEWIS

WORK, ECONOMY, SCIENCE, INNOVATION AND SOCIAL ECONOMY

The Department WEWIS (Work, Economy, Science, Innovation and Social Economy) was established in January 2025 as a merger of the Department EWI (Economy, Science and Innovation) and the Department WSE (Work and Social Economy).

The new Department WEWIS plays a central role in preparing, monitoring, evaluating and reporting on policy that contributes to prosperity and well-being in Flanders. Its focus areas are:

- Excellence in scientific research.
- An attractive, sustainable and competitive business climate.
- An inclusive, innovative and entrepreneurial society.

The strategic objectives of the department are aligned with the priorities of the Flemish Government and include:

- Strengthening the economic fabric and stimulating entrepreneurship.
- Fostering innovation, creativity and knowledge valorisation.
- Positioning Flanders internationally as a leading region for economy, science and innovation.
- Developing the department as a knowledge centre within the Flemish Government.

Department WEWIS is responsible for policy preparation, monitoring and the evaluation of Flemish policy on research infrastructures. The department acts as liaison with the responsible

minister, represents Flanders in Belgian and international consultation forums, and coordinates the strategic vision and priorities for infrastructure investments.

Department WEWIS works closely with the Research Foundation – Flanders (FWO), which is responsible for the funding of fundamental scientific research and the implementation of three complementary research infrastructure programmes:

- Medium-scale research infrastructure
- Large-scale research infrastructure
- International research infrastructure

FUNDING AGENCIES

While the departments of the Flemish Government prepare, monitor, evaluate and report on public policy, a few agencies are responsible for the implementation of the policy decisions.

The responsible agencies in the Policy Domain of Employment, Economy, Science, Innovation, Agriculture and Social Economy (WEWILS) have developed subsidy instruments and initiatives. The main agencies funding research in Flanders are:

- VLAIO: Flanders Innovation & Entrepreneurship
- FWO: Research Foundation – Flanders

Flanders Innovation & Entrepreneurship (VLAIO)
VLAIO (Agentschap Innoveren en Ondernemen in Dutch) is a government agency responsible for implementing Flemish policy in the domains of economy, science, and innovation. It helps companies with the start-up of their activities,

the growth and continuity of their businesses, but also with the search for the right location, information on permits, financing, investments in innovation and ecological technologies, and other topics. VLAIO also hosts the Enterprise Europe Network (EEN) Flanders and acts as the managing authority for the EU ERDF calls and support in the Flemish Region. VLAIO manages all economic and innovation support for companies located or active within the Flemish region.

Research Foundation – Flanders (FWO)
The FWO (Fonds Wetenschappelijk Onderzoek - Vlaanderen in Dutch) supports fundamental and strategic scientific research and research infrastructures, and also stimulates international cooperation. Researchers can apply for support from the FWO through a broad range of funding instruments. The most important criterion is the outstanding quality of the researcher and the research proposal.

The support instruments from the FWO are:

- PhD fellowships for fundamental and strategic basic research
- Postdoctoral fellowships
- Research projects
- Medium-scale, large-scale and international research infrastructure
- Incoming and outgoing international mobility of researchers
- International collaboration (exchange agreements, scientific cooperation, bilateral research collaboration, ‘Lead Agency’ procedures)
- International contacts (international coordination action, organisation of a scientific conference in Belgium, scientific research network)
- Scientific prizes in different domains
- Involvement in European programmes.

For example, the FWO is the contact point in Flanders for COST and, together with VLAIO, it is the national contact point (NCP) for the Horizon Europe programmes.



INVESTING IN THE FUTURE



Through the Innovation Pact of 2003, the Flemish Government initiated the objective of spending 3% of the regional gross domestic product (GDP) on research and development (R&D). This target has since been reaffirmed by successive Flemish Governments.

The increase in R&D budgets has ensured that the 3% target has been met since 2019. Based on the most recent data, collected via surveys for the relevant expenditure years, the R&D intensity for 2023 amounts to 3.52% of GDP.

Businesses recognise the importance of R&D for their competitive position. This has led to private R&D investments that significantly exceed the European target of 2%, amounting to 2.71% in 2023. The service sector is also contributing and is assuming an increasingly prominent role in the Flemish R&D landscape.

Meanwhile, the government continues its efforts. Research budgets at universities, research institutions and scientific establishments are increased, depending on budgetary capacity. At 0.81%, public funding remains below the 1% of GDP target.

With an R&D intensity of 3.52% of GDP, Flanders ranks second in Europe, after Sweden (3.6%).

The current Flemish government (2024-2029) is ambitious and has raised the target to 5% of GDP.

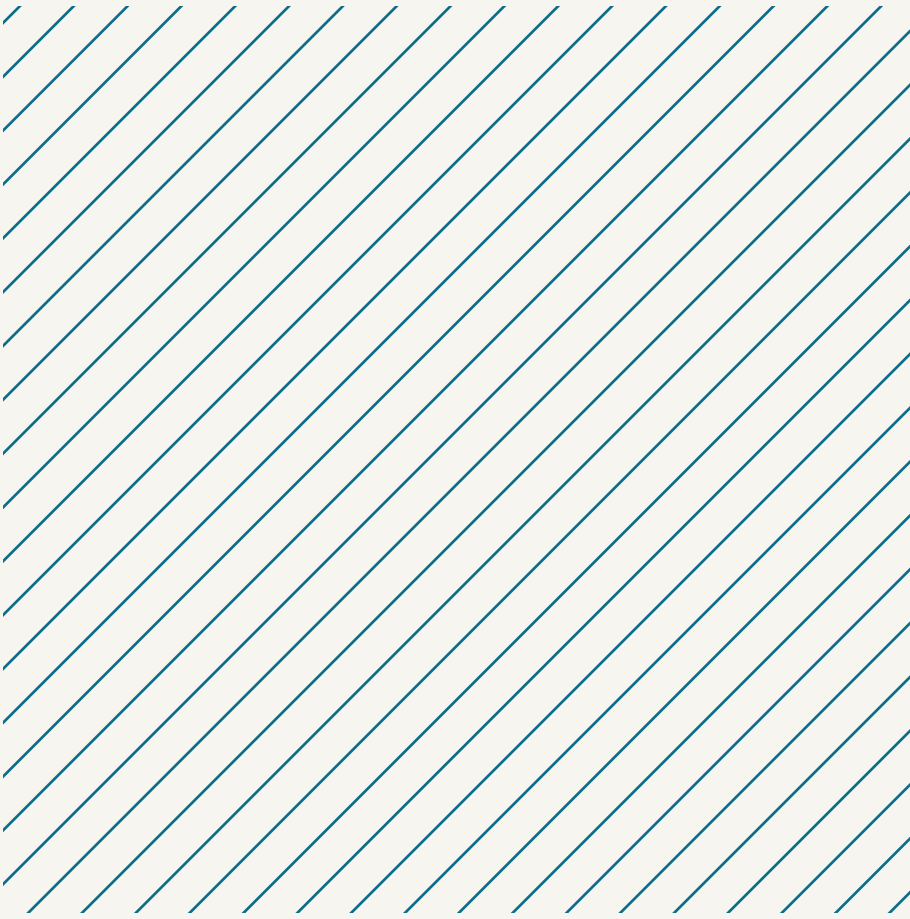
Excellence remains the guiding principle in the funding of scientific research, whether to encourage internationalisation or to develop new research infrastructure.

Policy must generate impact at all levels: researchers must have their groundbreaking results recognised by peers worldwide, and research and business projects must make a tangible contribution to societal and economic challenges, including enhanced competitiveness and sustainable job creation in Flanders.

The economic and societal potential is maximised through more and better collaboration. This includes collaboration between companies and knowledge institutions, between research teams from institutes and businesses, between scientific disciplines and sectors and, last but not least, cross-border collaboration within Europe and beyond. Flanders places particular emphasis on excellent partnerships and exchange programmes with the leading research institutions in Europe and worldwide. Adequate support instruments facilitate the participation of Flemish knowledge institutions in international programmes and in (inter)national research infrastructures.

The Flemish Government strengthens its strategic autonomy through a forward-looking vision that prioritises targeted investments in key technologies, research infrastructure and human capital.

Through this approach, Flanders seeks to reinforce its role within the European research landscape and contribute to a resilient, knowledge-driven economy for the future.

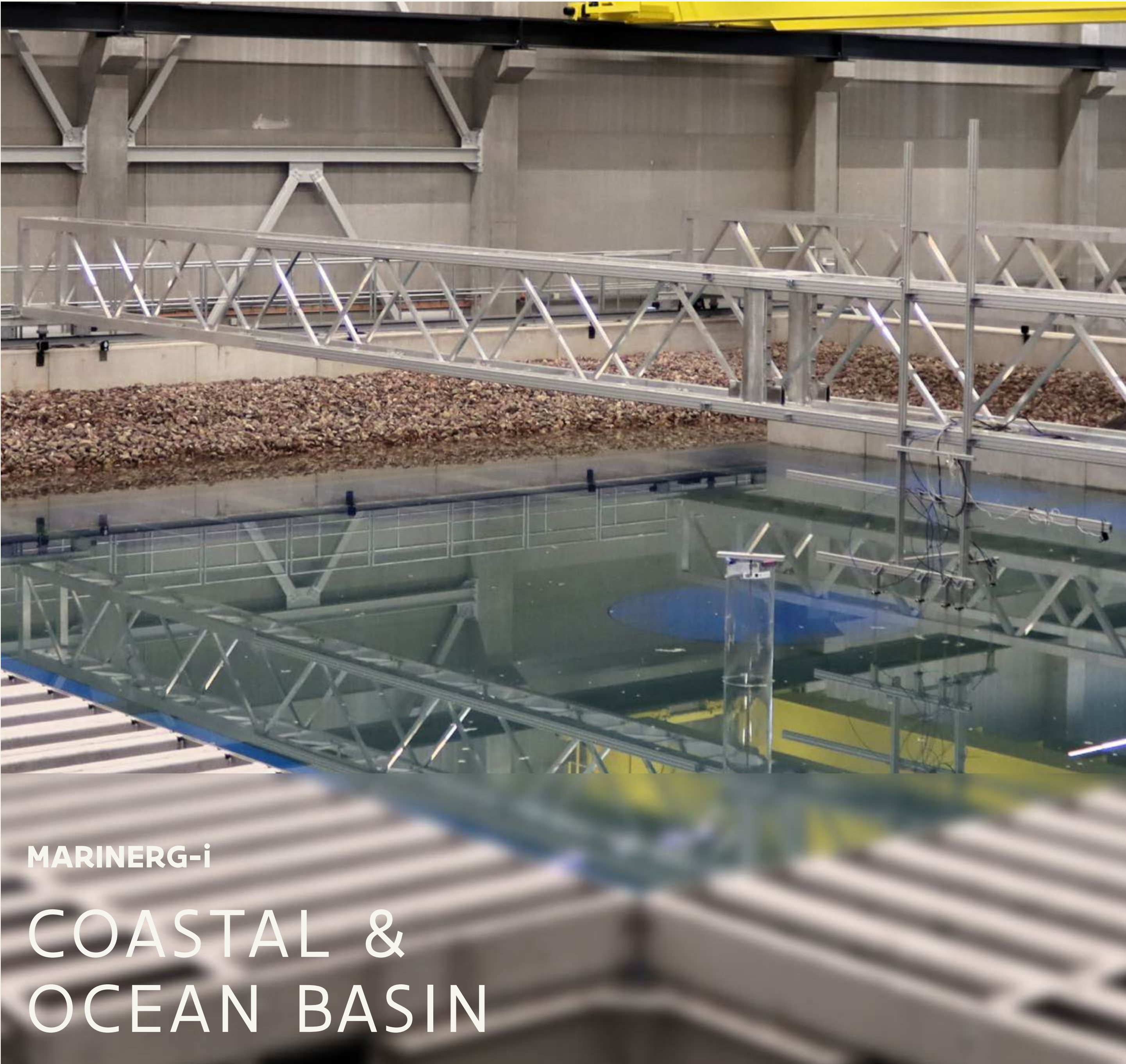


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An aerial photograph of a glacier's edge where it meets the ocean. The glacier is a bright, textured white mass on the left, while the surrounding water is a deep, dark blue with visible ripples and currents. A horizontal bar with a black and white checkered pattern is positioned across the middle of the image, partially overlapping the glacier and the water. The number '02' is printed in a large, white, sans-serif font to the left of this bar.

02

INTERNATIONAL
RESEARCH
INFRASTRUCTURES



MARINERG-i

COASTAL & OCEAN BASIN

COB ENABLES ADVANCED TESTING OF ORE TECHNOLOGIES

The Coastal & Ocean Basin (COB) is part of MARINERG-i, an emerging European Research Infrastructure Consortium (ERIC) for ORE testing. Supported by Ghent University, KU Leuven and Flanders Hydraulics, COB advances R&D through physical model testing and international collaboration. Ghent University takes on the role of coordinator and national hub in MARINERG-i. Innovative coastal and offshore structures and Ocean Renewable Energy (ORE) technologies are tested in the Coastal & Ocean Basin (COB) using scale models under combined wave, current and wind loading.

Activities and services

The COB is designed to study the effect of waves and currents on coastal and offshore structures, the generation of freak waves and the hydrodynamic and structural behaviour of devices for marine renewable energy. It is a cutting-edge research infrastructure for scaled testing of coastal/offshore structures and Ocean Renewable Energy (ORE) technologies. Its 30 x 30 x 2.3m basin features a pit up to 4.5m deep, enabling the generation of precise waves, currents and winds at any angle. Equipped with state-of-the-art instrumentation, the COB simulates extreme

conditions. Since 2023, it has tested wave energy converters, floating PV, tidal kites, wind turbines and cable/scour protection systems. The COB welcomes users from academia, industry and government institutions.

Impact

A unique research facility not just in Belgium but in Europe, the COB enables combined wave, current and wind testing at any angle. Unlike most RIs, it offers a holistic approach for evaluating coastal/offshore structures and ORE technologies. Strategically located in the Flanders Maritime Laboratory at UGent's Ostend Science Park, COB supports EU project participation and fosters the Blue Economy. The COB's role as the Belgian hub in MARINERG-i further enhances its international impact and collaboration potential.



PRACTICAL INFORMATION

- International website www.marinerg-i.eu/
- Flemish website www.cob.ugent.be
- Access modalities international research infrastructure www.marinerg-i.eu/
- Access modalities Flemish facility www.cob.ugent.be

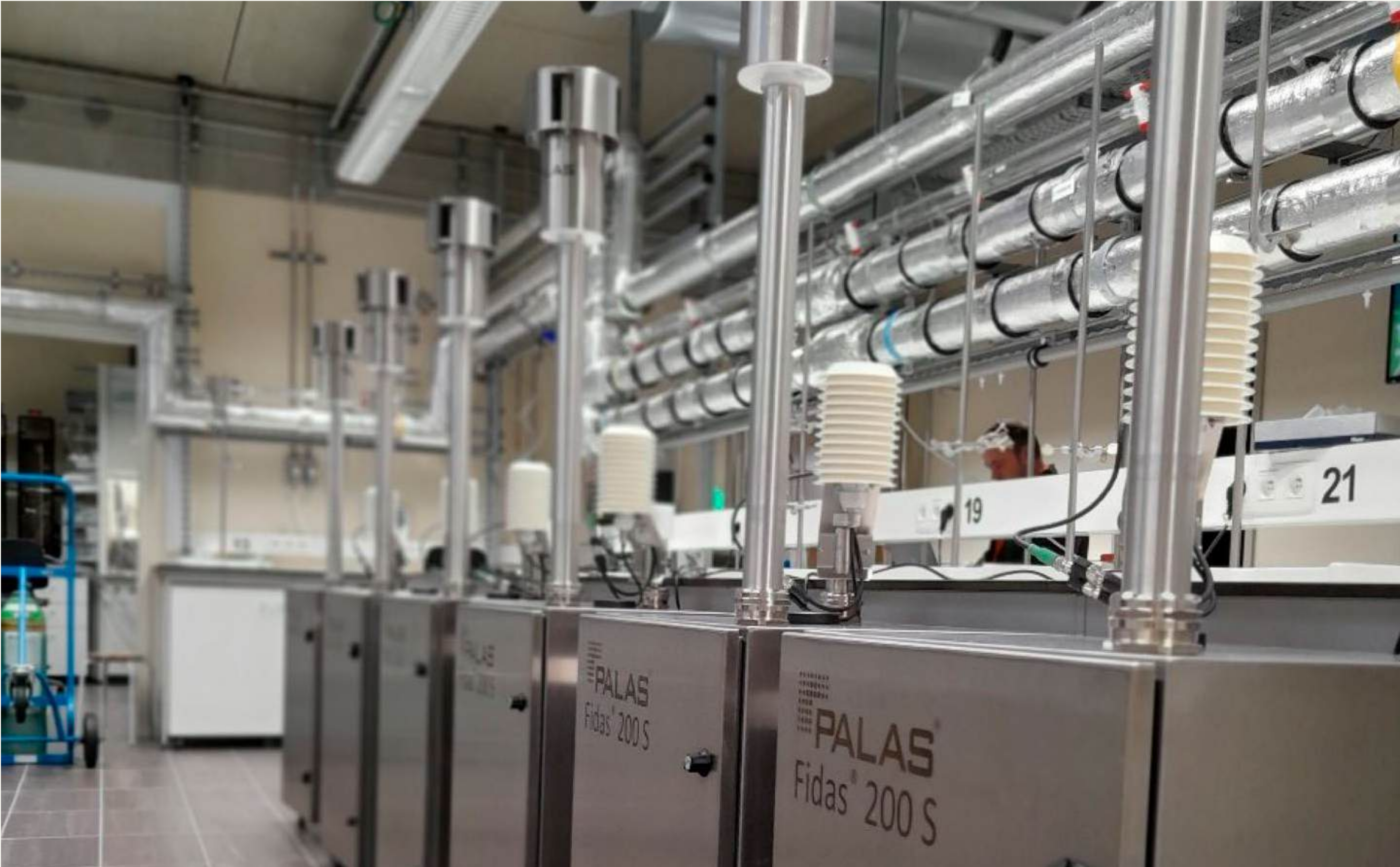
CONSORTIUM

Flemish coordinator

- Peter Troch (Ghent University)
- Maximilian Streicher (Ghent University)

Flemish consortium members and their institutions

- Pieter Rauwoens (KU Leuven)
- Karim Bellafkih (Flanders Hydraulics)



ACTRIS-FLANDERS

THE AEROSOL, CLOUDS AND TRACE GASES RESEARCH INFRASTRUCTURE-FLANDERS

CLEANER AIR, HEALTHIER CITIES AND INFORMED POLICY

ACTRIS is a European research infrastructure delivering high-quality data on aerosols, clouds and trace gases to advance climate and air quality science. Within this European scope, ACTRIS-Flanders is a mobile platform enabling flexible, high-resolution air quality monitoring in urban and hotspot environments. It addresses key scientific questions on pollutant dynamics, exposure and health, while supporting innovation, policy and sensor validation.

Activities and services

ACTRIS provides high-quality data and access to facilities for atmospheric research. It supports science, policy and innovation through standardised observations and services.

ACTRIS-Flanders offers high-resolution air quality monitoring that enables targeted campaigns and support for local and European air quality policies. It offers a modular platform and includes two trailers with high-end monitors for aerosol parameters (ultrafine particles and black carbon) and gases (nitrogen oxides, ozone and volatile organic compounds). Beyond that, the Flemish infrastructure also provides portable tools that allow for mobile mapping of air quality.

Impact

ACTRIS aims to respond to major societal challenges, namely the need for a deeper understanding of atmospheric processes and air quality to mitigate the effects of air pollution.

ACTRIS-Flanders strengthens Flanders' role in European air quality research and contributes to the mobile facilities in ACTRIS. It enhances collaboration and data harmonisation and can synergise with Flemish RIs like EIRENE and ICOS for joint research on air pollution, health and climate.



PRACTICAL INFORMATION

-  **International website**
www.actris.eu/
-  **Flemish website**
www.vito.be/en/research/infrastructure/actris-flanders
-  **Access modalities international research infrastructure**
www.actris.eu/catalogue-of-services/services

CONSORTIUM

- Flemish coordinator**
 - Martine Van Poppel (Flemish Institute for Technological Research - VITO)
- Flemish consortium members and their institutions**
 - Christophe Stroobants (Flanders Environment Agency - VMM)



DISSCO

ENHANCING ACCESS TO FLEMISH COLLECTIONS THROUGH INTEGRATION WITH DISSCO

UNLOCKING FLEMISH COLLECTIONS, ADVANCING GLOBAL RESEARCH

DiSSCo is a European research infrastructure that connects natural science collections from across 23 countries on one digital platform. It turns physical specimens into FAIR Digital Specimens, high-quality digital versions that are findable, accessible and reusable. By making this wealth of biodiversity and geodiversity data easy to explore and use, DiSSCo enables interdisciplinary research and helps scientists tackle big challenges like climate change, health and food security.

Activities and services

DiSSCo Flanders strengthens the European DiSSCo infrastructure by preserving and unlocking Flanders' rich natural science collections. It enhances access and management through AI, data integration and links to external sources like taxonomy, DNA and literature. Additional services include a public crowdsourcing platform (www.doedat.be) and training. These efforts ensure global standards for accessibility and boost the visibility and scientific use of Flemish collections.

Impact

DiSSCo Flanders provides key infrastructure and data for research in biodiversity, geology, climate, health and food security. Unlocking Flemish collections and linking them to global data fuels interdisciplinary, data-driven research. Close collaboration with Flemish RIs like EMBRC, ELIXIR, and CLARIAH strengthens Flanders' leadership in European biodiversity and data infrastructures.



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PRACTICAL INFORMATION

- International website www.dissco.eu/
- Flemish website www.dissco-flanders.be/
- Access modalities international research infrastructure www.disscover.dissco.eu/terms

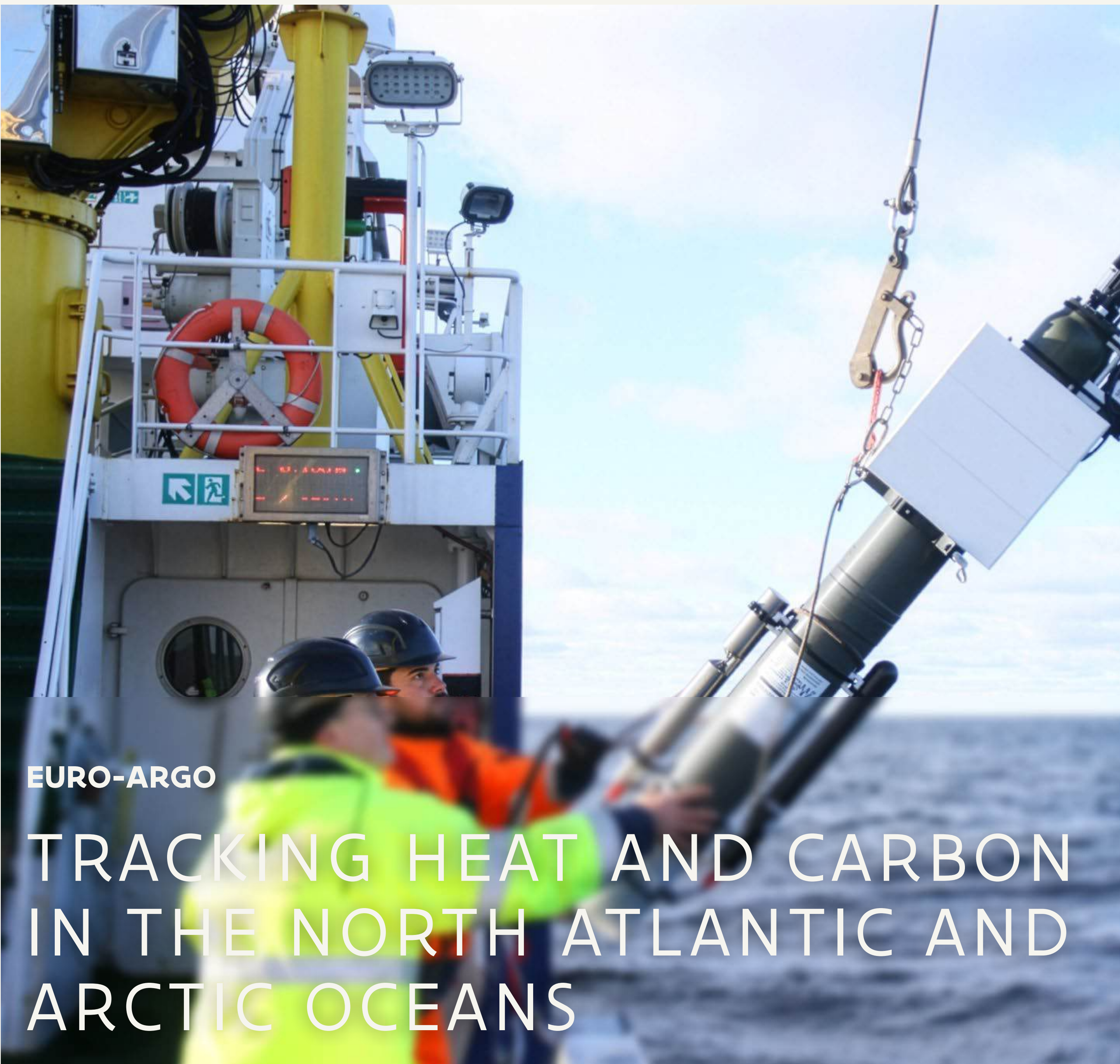
CONSORTIUM

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- Bert Demarsin (KU Leuven)
- Aaike De Wever (Research Institute for Nature and Forest - INBO)
- Kristian Hostens (Flanders Research Institute for Agriculture, Fisheries and Food - ILVO)
- Zjef Pereboom (Royal Zoological Society of Antwerp - KMDA)
- Leen Vandepitte (Flanders Marine Institute - VLIZ)
- Maartje van Frankenhuijsen (Institute of Tropical Medicine - ITM)
- Maarten Vanhove (Hasselt University)



EURO-ARGO

TRACKING HEAT AND CARBON IN THE NORTH ATLANTIC AND ARCTIC OCEANS

AUTONOMOUS OCEAN OBSERVATIONS FOR CLIMATE, CARBON AND ECOSYSTEMS

Euro-Argo is the European contribution to the global Argo programme: a network of autonomous profiling floats that continuously monitor the ocean. The infrastructure provides essential data on ocean temperature, circulation and biogeochemistry, underpinning climate research and policy as well as societal applications (e.g. weather prediction). The Flemish Euro-Argo initiative focuses on heat and carbon dynamics in the North Atlantic and Arctic Oceans, regions that play a key role in the global climate system.

Activities and services

Euro-Argo coordinates the development, deployment and operation of Argo profiling floats and provides open access to quality-controlled ocean data. The infrastructure supports fundamental and applied research, operational ocean services and climate monitoring. Flemish partners contribute advanced biogeochemical sensors, autonomous deployment strategies and data analysis, strengthening Europe's capacity for long-term observation of essential ocean, climate and biodiversity variables.

Impact

Flemish participation in Euro-Argo strengthens Flanders' international position in ocean and climate research and ensures structural access to essential observation data. The infrastructure supports climate modelling, marine policy development and innovation in marine robotics and autonomous observing technologies. At European and international level, Flanders contributes to a robust, coordinated observation system that is vital for understanding and monitoring climate change and ocean health.



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PRACTICAL INFORMATION

- 🌐 **International website**
www.euro-argo.eu/
- 🌐 **Access modalities international research infrastructure**
www.euro-argo.eu/Argo-Data-access

CONSORTIUM

- Flemish coordinator**
- Griet Neukermans (Ghent University)
- Flemish consortium members and their institutions**
- Peter Landschützer, Wieter Boone, Jan Mees, Leandro Ponsoni (Flanders Marine Institute - VLIZ)



ICOS-FLANDERS

GREENHOUSE GAS MEASUREMENTS FOR CLIMATE INSIGHTS

STANDARDISED GREENHOUSE GAS MEASUREMENTS FOR SCIENCE AND POLICY

ICOS monitors greenhouse gas (GHG) concentrations and fluxes, along with key environmental data, at 170 atmosphere, land and ocean sites across Europe and beyond. All measurements are standardised and quality-controlled to study ecosystem responses to global change. Long-term, high-quality GHG data remains scarce. ICOS fills this knowledge gap, collecting data that are crucial for tracking trends, improving climate models, assessing impacts of extreme weather events and evaluating climate policies.

Activities and services

ICOS is a European research infrastructure that provides high-quality, standardised data on GHG concentrations and fluxes across atmosphere, land and ocean domains. ICOS data is freely available and fully traceable for any user around the globe. ICOS-Flanders operates seven unique observation sites and co-hosts the Ecosystem Thematic Centre. It is an essential asset to the Belgian network. ICOS-Belgium has a dense station network measuring in some very unique locations. In the land domain, the Yangambi station in the Congo Basin rainforest is the only site measuring GHG fluxes in the tropical forest ecosystem. The forest stations of Brasschaat and Vielsalm have been collecting data for over two decades, ranking

them among the longest-running stations in the world. The Maasmechelen station in Hoge Kempen National Park is the first European heathland where GHG fluxes are monitored. The agricultural stations in Dorinne, Lonzée and Westmalle measure the effects of farming practices on GHG emissions and uptake. In the ocean domain, the Thornton Buoy operates at the artificial reefs in the C-power wind farm, while the research vessel Simon Stevin collects pCO₂ measurements along its transects in the Belgian North Sea. The atmosphere station is located at Réunion Island in the Indian Ocean and is a joint French-Belgian project.

Impact

ICOS is a key player in climate research, offering advanced infrastructure for GHG gas monitoring. Through partnerships with WMO and NASA, ICOS contributes to evaluating global climate trends. In Flanders, ICOS fosters international scientific collaboration, pushes innovation, trains (inter)national technical and scientific staff, engages in knowledge transfer to the general public and invests in policy-relevant climate topics. ICOS-Flanders collaborates with infrastructures including Lifewatch, ACTRIS and eLTER, and is committed to further strengthening joint research efforts in the future.

PRACTICAL INFORMATION

-  **International website**
www.icos-cp.eu/
-  **Flemish website**
www.icos-belgium.be/
-  **Access modalities international research infrastructure**
www.icos-cp.eu/about/organisation-governance/international-cooperation
-  **Access modalities Flemish facility**
www.icos-belgium.be/Outreach.php
[#Outreach](https://twitter.com/Outreach)

CONSORTIUM

- Flemish coordinator**
 - Ivan Janssens (University of Antwerp)
- Flemish consortium members and their institutions**
 - Bert Gielen (University of Antwerp)
 - Hans Verbeeck, Pascal Boeckx (Ghent University)
 - Jan Mees (Flanders Marine Institute - VLIZ)



ANAEE-FLANDERS

INTEGRATED INFRASTRUCTURE FOR EXPERIMENTAL ECOSYSTEM RESEARCH

EXPERIMENTAL OUTLOOK FOR FUTURE SOLUTIONS TO ENVIRONMENTAL CHANGE

Through a new generation of experimental facilities embedded in the European Research Infrastructure AnaEE, we analyse the impact of environmental change on ecosystem services and develop innovative solutions. The state-of-the-art, open access platforms – including ecotrons – encompass both terrestrial and aquatic ecosystems, encompassing managed as well as natural environments. Our research focuses on three areas:

1. the agroecological transition
2. the water crisis
3. the eutrophication and nitrogen challenge



Activities and services

AnaEE-Flanders focuses on running long- and short-term experiments where ecosystems are subjected to climate change and other forms of environmental change and/or mitigation solutions. We offer real-time long-term assessments of ecosystem functioning via nutrient exchange, greenhouse gas exchange and biodiversity dynamics.

Impact

AnaEE-Flanders enables accelerated development of the agroecological sector and promotes the positioning of Flemish science-based agroecological industries in the international arena by providing knowledge-based technologies to adapt to climate change and nitrogen/eutrophication challenges. In addition, we accelerate the potential to test new water management and flood control designs. We collaborate with many other IRIs, including EMPHASIS, ICOS, MIRRI, ELIXIR and Euro-Biolmaging.

PRACTICAL INFORMATION

- International website www.anaee.eu/
- Flemish website www.anaee.be/
- Access modalities international research infrastructure www.anaee.eu/services/user-access-policy-and-procedure

CONSORTIUM

- Flemish coordinator**
 - Nadia Soudzilovskaia (Hasselt University)
- Flemish consortium members and their institutions**
 - Ivan Nijs, Gudrun de Boeck (University of Antwerp)



BBMRI - BANKING THE BRAIN

SUSTAINABLE BIOBANKING
TO EMPOWER BRAIN DISEASE
RESEARCH

MAKING BRAIN RESEARCH IN FLANDERS STRONGER, FASTER AND MORE CONNECTED

Banking the Brain is a distributed research infrastructure that integrates biobanking, clinical and research data as well as advanced analytics to accelerate brain disease research. Embedded in BBMRI-ERIC, it harmonises sample and data collection across sites and enables secure, FAIR access via a dedicated BioPortal. The infrastructure addresses urgent research challenges in neurodegeneration and psychiatry, including biomarker discovery, disease heterogeneity and precision medicine.

Activities and services

The infrastructure delivers harmonised sample processing, standardised metadata and integrated data capture across clinical and research settings. Core services include a Brain BioPortal for searching samples and data, streamlined access procedures, and support for the inclusion of deep phenotyping, multi-omics, imaging and longitudinal analyses. Activities include automation of workflows, quality and ELSI support, training and facilitation of academic and public-private research projects.

Impact

For Flanders, Banking the Brain strengthens Flanders' leadership in brain research, boosts clinical trials, innovation and talent attraction, and maximises the value of existing recruitment. At European and international level, it enhances interoperability, visibility and reuse of high-quality brain data through BBMRI-ERIC and EHDS alignment. Close collaboration with Flemish infrastructures such as Flanders Bioimaging and Genomic Data Infrastructure ensures complementarity, efficiency and shared impact.

PRACTICAL INFORMATION

-  **International website**
www.bbMRI-eric.eu
-  **Flemish website**
www.bbMRI.be
-  **Access modalities international research infrastructure**
www.bbMRI-eric.eu/bbMRI-sample-and-data-portal

CONSORTIUM

Flemish coordinator

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Flemish consortium members and their institutions

- Rosa Rademakers, Julie van der Zee, Pieter Moons, Jonathan Baets, Sara Van Mossevelde, David Crosiers, Anne Sieben, Manuel Morrens, Kris van den Broeck, Manon Huizing, Bart De Vil (University of Antwerp)
- Tim Van Langenhove, Elke Berneel, Bruno Verhasselt, Veerle De Herdt (Ghent University)
- Liesbet Peeters, Kimberly Vanhees (Hasselt University)
- Dietmar Thal, Rik Vandenbergh, Wim Vandenbergh, Philip Van Damme, Koen Poesen, Loes Linsen (KU Leuven)
- Sebastiaan Engelborghs (Vrije Universiteit Brussel)



EIRENE
EUROPEAN
EXPOSOMICS RESEARCH
INFRASTRUCTURE

ENABLING DATA-DRIVEN PREVENTIVE HEALTH

Environmental exposures have been shown to play a pivotal role in non-communicable diseases. The exposome concept offers environmental, clinical and social scientists a holistic approach that transcends the examination of individual health determinants, embracing an interdisciplinary evaluation of a wide array of factors. These encompass physical environments, socioeconomic conditions, lifestyle, and an individual's resilience to various stressors, such as infections or psychological stress.

Impact

EIRENE strengthens exposome research in Flanders. The results contribute to effective and preventive environmental and public health policy measures, healthier citizens and cost savings in healthcare in Flanders and across Europe. Study alignment and harmonisation efforts will make the necessary multidisciplinary and upscaling of exposome research possible. EIRENE is set to join forces with [BBMRI](#) (biobank), [ACTRIS](#) (atmosphere), [ELIXIR](#) and EMBL (life science data access & analyses).

- Activities and services**
- EIRENE enables the multidisciplinary exposome research through:
- Large-scale recruitment and sampling via the Human Sentinel Surveillance Platform utilising occupational health systems and novel microsampling methods.
 - Analysis of exposure and effect biomarkers using advanced MS/MS, HRMS platforms and targeted proteomics equipment.
 - The Personal Exposure and Health Data Platform to collect, harmonise, integrate and securely store sensitive exposome data.
 - FAIRification of data which facilitates their reuse and additional data analyses.



PRACTICAL INFORMATION

- **International website**
www.eirene.eu/
- **Flemish website**
Under construction

CONSORTIUM

- Flemish coordinator**
- Jos Bessems (Flemish Institute for Technological Research - VITO)
- Flemish consortium members and their institutions**
- Lode Godderis (KU Leuven)
 - Adrian Covaci (University of Antwerp)
 - Sarah De Saeger (Ghent University)



ELIXIR

ELIXIR INFRASTRUCTURE
FOR DATA AND SERVICES TO
STRENGTHEN LIFE SCIENCES
RESEARCH IN FLANDERS

ELIXIR EMPOWERS SCIENCE
THROUGH DATA

ELIXIR is an intergovernmental organisation that unites life science resources across Europe - including databases, software tools and training materials - into a coordinated infrastructure. Its mission is to make it easier for scientists to access, share and analyse data, exchange expertise and align on best practices. Ultimately, this enables deeper insights into the workings of living organisms.

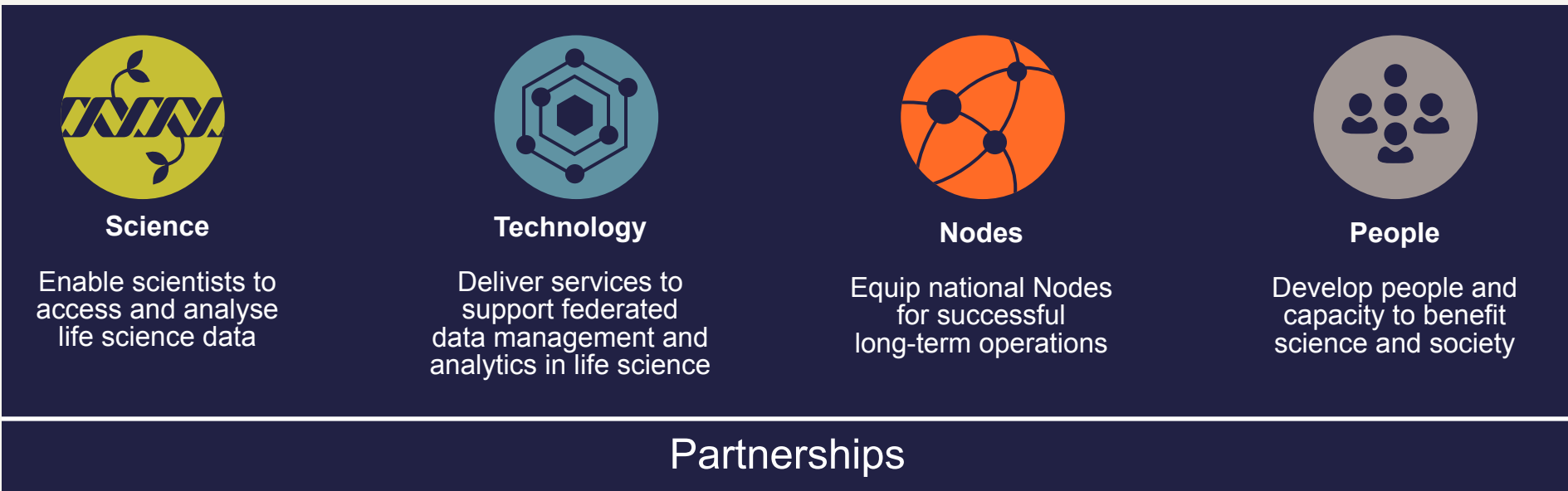
Activities and services

ELIXIR is a distributed research infrastructure that builds on existing data resources and services across Europe. Each national node leverages the strengths of its local scientific community. ELIXIR Belgium focuses on domain-specific services in plant and biodiversity research, human health and functional genomics. It promotes the

FAIRification of research data and supports reproducible analysis through initiatives in data management, analysis and training. In addition, the node contributes to the development of a European distributed infrastructure to share and process human genomics data.

Impact

ELIXIR plays a central role in life sciences by coordinating data services and shaping strategies for data-intensive research. For example, the Genomic Data Infrastructure (GDI) project, coordinated by ELIXIR, enables the development of a secure, federated infrastructure across Europe, fostering innovation in data-driven healthcare. This is exemplary of the role of the research infrastructure to strengthen the position of Flanders and its research institutes within the European life sciences data ecosystem.



PRACTICAL INFORMATION

International website
www.elixir-europe.org/

Flemish website
www.elixir-belgium.org/

Access modalities international research infrastructure
www.elixir-europe.org/services

CONSORTIUM

Flemish coordinator

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- Yves Moreau (KU Leuven)
- Kris Laukens, Pieter Meysman, Geert Vandeweyer (University of Antwerp)
- Wim Vranken, Tom Lenaerts (Vrije Universiteit Brussel)
- Dirk Valkenburg, Liesbeth Peeters (Hasselt University)
- Kim De Ruyck, Stijn Dhondt, Alexander Botzki (Vlaams Instituut voor Biotechnologie - VIB)



EMBRC

THE FLEMISH CONTRIBUTION
TO THE EUROPEAN MARINE
BIOLOGICAL RESOURCE CENTRE

EMBRC SUPPORTS SUSTAINABLE
INNOVATION IN MARINE
BIODIVERSITY RESEARCH

EMBRC is a research infrastructure dedicated to marine biology and ecology. Its core mission is to advance our understanding of marine biological resources and their function, while promoting their sustainable use for the benefit of society. Flanders participates in the Belgian node with four operators. A dedicated role is assigned to the Marine Training Unit (MTU), which facilitates the European infrastructure's training and knowledge and technology transfer through advanced and specialised training courses.

Activities and services

EMBRC accelerates knowledge of marine biodiversity through research and ocean exploration in order to understand the pressures on life in the ocean, advance scientific innovation and promote the sustainable use of marine resources. By providing access to marine resources (organisms and ecosystems), state-of-the-art expertise and infrastructure for users from various sectors, the EMBRC supports innovative research to address marine environmental challenges. In addition, MTU offers specialised training in marine biodiversity, biotechnology, FAIR data and the blue bioeconomy.

Impact

EMBRC strengthens Flanders as a key player in marine research and innovation, with impact on aquaculture, blue biotechnology, offshore energy and ecosystem management. Flemish operators offer unique expertise and infrastructure for research, training and monitoring.

At the same time, EMBRC is a major European and international actor, partnering with LifeWatch, DISSCo, ELIXIR, and Euro-Biolmaging, providing access to marine biodiversity and enabling knowledge exchange.



PRACTICAL INFORMATION

- International website www.embrc.eu/
- Flemish website www.embrc.be/
- Access modalities international research infrastructure www.embrc.eu/services/how-to-access

CONSORTIUM

- Flemish coordinator**
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- Flemish consortium members and their institutions**
- Jana Asselman, Koen Chiers, Olivier De Clerck, Annelies Declercq, Wim Vyverman, Koen Sabbe, Tom Moens (Ghent University)
 - Karen Smeets, Tom Artois, Maarten Vanhove (Hasselt University)
 - Eve Seuntjens (KU Leuven)
 - Jan Mees (Flanders Marine Institute - VLIZ)
 - Jan Vanaverbeke (Institute of Natural Sciences)



TECHNOLOGICAL INNOVATION AS THE ENGINE FOR FOOD SECURITY IN THE FUTURE

EMPHASIS-Belgium addresses the agricultural challenges posed by both climate change and EU targets towards sustainable agriculture with reduced input. It does so through the use of plant phenotyping, defined as the study of plant traits using advanced imaging tools. This is applied as a groundbreaking technology driving both plant research and crop breeding. EMPHASIS-Belgium takes a multi-scale approach, covering above and below-ground phenotyping; indoor and in the field, using automation, drones, and expansion into satellite imaging.

Activities and services

The primary focus of the consortium is on access provision to both physical and digital services by the organisation of access calls. User feedback is captured to further improve the procedures and steer technological developments based on user needs. Furthermore, to keep Belgium at the forefront of high-throughput plant phenotyping,

EMPHASIS-Belgium focuses on the following activities and services:

- The development and implementation of new technologies at the facilities.
- The expansion of the functionality of FAIR data management systems.
- Engagement with stakeholders through dissemination, training and collaborative activities.

Impact

EMPHASIS-Belgium comprises unique facilities and services that are complementary to capabilities available within the distributed research infrastructure EMPHASIS in Europe. The consortium collaborates with ELIXIR-Belgium and AnaEE-Flanders for data and ecosystem advancements and engages with other national research infrastructure communities. Moreover, with the EMPHASIS central coordination office being hosted within VIB, EMPHASIS is the first European RI coordinated and hosted from within Belgium.

PRACTICAL INFORMATION

- 🌐 **International website**
www.emphasis.plant-phenotyping.eu/
- 🌐 **Flemish website**
www.emphasis-belgium.sites.vib.be/en
- 🌐 **Access modalities international research infrastructure**
www.emphasis.plant-phenotyping.eu/about/infrastructure-categories

CONSORTIUM

- Flemish coordinator**
- Stijn Dhondt (Vlaams Instituut voor Biotechnologie - VIB)
- Flemish consortium members and their institutions**
- Hilde Nelissen (Vlaams Instituut voor Biotechnologie - VIB)
 - Peter Lootens (Instituut voor Landbouw-, Visserij- en Voedingsonderzoek - ILVO)
 - Dries Raymaekers (Flemish Institute for Technological Research - VITO)



FLANDERS BIOIMAGING

LEADING IMAGING
APPLICATION INTEGRATED
SERVICE AND ENABLEMENT

VISUALISING THE FUTURE

Imaging is indispensable in biology and biomedical science but also resource-intensive. Flanders has invested heavily in imaging infrastructure, establishing innovative and cost-effective core facilities. Flanders Bioimaging has been established with the intention to integrate, optimise, rationalise and coordinate the imaging infrastructure available in Flanders while providing access to regional, national and international users. In 2024, Flanders Bioimaging joined the ESFRI project, Euro-Bioimaging, as a preclinical and microscopy node.

Activities and services

As a knowledge hub, our leading, most highly developed and unique imaging applications from each of our sites were developed as robust services for our users. Additionally,

our focus on training, quality and data management services supports both Open Science and the local innovation landscape, including SMEs. This way, Flanders Bioimaging ensures the highest value and impact for our stakeholders, funders and, most importantly, our users.

Impact

Integrated services (i.e. the provision of techniques, technologies and applications) can exploit fundamental research to deliver high-quality results to academic and industry users. By joining forces, we can provide the critical mass required to transform the available infrastructure into a knowledge hub that attracts talent, allows optimum valorisation of results and offers the best return on investment for science funding.



PRACTICAL INFORMATION

- 🌐 **International website**
www.eurobioimaging.eu
- 🌐 **Flemish website**
www.flandersbioimaging.org/
- 🌐 **Access modalities international research infrastructure**
www.eurobioimaging.eu/how-to-access

CONSORTIUM

- Flemish coordinator**
- Sebastian Munck (KU Leuven & Vlaams Instituut voor Biotechnologie - VIB)
- Flemish consortium members and their institutions**
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 - Sigrid Stroobants, Winnok De Vos (University of Antwerp)
 - Tony Lahoutte (Vrije Universiteit Brussel)
 - Stefaan Vandenberghe, Kevin Braeckmans (Ghent University)
 - Jelle Hendrix (Hasselt University)



IBISBA-FL

INDUSTRIAL BIOTECHNOLOGY INNOVATOR AND SYNTHETIC BIOLOGY ACCELERATOR

HIGH-VALUE BIOMATERIALS AND CHEMICALS FROM LOCAL RESOURCES

IBISBA-FL aims to contribute to the bio-based economy by developing new value chains for the production of high added-value (bio) materials and fine and specialty chemicals from locally available renewable resources. It will exploit promising non-conventional microbes and shorten development times by establishing a novel, integrated equipment pipeline providing unique capabilities across scales (nL to L scale) and temperature ranges (4°C to >60°C).

Activities and services

IBISBA-FL will identify novel genetic parts from bioprospecting and develop synthetic biology parts and tools for non-conventional microbes. These will be used to engineer strains for the production of specific bio-based compounds and biomaterials.

IBISBA-FL combines a novel, high-throughput integrated equipment pipeline for automated screening and in-depth characterisation of microbes (growth, metabolites) with equipment that allows online metabolic fingerprinting for bioprocess development and intensification.

The work in IBISBA-FL will generate insights into metabolic, process and product performance of microbial hosts under industrially relevant conditions.

Impact

IBISBA-FL provides an ideal platform for the creation of (i) superior non-conventional strains for various industries, (ii) new sustainable production processes, and (iii) materials and chemicals with novel functionalities. By developing bioprocesses that convert local resources into added-value chemicals and biomaterials, IBISBA-FL not only contributes to a green future and increased competitiveness but also fosters greater self-sufficiency and strategic autonomy for Flanders and Europe.

PRACTICAL INFORMATION

 **International website**
www.ibisba.eu

CONSORTIUM

Flemish coordinator

- Heleen De Wever (Flemish Institute for Technological Research - VITO)

Flemish consortium members and their institutions

- Marjan De Mey, Tom Desmet, Inge Van Bogaert, Wim Soetaert (Ghent University)
- Kevin Verstrepen (Vlaams Instituut voor Biotechnologie - VIB)
- Eveline Peeters (Vrije Universiteit Brussel)



NANOBODIES4INSTRUCT

NANOBODIES FOR USE IN
STRUCTURAL BIOLOGY

NANOBODIES FROM THE LAB THAT DISCOVERED CAMEL ANTIBODIES

Founded in 2014, Nanobodies4Instruct is the flagship facility of Instruct-ERIC, a leading ESFRI infrastructure offering advanced technologies, expertise and training in structural biology. Scientists from Instruct member states can apply for access to generate conformational nanobodies and megabodies – powerful tools that enable structural studies of proteins that are difficult to purify, crystallise or analyse using conventional methods.

Activities and services

The Nanobodies4Instruct centre specialises in generating conformational nanobodies to support the structural analysis of proteins that are notoriously difficult to purify, crystallise or study using conventional methods. Collaborative research has shown that nanobodies serve as exceptional chaperones for crystallising complex biological systems including membrane proteins, transient assemblies, conformational states and intrinsically disordered proteins. Additionally, they can act as precise structural probes for investigating protein misfolding and fibril formation.

Impact

Nanobodies4Instruct is the flagship facility of Instruct-ERIC, one of the first ESFRI infrastructures that provides cutting-edge technology, scientific expertise and pioneering training in structural biology. As Flanders/Belgium is a founding partner of Instruct, Belgian scientists also have access to the services of Nanobodies4Instruct.

PRACTICAL INFORMATION

-  **International website**
www.instruct-eric.org/
-  **Flemish website**
www.instruct-eric.org/centre/nanobodies4instruct
-  **Access modalities international research infrastructure**
www.instruct-eric.org/who-can-apply#
-  **Access modalities Flemish facility**
www.instruct-eric.org/centre/nanobodies4instruct
-  **Core facility**
NANOBODIES4INSTRUCT3.0
Nanobodies for the integrated structural and spatiotemporal analysis of proteins and their interaction networks

CONSORTIUM

- Flemish coordinator**
- Jan Steyaert (Vrije Universiteit Brussel & Vlaams Instituut voor Biotechnologie - VIB)



CMS FOR CERN

FLEMISH PARTICIPATION IN THE CMS EXPERIMENT AT CERN

GLOBAL AND FUNDAMENTAL SCIENCE DRIVING CUTTING- EDGE TECHNOLOGY

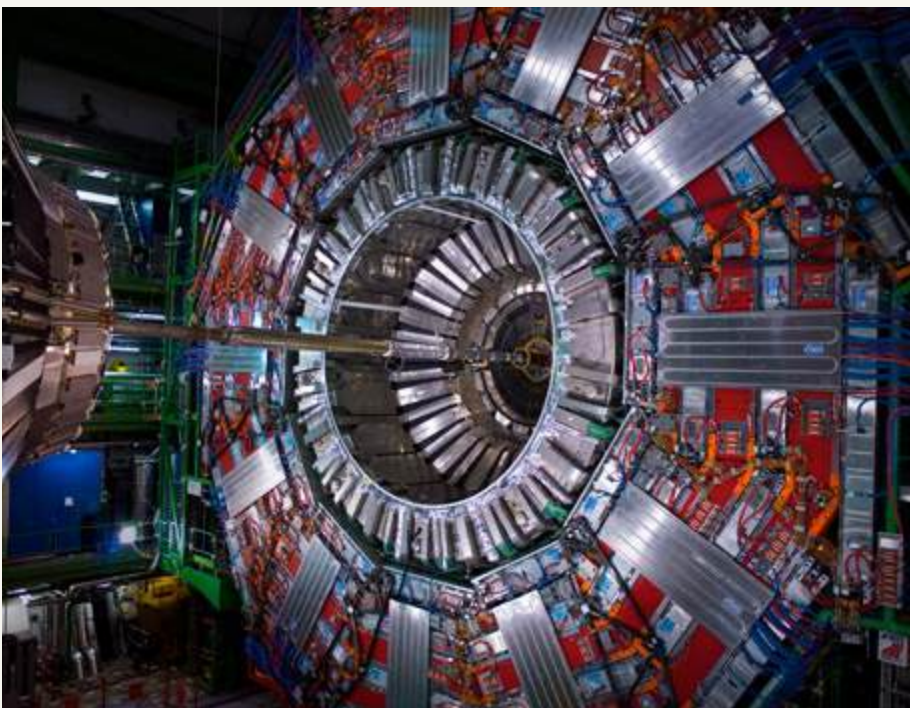
Exploring elementary particles and their interactions has been a long-standing human endeavour. In 2012, the Large Hadron Collider (LHC) at CERN confirmed the existence of the Higgs boson, predicted by Brout, Englert and Higgs 50 years earlier. However, fundamental questions remain, such as the nature of dark matter, the matter-antimatter asymmetry, the weakness of gravity and the unification of all forces. The Compact Muon Solenoid allows the testing of theoretical ideas to answer these questions.

Activities and services

The Large Hadron Collider provides high-energy proton and ion beams for particle physics experiments. One of its key experiments, the CMS detector, functions like a giant camera, capturing detailed data from particle collisions. It includes the advanced Tracking Detector, developed with contributions from Flemish scientists. Researchers worldwide analyse this data using the powerful Worldwide LHC Computing GRID to explore the fundamental structure of the universe.

Impact

European research institute CERN offers world-class facilities for particle physics research to scientists worldwide. The CMS Collaboration unites around 240 institutes and universities from over 50 countries. This global effort includes scientists from UAntwerp, UGhent and VUB, who contribute to groundbreaking discoveries, technological innovation and the training of future experts in fundamental science.

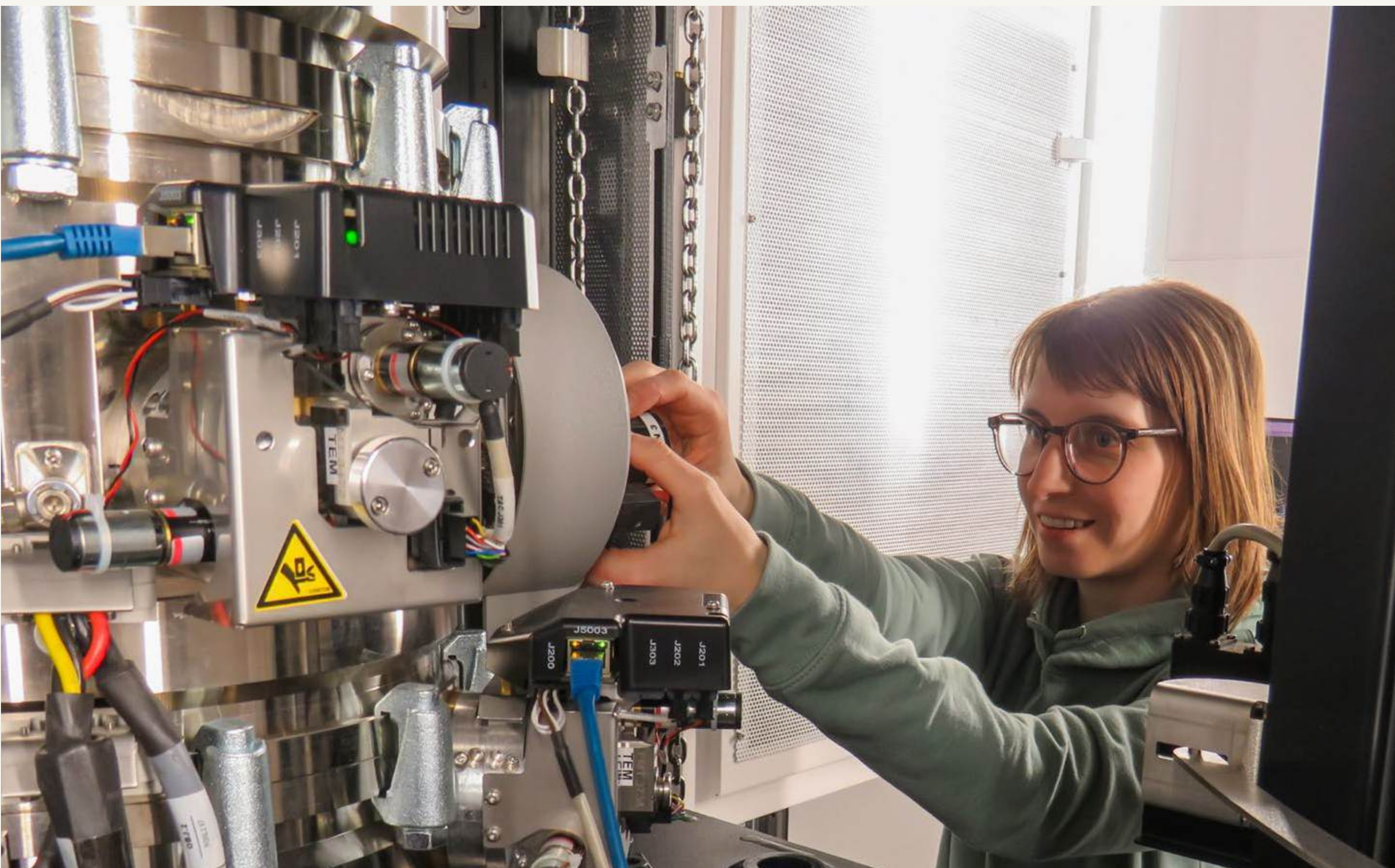


PRACTICAL INFORMATION

-  **International website**
www.home.cern/science/accelerators/large-hadron-collider
www.cms.cern
-  **Flemish website**
www.cms.cern/
-  **Access modalities international research infrastructure**
www.international-relations.web.cern.ch/stakeholder-relations/Participation-CERN
-  **Access modalities Flemish facility**
www.cms.cern/collaboration/how-join-cms

CONSORTIUM

- Flemish coordinator**
 - Pierre Van Mechelen (University of Antwerp)
- Flemish consortium members and their institutions**
 - Steven Lowette, Michael Tytgat (Vrije Universiteit Brussel)
 - Didar Dobur (Ghent University)



ELECTRON MICROSCOPY FLANDERS

EXCELLENCE IN ELECTRON
MICROSCOPY FOR MATERIALS
SCIENCE

ELECTRON MICROSCOPY REVEALS
THE ATOMIC STRUCTURE OF
MATERIALS OF THE FUTURE

Microscopy Europe merges the most advanced electron microscopy infrastructure in Europe into a uniform service for materials research. A consortium of 13 countries will grant access to both academic research and businesses to reveal the atomic structure of their materials and provide insights into the operation, performance and degradation mechanisms of newly discovered materials. This eliminates the barrier of high costs and ensures a steep learning curve. Strengthening the organisation strongly increases the efficiency of the investment.

Activities and services

The infrastructure offers electron microscopy for materials research. This includes determining the (atomic) structure of materials in 2D and 3D, the local composition and the morphology of nanomaterials. Also covered are the electronic structure and its link with optical properties, defects and the connection to transport and mechanical properties of materials, as well as in-situ behaviour in gases, liquids, electric and magnetic fields.

The service offer includes infrastructure and expert support in operating the instruments and interpreting the results. Instrument time can be requested via an application form describing the scientific background and the problem to be solved. This form will be reviewed by a scientific panel, judging feasibility and fit with the available infrastructure.

Impact

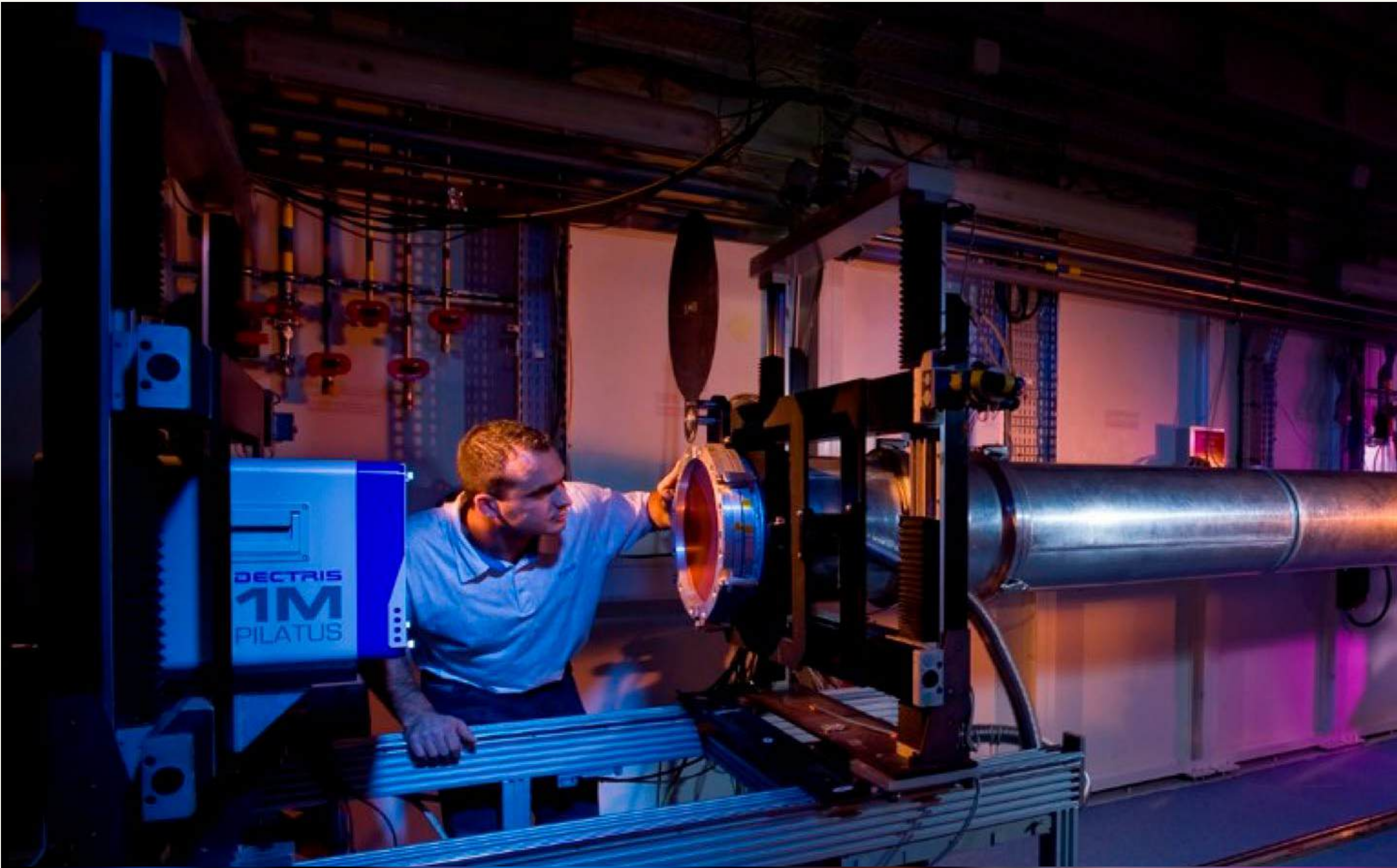
The infrastructure gives access to cutting-edge characterisation methods for materials research, thereby providing insights into materials, which is essential for their further development. Access is unified and easy, and the infrastructure is operated by trained experts. In this way, Europe strengthens its leading role in materials science and supports companies and research institutions in their development. Rationally investing in expensive infrastructure in places where it can be optimally utilised anchors expertise and talent in materials research in Flanders and Europe.

PRACTICAL INFORMATION

-  **International website**
www.microscopyeurope.eu
(under construction)
-  **Flemish website**
www.e-microscopyflanders.be
(under construction)
-  **Access modalities international research infrastructure**
www.e-microscopyflanders.be
(under construction)
-  **Core facility**
EMAT (Electron microscopy for materials science)
www.uantwerpen.be/en/research-groups/emat/

CONSORTIUM

- Flemish coordinator**
 - Johan Verbeeck (University of Antwerp)
- Flemish consortium members and their institutions**
 - Sara Bals (University of Antwerp)
 - Zeger Hens, Iwan Moreels (Ghent University)
 - Maria Seo (KU Leuven)



ESRF - FLAME

ADVANCED MATERIAL RESEARCH DOWN TO THE ATOMIC LEVEL

ILLUMINATING MATTER TO DRIVE INNOVATION

The ESRF in Grenoble (France) is the world's most powerful synchrotron X-ray source and is used to study the structure and function of atoms, molecules and materials. Access to the ESRF X-ray beamlines is allocated to countries in proportion to their membership fee. ESRF members are also allowed to install and operate their own CRG (Collaborating Research Group) beamlines. FLAME is the Flemish beamLine for Advanced Materials Exploration at the European Synchrotron Radiation Facility. It is a CRG beamline and offers priority access to the ESRF for Flemish users.

Activities and services

Synchrotron X-rays are far more intense than those produced in laboratories or hospitals. By probing the interaction of synchrotron X-ray beams with living or non-living matter, researchers can reveal structures and dynamic changes at the atomic scale and within sub-millisecond time frames. FLAME, formerly known as DUBBLE, supports combined small-(SAXS) and wide-angle (WAXS) X-ray scattering, X-ray spectroscopy (XAS, EXAFS, XANES) and imaging. Through exchange agreements, Flemish researchers can also access setups at other CRG beamlines.

Impact

Through experiments at the ESRF and FLAME, Flemish scientists develop new, sustainable materials for advanced electronic components, solar cells and batteries. This research also supports chemical innovation and makes it possible to understand what our planet is made of, how human activities affect the environment, which processes sustain life and how our cultural heritage materials can be preserved. It also contributes to the development of healthier food and new ways to fight diseases.



PRACTICAL INFORMATION

- International website www.esrf.fr/
- Flemish website www.esrf.fr/UsersAndScience/Experiments/CRG/BM26
- Access modalities international research infrastructure www.esrf.fr/home/UsersAndScience/Applying.html

CONSORTIUM

Flemish coordinator
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- Flemish consortium members and their institutions
- Laszlo Vincze (Ghent University)
 - Koen Janssens (University of Antwerp)
 - Marlies Van Bael (Hasselt University)
 - Tom Hauffman (Vrije Universiteit Brussel)
 - Sean McMitchell (Interuniversity Microelectronics Centre - IMEC)
 - Jeroen Spooren (Flemish Institute for Technological Research - VITO)



ET-TECH
EINSTEIN TELESCOPE

EXPLORING THE UNIVERSE WITH A GROUNDBREAKING UNDERGROUND TELESCOPE

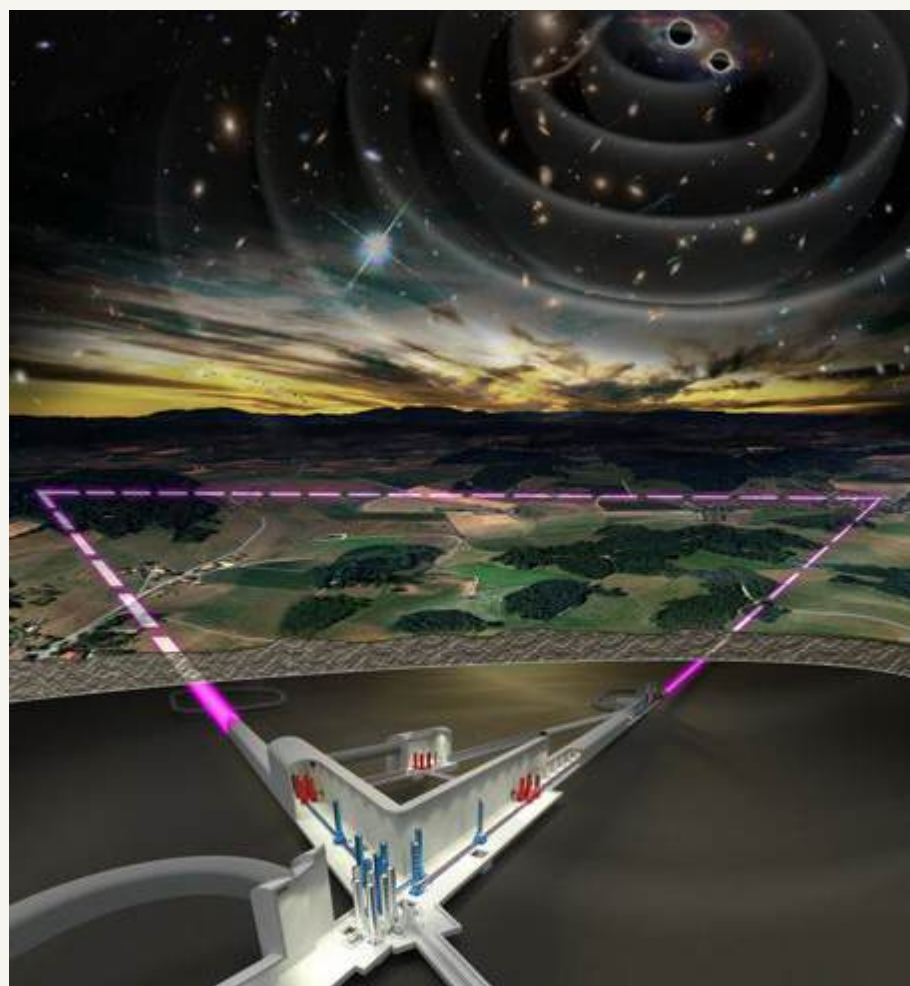
The Einstein Telescope (ET) is set to pioneer third-generation interferometry, enabling both the detection and measurement of a multitude of gravitational waves. With a sensitivity up to ten times greater than existing detectors, the ET will teach us much more about the universe. The telescope will become a pioneer in an era of international collaboration among astronomical observatories, engaging in multi-messenger astronomy together with existing telescopes and observatories. The aim of this infrastructure project is the research of critical elements for the Einstein Telescope, such as the optical elements and stabilisation.

Activities and services

The research covers a wide range of technologies, such as mirror polishing, mirror coatings, optical filters, lasers for new light frequencies, vacuum systems and materials research, sensors and control systems... The research also focuses on the analysis of gravitational waves based on Artificial Intelligence.

Impact

This research makes Flanders a front-runner in the European Gravitational Wave research, whereby important knowledge is acquired regarding critical elements for gravitational wave detectors. In addition to the research itself, patents and spin-offs are also expected. The direct influence on STEAM is already noticeable and will only increase. The knowledge strengthens the candidacy of the Euregio Meuse-Rhine (EMR) to build the Einstein Telescope, with a view to creating an ecosystem with a high economic return.



PRACTICAL INFORMATION

- International website www.et-emr.eu/
- Flemish website www.etforbusiness.be
- Access modalities international research infrastructure www.einsteintelelescope-emr.eu/en/faq/

CONSORTIUM

Flemish coordinator

- ET Consortium (University of Antwerp & KU Leuven)

Flemish consortium members and their institutions

- Nick van Remortel (University of Antwerp)
- Tjonnje Li (KU Leuven)
- Archisman Ghosh (Ghent University)
- Bart Vermang (Hasselt University)
- Alexander Sevrin (Vrije Universiteit Brussel)
- Michiel Ritzén (Flemish Institute for Technological Research - VITO)



EUFAR

EUROPEAN FACILITY FOR AIRBORNE RESEARCH

UNDERSTANDING EARTH USING HYPERSPECTRAL GLASSES

EUFAR is a collaborative research infrastructure dedicated to advancing airborne research in environmental and geo-sciences across Europe and beyond. Earth's terrestrial and aquatic ecosystems are under pressure due to climate change. To better understand these ecosystems, EUFAR provides access to hyperspectral imaging sensors (or imaging spectrometers) mounted on manned or unmanned airborne platforms and image processing facilities making it possible to derive quantitative information from each imaged pixel of the Earth.

Activities and services

VITO contributes to EUFAR through the project "Integrating the AVIRIS-4 airborne imaging spectrometer in the VITO Remote Sensing Data Centre as contribution to the European Facility for Airborne Research in Environmental and Geo-Sciences". Within this project, VITO built on expertise with APEX, an airborne imaging spectrometer developed by a Swiss/Belgian consortium for ESA.

Together with the Remote Sensing Laboratories (RSL) of the University of Zurich, VITO operated APEX and processed images to Analysis Ready Data for the European research community

including Flanders since 2010 and trained MSc, PhD, postdocs in airborne imaging spectroscopy in Belgium, Europe and beyond.

As APEX reached end of life and was replaced by AVIRIS-4 operated by RSL, VITO fully upgraded its hyperspectral image processing facility for AVIRIS-4.

Impact

APEX campaigns covered 250 areas in 15 countries. More than 7 TB of raw data were acquired and more than 100 research projects were supported, resulting in scientific publications advancing our knowledge about the Earth's ecosystems.

Several joint campaigns have been organised at ICOS sites in Belgium. Access to the upgraded facility is now offered through the Horizon Europe AQUARIUS project for Transnational Access.



PRACTICAL INFORMATION

-  **International website**
www.eufar.net/
-  **Flemish websites**
www.remotesensing.vito.be/
www.remotesensing.vito.be/news/new-data-processing-infrastructure-cwis-ii-sensor
-  **Access modalities international research infrastructure**
www.eufar.net/data-archives/
-  **Access modalities via AQUARIUS**
www.aquarius-ri.eu/

CONSORTIUM

- Flemish coordinator**
 - IIs Reusen (Flemish Institute for Technological Research - VITO)



ICECUBE

THE ICECUBE NEUTRINO AND COSMIC RAY OBSERVATORY AT THE SOUTH POLE

ICECUBE HAS OPENED THE FIELD OF NEUTRINO ASTRONOMY

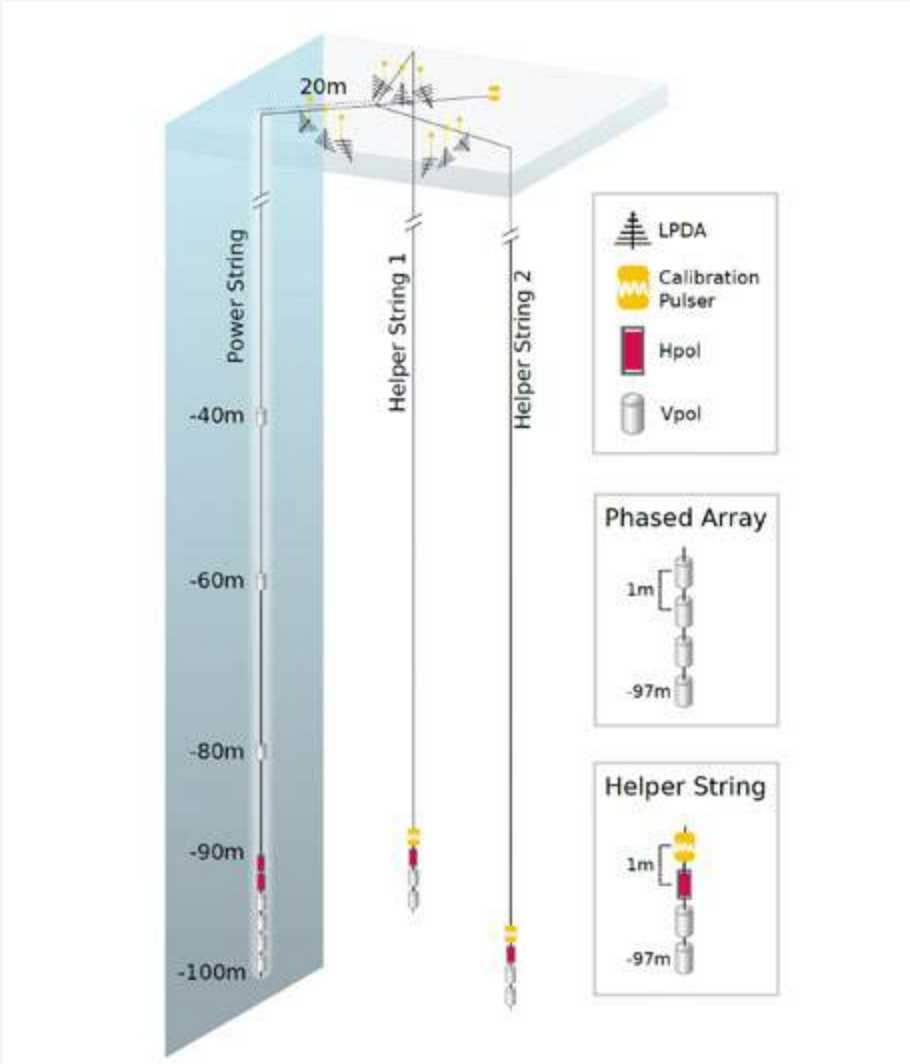
Buried in the deep glacial ice, the IceCube observatory is located close to the geographic South Pole and searches for high-energy neutrinos related to explosive cosmic phenomena. After the discovery of high-energy neutrinos in 2013 it became clear that an extension of the observatory is needed to access higher neutrino energies. This will be realised by the development of an array of radio detector stations in which the Flemish teams have taken the lead.

Activities and services

The Flemish groups are key players in various IceCube analysis areas and take a share in the detector operations and management within the international IceCube consortium. The computer cluster in Brussels is intended for collaboration-wide use. Flanders has been a significant contributor to the realisation of the IceCube neutrino observatory and the Flemish teams were instrumental in the commissioning of the detector. Flemish team members have taken the lead in detector R&D for the new radio array and the Flemish consortium will play a similar role as outlined above.

Impact

The discovery of cosmic high-energy neutrinos has an enormous impact on the field of astrophysics and cosmology. It has opened a completely new window on the universe, revealing parts not accessible by other messengers, and as such it is poised to yield new surprises and unexpected discoveries. This creates ample opportunities to convey the results of this research to a large audience. Since mankind has always been fascinated by the universe, this will appeal to both experts and laymen.

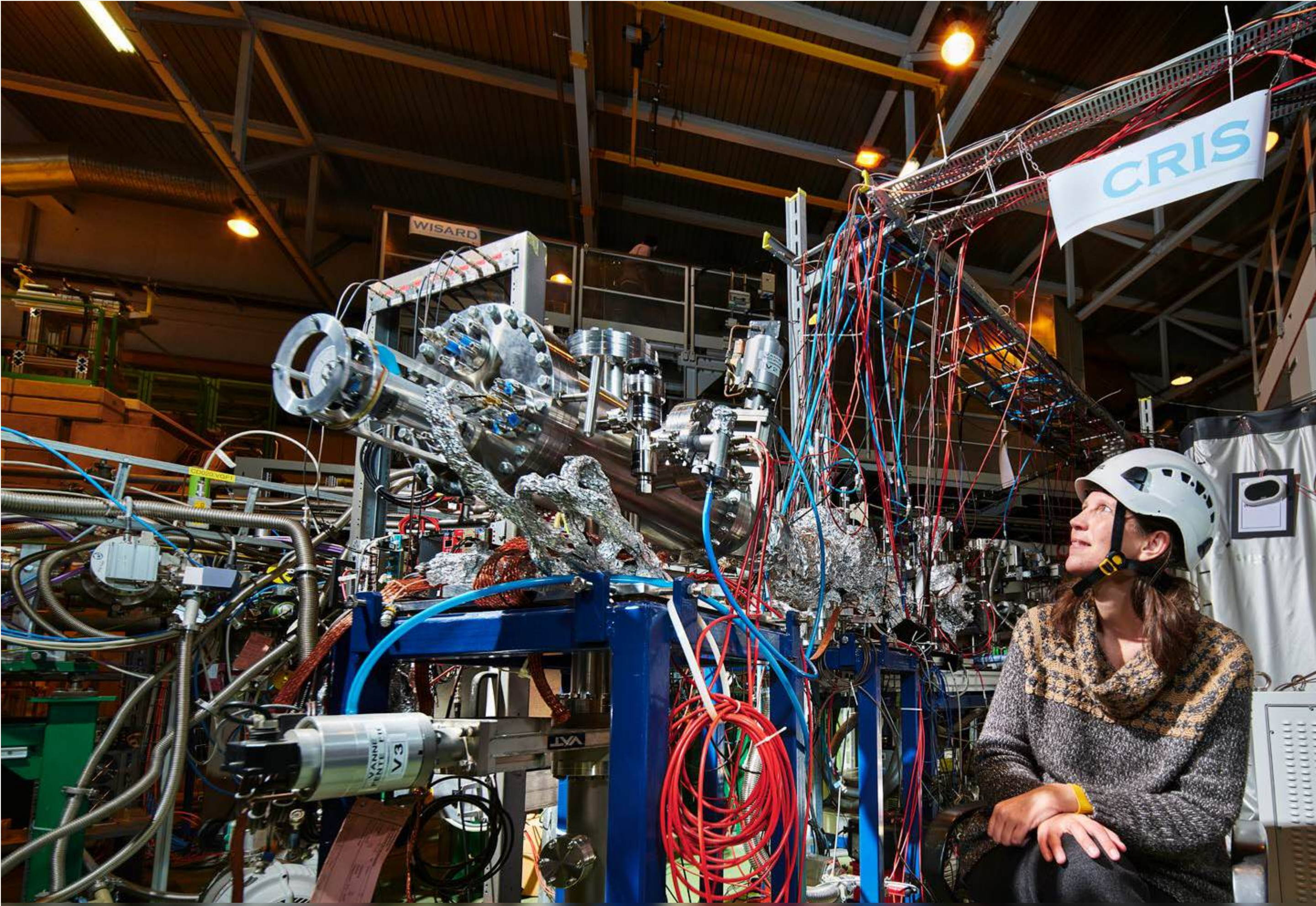


PRACTICAL INFORMATION

- International website www.icecube.wisc.edu/
- Flemish website www.iihe.ac.be/icecube
- Access modalities international research infrastructure www.icecube.wisc.edu/contact-us/

CONSORTIUM

- Flemish coordinator**
- Nick Van Eijndhoven (Vrije Universiteit Brussel)
- Flemish consortium members and their institutions**
- Krijn de Vries, Stijn Buitink (Vrije Universiteit Brussel)
 - Juliana Stachurska (Ghent University)



ISOLDE AND MEDICIS AT CERN - SPIRAL2 AT GANIL

RESEARCH ON
RADIOACTIVE NUCLEI

INNOVATIVE ISOTOPES
POWERING SCIENCE, HEALTH
AND HIGH-TECH SOLUTIONS

ISOLDE and MEDICIS at CERN and SPIRAL2 at GANIL are flagship European research infrastructures enabling the production, manipulation and use of radioactive ion beams. Flemish researchers use these facilities for precision studies of nuclear structure, fundamental interactions and novel radioisotope development. Key challenges include exploring the limits of nuclear stability, probing the Standard Model, explaining the origin of elements, and advancing applications in health and materials science.

Activities and services

At ISOLDE, proton-induced reactions generate a broad range of exotic nuclei, which are extracted, ionised and delivered as high-quality beams. MEDICIS conducts parallel research into new methods of producing innovative medical isotopes. SPIRAL2 provides complementary access to rare isotopes via in-flight separation using heavy-ion beams. Flemish researchers develop and operate equipment for laser and decay spectroscopy, nuclear reactions, weak-interaction studies and (quantum) material research, while contributing key technologies such as ion sources and detection systems.

Impact

Access to ISOLDE, MEDICIS and SPIRAL2 is essential to sustain Flanders' excellence in nuclear science, isotope research and detector development. Our next-generation nuclear scientists are trained at these facilities by participating in international collaborations, preparing them for new challenges in the Belgian nuclear sector, such as ISOL@MYRRHA, SMR and medical isotope production. Globally, these facilities promote nuclear innovation, enabling breakthroughs with broad societal relevance.



PRACTICAL INFORMATION

- International websites:**
- www.isolde.cern
 - www.medicis.cern
 - www.ganil-spiral2.eu
- Access modalities international research infrastructure**
- www.isolde.cern/submitting-proposals
 - www.medicis.cern/cern-medicis-collaboration
 - www.ganil-spiral2.eu/scientists/running-an-experiment-in-ganil/proposing-an-experiment/program-advisory-committee-pac/

CONSORTIUM

- Flemish coordinator**
- Riccardo Raabe (KU Leuven)
- Flemish consortium members and their institutions**
- Matthias D'Huyvetter (Vrije Universiteit Brussel)
 - Stefaan Vandenberghe (Ghent University)



MERCATOBS

THE MERCATOR OBSERVATORY

A FLEMISH-LED VISION FOR GLOBAL DISCOVERY

The Mercator Observatory is a Flemish-led astronomical facility located on the island of La Palma (Canary Islands, Spain). The observatory hosts five telescopes. The 1.2-m Mercator telescope is dedicated to time-domain stellar physics, with a focus on binary stars and asteroseismology. The Mercator Array for Radial VELOCities (MARVEL), currently under construction, will be dedicated to high-precision radial velocity measurements of planet-host stars.

Activities and services

MercatObs provides the high-quality ground-based time-domain observations needed to unravel the interior structure and evolution of single and binary stars. These observations are used to prepare and complement ESA and NASA space missions in which consortium members have invested. MercatObs also delivers a test bed for the development of new high-performance instrumentation. Complementary activities include professional training, contributions to various higher education programmes and public outreach.

Impact

MercatObs allows scientists and engineers in Flanders to play a leading role in their field: MercatObs shortens the intellectual cycle of novel ideas, obtains the necessary data for the scientific harvest of ESA and NASA space missions, and helps to secure external research funds. The crucial expertise gained enables their participation in top international projects, including instrumentation for the JWST and ELT telescopes, and the next generation of gravitational wave detectors such as the Einstein Telescope (ET) and LISA.



PRACTICAL INFORMATION

-  **International website**
www.mercator.iac.es/
-  **Flemish website**
www.fys.kuleuven.be/ster/
-  **Access modalities international research infrastructure**
www.mercator.iac.es/observing/time_allocation/

CONSORTIUM

- Flemish coordinator**
- Hugues Sana (KU Leuven)
- Flemish consortium members and their institutions**
- Hans Van Winckel, Conny Aerts, Andrew Tkachenko, Joris De Ridder, Gert Raskin, Kaustubh Hakim (KU Leuven)



METIS-ELT

THE MID-INFRARED IMAGER
AND SPECTROGRAPH FOR ELT

METIS AT THE ELT WILL
SHARPEN OUR VIEW ON
THE UNIVERSE

The Extremely Large Telescope (ELT) is the European Southern Observatory's ambitious next-generation telescope, with an optical main mirror of 39 metres in diameter. The ELT is currently under construction in Chile. One of the first instruments to be mounted on the ELT telescope is METIS. METIS offers imaging, coronagraphy, medium-resolution spectroscopy at 3-13 microns and high-resolution integral field spectroscopy.

Activities and services

The goal is to finalise the development of the control system for METIS. Over the past few years, our team has collaborated with ESO, the METIS system team and the consortium partners responsible for building the various instrument subsystems in order to design and prototype all the control functions for the METIS instrument's actuators and sensors. Our responsibilities include the electronics hardware, the full control software and integration into the ESO ELT observatory control framework. METIS is one of the most complex infrared astronomical instruments ever built.

Impact

The added value of being active at the forefront of astrophysical instrumentation is twofold: we develop technology as METIS involves an R&D effort of the equivalent of 670 FTEs, clearly beyond the scale of any astrophysical institute in Flanders and even the world. Moreover, by co-developing the instruments, we are also involved in preparing the scientific exploitation of this unique instrument. Flemish and Belgian astronomers will be well-prepared for the scientific exploitation.



PRACTICAL INFORMATION

-  **International website**
www.elte.eso.org/instrument/METIS/
-  **Flemish website**
www.fys.kuleuven.be/ster/instruments/elt-metis
-  **Access modalities international research infrastructure**
www.eso.org/sci.html
-  **Core facility**
METIS for the Extremely Large Telescope of the European Southern Observatory
www.metis.strw.leidenuniv.nl/

CONSORTIUM

- Flemish coordinator**
 - Hans Van Winckel (KU Leuven)
- Flemish consortium members and their institutions**
 - Denis Defrère, Hugues Sana, Leen Decin, Bart Vandenbussche (KU Leuven)



CLARIAH-VL+

PAVING THE WAY FOR AN SSH OPEN SCIENCE CLOUD FOR FLANDERS

CONNECTING PEOPLE, SERVICES AND TOOLS FOR FUTURE-READY RESEARCH

CLARIAH-VL+ supports digital research in the humanities and social sciences and fosters collaboration through shared services and tools. It connects Flemish core facilities to European infrastructures and unites disciplines around the challenge of using diverse heritage and data sources – from manuscripts to digital files – to address pressing societal questions.

Activities and services

CLARIAH-VL+ supports researchers in the humanities and social sciences with digital services and tools: domain-specific data standards, vocabularies, analysis tools and workflows for data cleaning, visualisation, text analysis, computational linguistics and AI. We facilitate the sustainable curation, enrichment, linking and analysis of multilingual and multimodal data – such as text, images, audio and statistics – within standardised infrastructures.

Impact

CLARIAH-VL+ strengthens Flanders' position in the European research landscape by delivering sustainable, domain-specific digital infrastructure for the Humanities and Social Sciences. It enables interdisciplinary research on pressing societal issues such as cultural diversity, climate change and social inequality, supports multilingual and multimodal data and promotes Open Science. This infrastructure ensures that Flemish research remains competitive, innovative and globally connected.

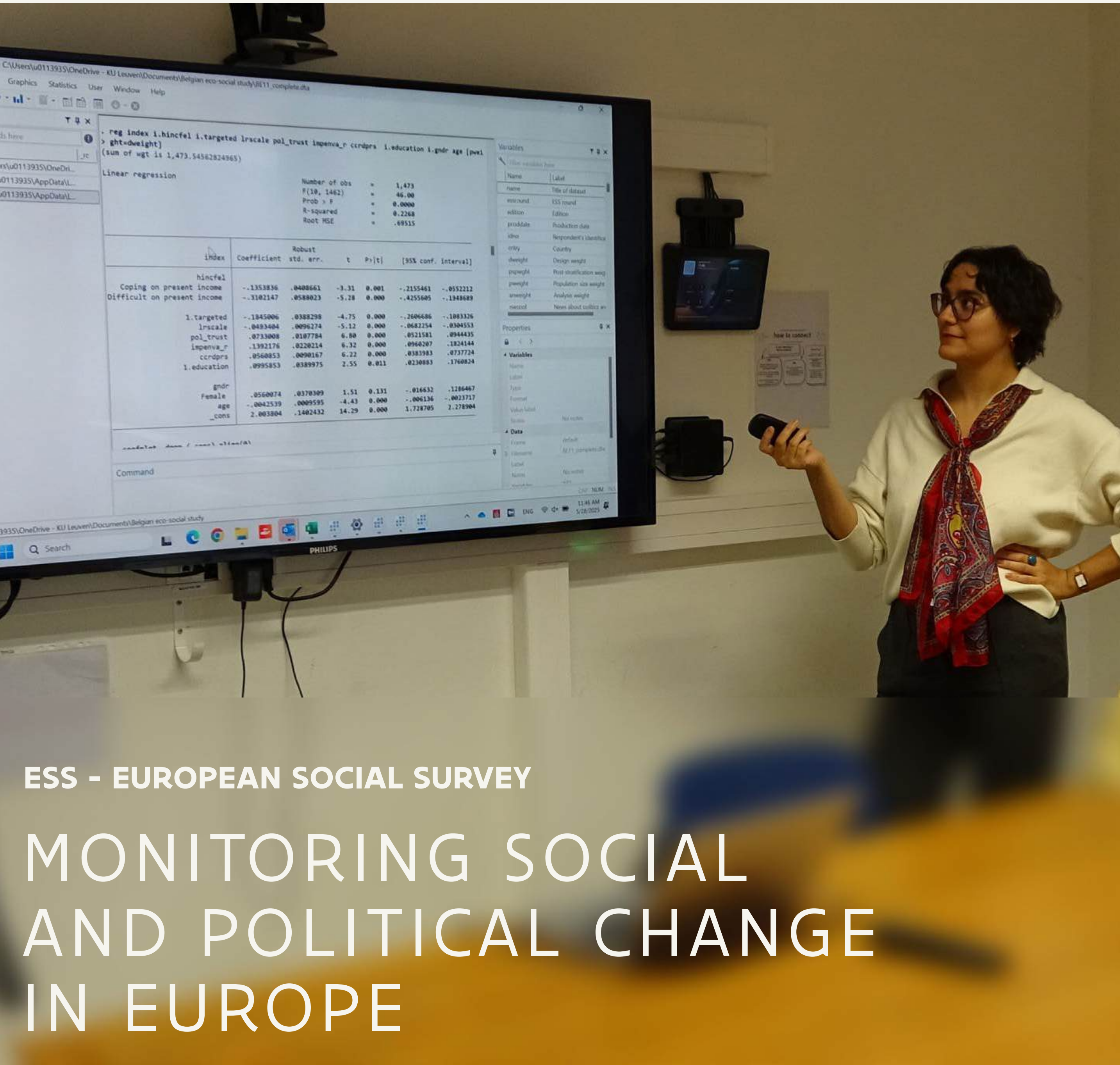


PRACTICAL INFORMATION

-  **International websites**
www.dariah.eu
www.clarin.eu
-  **Flemish website**
www.clariahvl.hypotheses.org
-  **Access modalities international research infrastructure**
www.dariah.eu/tools-services/tools-and-services/
-  **Core facility**
www.ghentcdh.ugent.be

CONSORTIUM

- Flemish coordinator**
 - Christophe Verbruggen (Ghent University)
- Flemish consortium members and their institutions**
 - Julie Birkholz, Els Lefever, Veronique Hoste, Isabelle De Groote, Jeroen Deploige, Isabelle Devos (Ghent University)
 - Dirk Van Hulle, Walter Daelemans, Luna De Bruyne, Piraye Haciguzeller, Iason Jongepier, Tim Soens, Mike Kestemont (University of Antwerp)
 - Frederik Truyen, Mark Depauw, Margherita Fantoli, Kim Christiaens, Tim Van de Cruys (KU Leuven)
 - Rik Vosters, Anne Winters (Vrije Universiteit Brussel)



HIGH-QUALITY SURVEY DATA TO MONITOR SOCIAL CHANGE IN EUROPE

The European Social Survey (ESS) is a biennial social survey designed to chart stability and change in the attitudes, beliefs and behaviour of Europe's diverse populations. Having interviewed more than half a million people in over 40 European countries since 2001, the ESS provides an international database of the highest quality about citizens' social and political attitudes, covering a wide variety of topics such as immigration, well-being and health, democracy, the welfare state and climate change.

Activities and services

The ESS develops and applies rigorous methods for survey research. The full ESS dataset is freely available for non-profit research, allowing academics from diverse disciplines to analyse public opinion across countries and time. Social indicators based on the ESS data are highly relevant for policymakers, journalists and interested citizens. In addition, the ESS provides ample opportunities for training new generations of researchers in quantitative data analysis.

Impact

To date, more than 7,000 English-language academic publications have used the ESS data, of which some 400 were written by Belgian scientists. ESS has over 250,000 registered users (with 17,000 in Belgium). ESS has received multiple prestigious awards and recognitions, including the EU's Descartes Prize (2005). KU Leuven is one of the founding institutions of the ESS and Flemish scientists have developed several questionnaire modules that are implemented internationally. ESS data is actively used by policymakers and media in Flanders.



PRACTICAL INFORMATION

-  **International website**
www.europeansocialsurvey.org/
-  **Flemish website**
www.europeansocialsurvey.org/about/country-information/belgium/dutch
-  **Access modalities international research infrastructure**
www.europeansocialsurvey.org/data-portal

CONSORTIUM

- Flemish coordinator**
 - Dimitri Gugushvili (KU Leuven)
- Flemish consortium members and their institutions**
 - Bart Meuleman, Cecil Meeusen (KU Leuven)



SHARE

FLEMISH PARTICIPATION IN THE SURVEY OF HEALTH, AGEING AND RETIREMENT IN EUROPE

LONG-RUNNING PANEL SURVEY TO STUDY CHALLENGES OF AGEING SOCIETIES

SHARE is a long-running infrastructure providing microdata about 160,000 people aged 50 and older in 28 countries. SHARE's goal is to collect representative longitudinal data on various living conditions of people over 50, which can be used to conduct multidisciplinary research into the physical, cognitive, socioeconomic and social aspects of ageing. The infrastructure enables research on the Flemish and Belgian level as well as cross-national comparisons.

Activities and services

The ESFRI infrastructure SHARE creates and maintains a high-quality dataset on the living conditions of people aged 50 and over in Europe. The SHARE dataset contains longitudinal, multidisciplinary and cross-nationally comparable microdata and offers a unique source of information for highly policy-relevant topics, such as labour market participation of older workers, availability of long-term care, and well-being in older age. SHARE is crucial for researchers and policymakers analysing the many aspects of ageing and the socioeconomic and health(care)-related challenges involved with ageing.

Impact

Ageing is one of the most important societal challenges for Flanders. The impact of ageing on the labour market, long-term care and mental well-being is acknowledged by policymakers. In addition to the scientific importance of SHARE, the infrastructure is also important for evidence-based policy. SHARE data is used for Flemish policy, such as in the Flemish policy plan for the elderly, and for policy at European level, for example by the European Commission, the OECD and the WHO.



PRACTICAL INFORMATION

-  **International website**
www.share-eric.eu/
-  **Flemish website**
www.share-project.be/
-  **Access modalities international research infrastructure**
www.share-eric.eu/data/data-access
-  **Access modalities Flemish facility**
www.share-eric.eu/data/data-access
-  **Core facility + website**
Centre for Population, Family and Health,
University of Antwerp
www.uantwerpen.be/en/research-groups/csb/

CONSORTIUM

- Flemish coordinator**
 - Koen Decanq (University of Antwerp)
- Flemish consortium members and their institutions**
 - Dimitri Mortelmans (University of Antwerp)



SLICES-BE

LEADING THE WAY IN DIGITAL SCIENCES

EXPERIMENTAL RESEARCH IN DIGITAL INFRASTRUCTURES

The research community needs to address significant challenges in order to research and master digital infrastructures as the future internet, which constitute the cornerstone of the digital transformation of our society. SLICES is a flexible platform designed to support large-scale experimental research focused on networking protocols, radio technologies, services, data collection, parallel and distributed computing and, in particular, cloud and edge-based computing architectures and services.

Activities and services

SLICES is aimed at integrating existing infrastructures into an integrated but distributed scientific research infrastructure for digital sciences offering full control of programmable and configurable networks (wired & wireless) with repeatable experiments, regardless of the physical infrastructure.

The SLICES Research Infrastructure brings together key players in testbed provisioning from around Europe, at the forefront of research in digital sciences including 5G/6G networks and advanced wireless radio operation, high-speed virtualised network operation, IoT and High-Performance

Computing. The SLICES-BE resources include over 550 bare-metal servers, more than 200 wireless nodes, software-defined radios (SDRs) and a GPU-rich infrastructure with over 125 high-performance GPUs for supporting AI and GPU-accelerated workloads.

Impact

SLICES-BE enables cutting-edge experimentation across several domains covering wired and wireless networking, (federated) machine learning, Internet of Things (IoT), cloud and edge computing, distributed software systems, service backends and scalability... It supports research and development for academic groups, industrial partners and SMEs within Belgium, but also on a European level as well as internationally through a well-established network of interconnections with other research facilities. SLICES offers reliable, diverse and remotely accessible software/equipment, allowing large-scale experimentation under realistic provider-neutral conditions, leading to increased scientific impact.

PRACTICAL INFORMATION

-  **International website**
www.slices-ri.eu/
-  **Access modalities international research infrastructure**
www.doc.slices-ri.eu/
-  **Access modalities Flemish facility**
www.slices-ri.eu/consortium-belgium/

CONSORTIUM

Flemish coordinator

- Peter Van Daele (Ghent University)

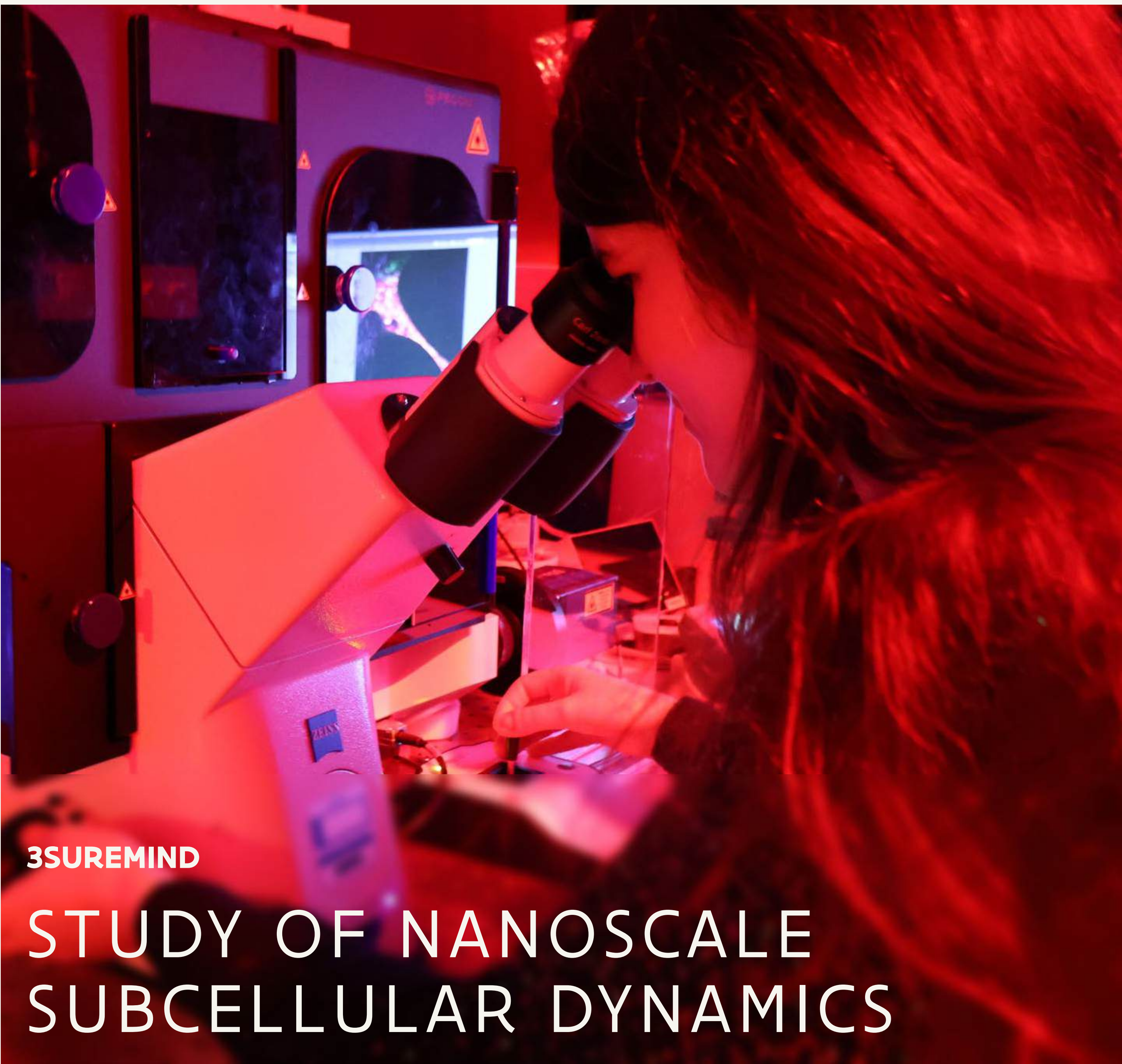
Flemish consortium members and their institutions

- Ingrid Moerman (Interuniversity Microelectronics Centre - IMEC)
- Johann Marquez-Barja (University of Antwerp)
- Piet Demeester (Ghent University)



03

LARGE-SCALE
RESEARCH
INFRASTRUCTURES



3SUREMIND

STUDY OF NANOSCALE SUBCELLULAR DYNAMICS

YOU HAVE TO LOOK INSIDE THE CELL TO UNDERSTAND NEURODEGENERATION

3SUREMIND aims to investigate, through high spatial and temporal resolution, subcellular alterations in the endolysosomal system that are critically involved in the early stages of neurodegeneration. Combined super-resolution and electron microscopy will reveal new insights in mechanisms underlying the onset and progress of diseases like Alzheimer's and Parkinson's disease. Bridging this knowledge gap may ultimately facilitate the development of improved and innovative diagnostic and therapeutic strategies.

Activities and services

The central vision behind the 3SUREMIND infrastructure is to set up the necessary logistics and strengthen the collaboration between existing infrastructures to create a seamless workflow for correlative super-resolution cryo-CLEM across Flanders, with the aim to go from description to mechanism and from cell biology to structure. Specifically, inter-organelle communication and endolysosomal dysfunction in neurodegeneration, and the dynamics and structural analysis of the aggregation process are investigated.

Impact

The 3SUREMIND infrastructure is establishing an imaging workflow that enables Flemish researchers to move beyond state-of-the-art imaging and links dynamic live-cell imaging with ultrastructure. By connecting the existing infrastructure to create a synergistic and complementary setup, a service for unravelling subcellular structure-function relationships and their contributions to neurodegenerative pathogenesis is created. This can be leveraged broadly for Flanders and Euro-BiolMaging.

PRACTICAL INFORMATION

 **Website**
www.bioimagingcore-leuven.sites.vib.be/en

 **Core facility**
VIB BiolMaging Core

CONSORTIUM

Flemish coordinator

- Wim Annaert (Vlaams Instituut voor Biotechnologie - VIB)

Flemish consortium members and their institutions

- Patrik Verstreken, Joost Schymkowitz, Frederic Rousseau, Saskia Lippens (Vlaams Instituut voor Biotechnologie - VIB)
- Sebastian Munck, Peter Vangheluwe, Lies De Groef (KU Leuven)
- Renzo Mancuso (University of Antwerp)
- Han Karel Remaut (Vrije Universiteit Brussel)



BGB
BELGIAN GENOME
LIBRARY

ENABLING LARGE-SCALE GENOMIC RESEARCH

The BGB consists of two components: on the one hand a genomic data bank representing the Flemish and Belgian population. This bank will include high-quality reference genomes including haplotype-resolved telomere-to-telomere sequences, whole genome sequences and up to 10,000 low-coverage genome sequences. On the other hand, it offers a cloud-based IT environment in which the data from the genomic reference population can be analysed and used for studies in a secure, privacy-protected manner, without the need to distribute the full datasets.

Activities and services

The BGB provides access to a genomic data bank and an IT infrastructure that enables large-scale genotype-phenotype associations and genomic analyses. This initiative will spark other efforts that will facilitate population-scale genomic sequencing initiatives. The environment will evolve into a privacy-protecting, federated analysis platform in which genomic data can be interpreted. BGB will also define the criteria and develop the mechanisms for sharing human genomic data in compliance with GDPR rules.

Impact

BGB will provide Flanders with a state-of-the-art infrastructure to support future research into the genetic causes and (risk) factors of human traits and diseases. In addition, it will strengthen international collaborations in genomic research. The infrastructure will enable research to characterise population-specific genetic associations. These insights will also form the cornerstone of personalised medicine. The BGB collaborates with other ESFRI and EU omics initiatives such as ELIXIR, ERDERA, Genome of Europe and the EU 1M+ project.



PRACTICAL INFORMATION

Website
www.gbiomed.kuleuven.be/english/cme/research/laboratories/laboratory-for-cytogenetics-and-genome-research/belgiangenome.be

CONSORTIUM

- Flemish coordinator**
- Joris Vermeesch (KU Leuven)
- Flemish consortium members and their institutions**
- An Goris, Isabelle Cleynen, Toomas Kivisild, Peter Claes (KU Leuven)
 - Bart Loeys, Frank Kooy (University of Antwerp)
 - Lies Lahousse, Elfride De Baere, Kathleen Claes (Ghent University)
 - Gokhan Ertaylan (Flemish Institute for Technological Research - VITO)
 - Frederik Coppens, Stein Aerts (Vlaams Instituut voor Biotechnologie - VIB)
 - Wilfried Verachtert (Interuniversity microelectronics Center - IMEC)



CELLGENTHERAPIES

GMP PRODUCTION OF ADVANCED THERAPIES

TAKING YOUR CELL AND GENE THERAPY FROM BENCH TO BEDSIDE

The GMP Unit is an academic production and quality facility supporting the research and development of Advanced Therapy Medicinal Products (ATMPs), such as cell therapies, gene therapies and RNA vaccines. Located at Ghent University Hospital, it enables the translation of cutting-edge biomedical innovations into clinical-grade therapies. It gives access to researchers, clinicians, and spin-offs, ensuring a sustainable academic platform for therapeutic innovation.

Activities and services

The infrastructure includes certified cleanrooms, QC labs, cryopreservation units, digital GMP documentation and logistics support. Services comprise production of RNA-based formulations, lipid-nanoparticles, viral vectors (e.g. lentivirus), cell-based therapies (e.g. CAR-T, DC), sterility validation, product release testing and GMP consultancy. The unit supports researchers in filing an IMPD. It also offers training in cleanroom operations and regulatory guidance.

Impact

As the only academic GMP Unit in Flanders, it uniquely supports translational research and clinical implementation of ATMPs. It lowers barriers for access to GMP manufacturing, thereby accelerating clinical translation and spin-offs. It strengthens the Flemish research landscape by enabling competitive participation in European initiatives and national networks. The societal impact includes improving patient access to novel treatments and fostering public-private-academic collaboration.

PRACTICAL INFORMATION

 **Website**
www.gmp-unit.be/

 **Core facility**
CellGENTherapies

CONSORTIUM

Flemish coordinator
• Bart Vandekerckhove (Ghent University)





CRYO-EM 200KV

A 200 KV TRANSMISSION ELECTRON MICROSCOPE FOR HIGH-RESOLUTION DETERMINATION OF 3D ULTRASTRUCTURE OF NATIVE PROTEINS, CELLS AND TISSUE

RESOLVING STRUCTURES TO UNDERSTAND THE BASIS OF DISEASE

Cryo-EM has revolutionised structural biology by enabling the depiction of biomolecules, particularly of proteins, at atomic resolution under close-to-native conditions. This technique, which requires very delicate, vitreous samples, has the potential to shed light on the mechanisms underlying ion channel conformational changes or protein misfolding and aggregation, which are the molecular basis of several diseases. Our Cryo-EM, the 200kV Jeol F200, empowers the community in its quest for understanding.

Activities and services

The infrastructure is supported by Electron Microscopy staff members at the VIB BioImaging Core Leuven. The infrastructure is accessible to both internal and external users via a portal and is bookable by the hour. The staff not only provides support with imaging but also with the delicate sample preparation steps that are critical for successful cryo-electron microscopy work. Consultancy and infrastructure dedicated to data processing and structural analysis are also provided within the unit.

Impact

Cryo-electron microscopy, rewarded with the Nobel Prize in 2017, has boomed in recent years. Hence, open-access cryo-electron microscopy infrastructure is essential to ensure cutting-edge research in Flanders. Our Cryo-EM at the Bioimaging Core Leuven connects with other related infrastructures; it complements the 300kV microscope hosted at VIB-VUB in Brussels, creating a unique landscape at the interface of structural research and imaging.

PRACTICAL INFORMATION

-  **Website**
www.connect.vib.be/devices/jeol-f200-cryo?prev=facilityDevices
-  **Website access modalities**
www.connect.vib.be/bioimaging-core/
-  **Core facility**
Cryo-EM services at the VIB BioImaging Core Leuven
www.connect.vib.be/facilities/electron-microscopy/services

CONSORTIUM

- Flemish coordinator**
 - Joost Schymkowitz (Vlaams Instituut voor Biotechnologie - VIB)
- Flemish consortium members and their institutions**
 - Joris de Wit (Vlaams Instituut voor Biotechnologie - VIB)
 - Kalyan Das, Chris Ulens, Sergei Strelkov (KU Leuven)
 - Saskia Lippens, Moritz Nowack (Ghent University)



THE FLEMISH MR PENTAGON FOR 7T RESEARCH

A Flemish Inter-University (5 universities) Ultra-high-field MRI Research Centre for advanced magnetic resonance imaging and spectroscopy at 7 Tesla. The centre uses a very powerful MRI scanner with a field strength of 7 Tesla and aims to optimise ultra-high-field MRI applications and facilitate the transition from pure scientific research to clinical applications.

Activities and services

The infrastructure provides state-of-the-art MRI imaging and spectroscopy of the structure, function and metabolism of the human body, initially focussing on the brain and the musculoskeletal system, and later expanding to other organs. The much stronger MRI signal from a 7T scanner enables a more detailed study of all aspects of normal brain anatomy and function. The facility offers support to MR physics, sequence optimisation, experimental setup and supervised image acquisition, as well as data analysis and image processing.

Impact

This infrastructure is built on a consortium of the five Flemish universities and four university hospitals and will give a major boost to MR science in Flanders, as well as to all disciplines that use MRI and MRS as a source of information, such as neurology, oncology and orthopaedics. Through this research infrastructure, we aim to better understand diseases such as dementia, epilepsy, cartilage degeneration, kidney disorders and tumours in order to establish early and accurate diagnoses, and to propose more effective therapies that will allow more targeted treatment. The collaboration among the MR academics involved (with over 800 international publications) guarantees the expertise essential for a successful transition from research to clinic.

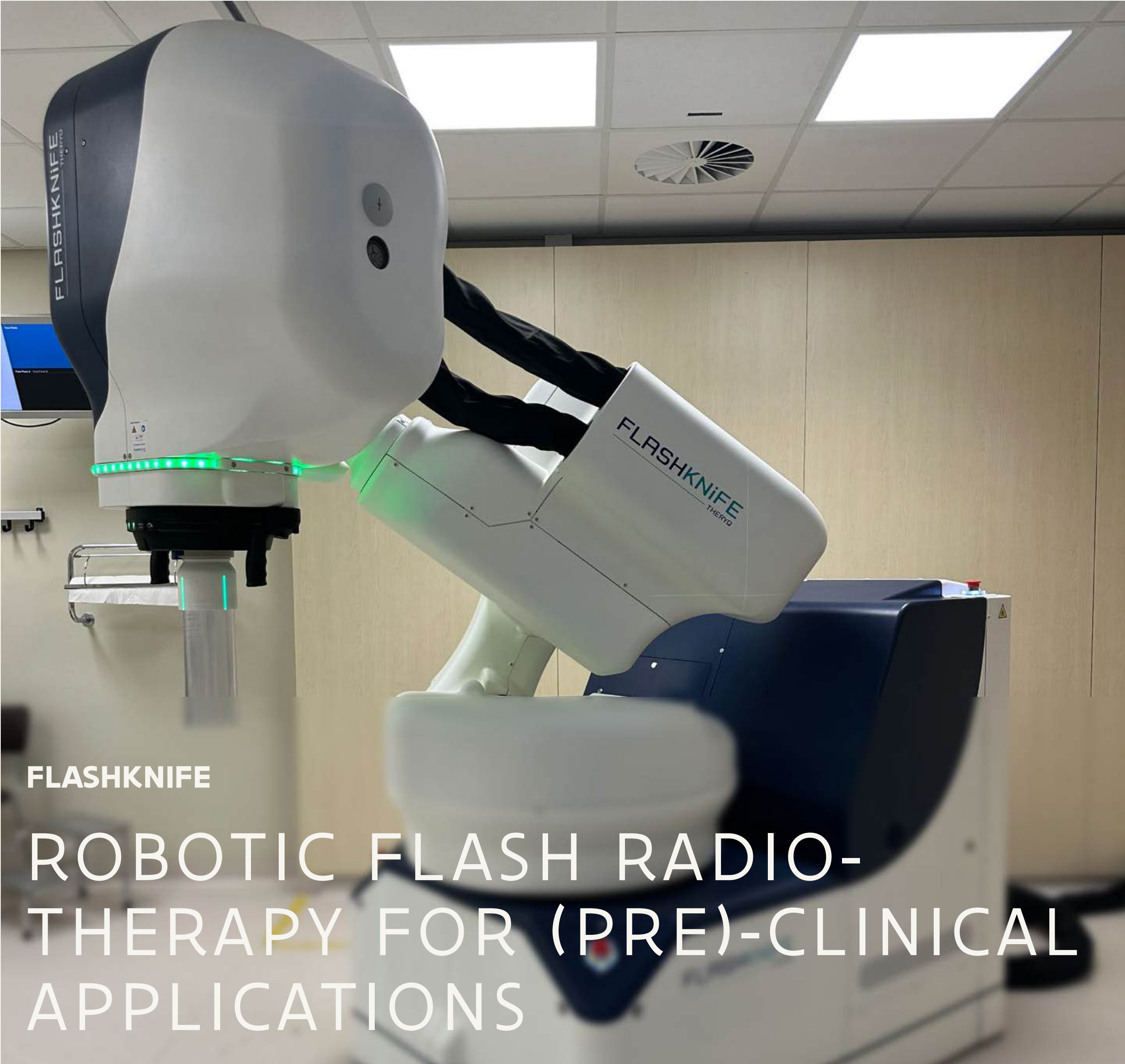


PRACTICAL INFORMATION

Core facility
A Flemish Inter-University Ultra-high-field MRI Research Centre for advanced magnetic resonance imaging and spectroscopy at 7 Tesla.
www.7t-mri.be/

CONSORTIUM

- Flemish coordinator**
- Johan de Mey, Hubert Raeymaekers (Vrije Universiteit Brussel)
- Flemish consortium members and their institutions**
- Stefan Sunaert, Chantal Van Ongeval (KU Leuven)
 - Geert Villeirs, Eric Achten (Ghent University)
 - Koen Cuypers (Hasselt University)
 - Pieter Van Dyck, Annemiek Snoeckx (University of Antwerp)



FLASHKNIFE

ROBOTIC FLASH RADIO-THERAPY FOR (PRE)-CLINICAL APPLICATIONS

NEXT-GENERATION CANCER CARE WITH ROBOTIC FLASH RADIOTHERAPY

FLASH radiotherapy (FLASH-RT) delivers ultra-high dose rate (UHDR >40 Gy/s) radiation, sparing healthy tissue while preserving tumour control. Currently limited to preclinical use, FLASHKNIFE, a robotic arm-based system, is the first fully dedicated FLASH-RT platform. Phase one focuses on translational research to optimise planning and delivery while studying biological mechanisms. Ultimately, this technology aims to offer optimum patient care.

Activities and services

The focus is on optimising dosimetry, treatment planning and delivery strategies while simultaneously investigating the fundamental biological processes through interdisciplinary studies. The aim is to develop a revolutionary cancer treatment delivered in seconds, reducing side effects by sparing healthy tissue, minimising treatment fractions and shortening overall treatment times. The goal is to reduce radiotherapy's societal burden and improve patient well-being. The facility will also give other research groups access to the FLASH beam.

Impact

This infrastructure is the first robotic FLASH device in Belgium and the third worldwide, showcasing Flanders' leadership in advanced technologies and enabling new care pathways in the region. We maintain strong partnerships with several national and international hospitals and research groups. Additionally, we are active members of the BelFLASH consortium, an FWO scientific research network. We are also looking to establish a user consortium and initiate multicentre clinical trials.

PRACTICAL INFORMATION

 **Core facility**
Radio Therapy Brussels
www.radiotherapybrussels.com/core-facilities

CONSORTIUM

Flemish coordinator
• Mark De Ridder (Vrije Universiteit Brussel)

Flemish consortium members and their institutions
• Thierry Gevaert (Vrije Universiteit Brussel)



HITMAN

A HIGH-THROUGHPUT
MICROBE HANDLER FOR
GROUNDBREAKING MICROBIAL
RESEARCH

AUTOMATED CHARACTERISATION OF MICROBES BOOSTS INNOVATIVE SCIENCE

HiTMan is a versatile robot tailor-made for cutting-edge microbial research. It automates experiments from the initial cultivation step to final phenotypic characterisation. It drastically improves experimental throughput, making it possible to evolve and test thousands of strain variants in parallel. This accelerates scientific discoveries, supports strategic basic research and stimulates valorisation through the discovery and development of novel antibiotics, probiotics and superior industrial microbes.

Activities and services

The core of HiTMan is a liquid handling robot with access to:

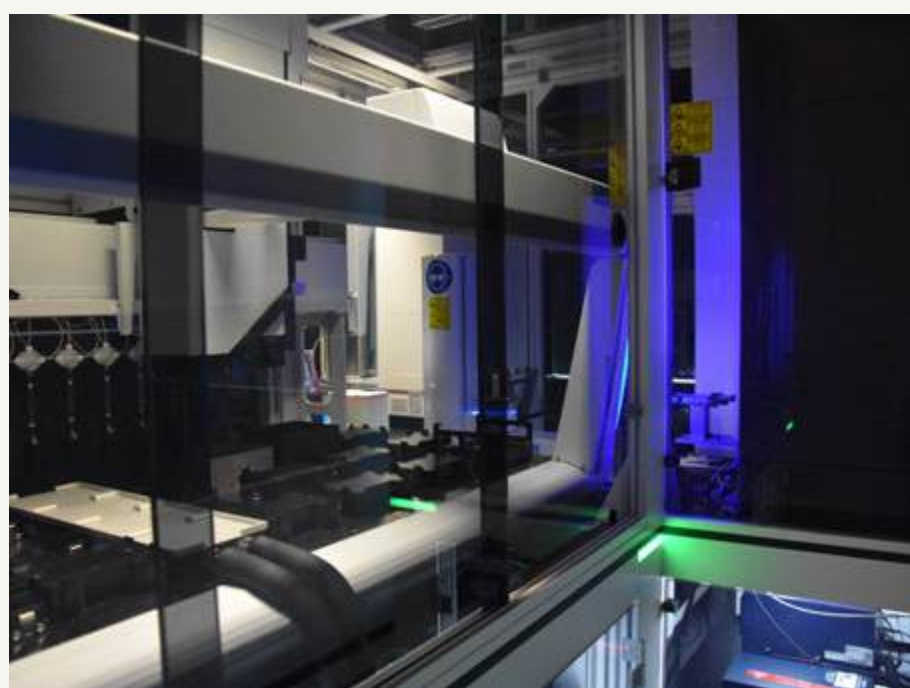
- Plate imaging station
- Different incubators with a wide temperature range (4-50°C)
- Multimode microplate readers for spectrophotometric, fluorescence and luminescence measurements
- Centrifuge
- Automated plate sealer and peeler

This makes it possible to grow, evolve and characterise thousands of cultures in parallel, for an experimental duration of days up

to several months. We provide a dedicated operator for assistance in experimental design, setting up and performing experiments as well as assistance with data analysis when needed.

Impact

HiTMan forms the core of a Flemish Biofoundry, a technology and knowledge hub for designing, constructing and testing microbes. It contributes to Flemish IRIs such as IBISBA-FL and strengthens Flanders' leading position in biotech. It stimulates (inter)national collaboration and provides a competitive edge by generating data and insights at an unprecedented scale. HiTMan strengthens the academic and industrial ecosystem in Flanders and beyond, opening doors to valorisation opportunities.



PRACTICAL INFORMATION

 **Website**
www.kuleuven.be/hitman

CONSORTIUM

Flemish coordinator

- Kevin Verstrepen (KU Leuven)

Flemish consortium members and their institutions

- Sofie Goormachtig (Ghent University)
- Sarah Lebeer (University of Antwerp)
- Jan Michiels (Vlaams Instituut voor Biotechnologie - VIB)
- Vera van Noort, Hans Steenackers, Bart Lievens, Hans Rediers, Rob Jelier, Chris Michiels, Abram Aertsen, Rob Lavigne, Christophe Courtin, Patrick Van Dijck, Joris Winderickx, Vitor Pinheiro, Arnout Voet (KU Leuven)



HYPER-MPI

**IMAGING THE INVISIBLE IN
PRECLINICAL MODELS USING
MAGNETIC PARTICLE IMAGING**

**IMAGING THE INVISIBLE: QUANTITA-
TIVE LONG-TERM BIODISTRIBUTION**

The **MOMENTUM+HYPER** system is a magnetic particle imaging (MPI) system with included image-guided localised hyperthermia. MPI is an emerging imaging modality with exceptional contrast, quantitative capacity and high sensitivity. By using MPI it becomes possible to monitor local inflammation over long time frames, to visualise and quantify T or NK cells or extracellular vesicles over the long term or to perform image-guided hyperthermia. These methods will have a strong translational impact.

Activities and services

The technology will be used on a daily basis to solve major questions in a wide range of biomedical fields. Examples include direct visualisation of tumour-associated macrophages and the degree of tumour malignancy, or identification of T or NK cell homing to solid tumours to determine biodistribution, or the distribution of extracellular vesicles or systemically administered nanomedicines, or the accurate determination of the number of nanoformulations required to deliver sufficient therapeutic compounds to the tumour or to produce sufficient heat for thermal therapy.

Impact

The infrastructure is used as a service provider for industrial partners and the research with this infrastructure will lead to new projects in the fields of nanomedicine, cell and gene therapy, and extracellular vesicles. This can potentially lead to the generation of a spin-off in Flanders and further support the application of MPI. Furthermore, given the uniqueness of this technology in Europe, it can help and serve various European customers.



PRACTICAL INFORMATION

 **Website**
www.gbiomed.kuleuven.be/english/research/50000677/50000686/55641774/come

 **Website access modalities:**
www.gbiomed.kuleuven.be/english/research/50000677/50000686/55641774/come/bookings-and-reservations

 **Core facility**
Center for Multimodal Oncology Research (C-More)
www.gbiomed.kuleuven.be/english/research/50000677/50000686/55641774/come

CONSORTIUM

Flemish coordinator
• Stefaan Soenen (KU Leuven)

Flemish consortium members and their institutions
• Peter Carmeliet, Massimiliano Mazzone, Sarah-Maria Fendt, Gabriele Bergers, Jean-Christophe Marine, Colinda Scheele, Abhishek Garg, Gianluca Matteoli, Katrien Lagrou, Patrick Van Dijck, Uwe Himmelreich, Tania Roskams (KU Leuven)
• Christian Vanhove (Ghent University)
• Marleen Verhoye (University of Antwerp)



MOSAIC

A MASS SPECTROMETRY
PLATFORM FOR SINGLE-CELL
OMICS: AN INTEGRATED
CONSTELLATION

DECODING SINGLE-CELL
BIOLOGY THROUGH
MULTI-OMICS ANALYSES

This research infrastructure establishes a state-of-the-art mass spectrometry platform for single-cell multi-omics, enabling simultaneous analysis of proteins, lipids and metabolites from individual cells. It addresses the current gap in functional single-cell analysis and supports research into complex diseases such as cancer, neurodegeneration and inflammation.

Activities and services

The platform offers automated, high-throughput sample preparation and ultra-sensitive mass spectrometry for proteomics, metabolomics, and lipidomics at the single-cell level. Researchers can access end-to-end services in project design, sample processing, data acquisition and multi-omics integration. The infrastructure is embedded in a professional core facility and is open to academic, clinical and industrial partners.

Impact

This platform enables unprecedented insights into cellular function, accelerating biomarker discovery and therapeutic innovation. It strengthens Flanders' position in biomedical research, supports translational and personalised medicine and fosters collaboration across disciplines and sectors, from academia to biotech and pharma.

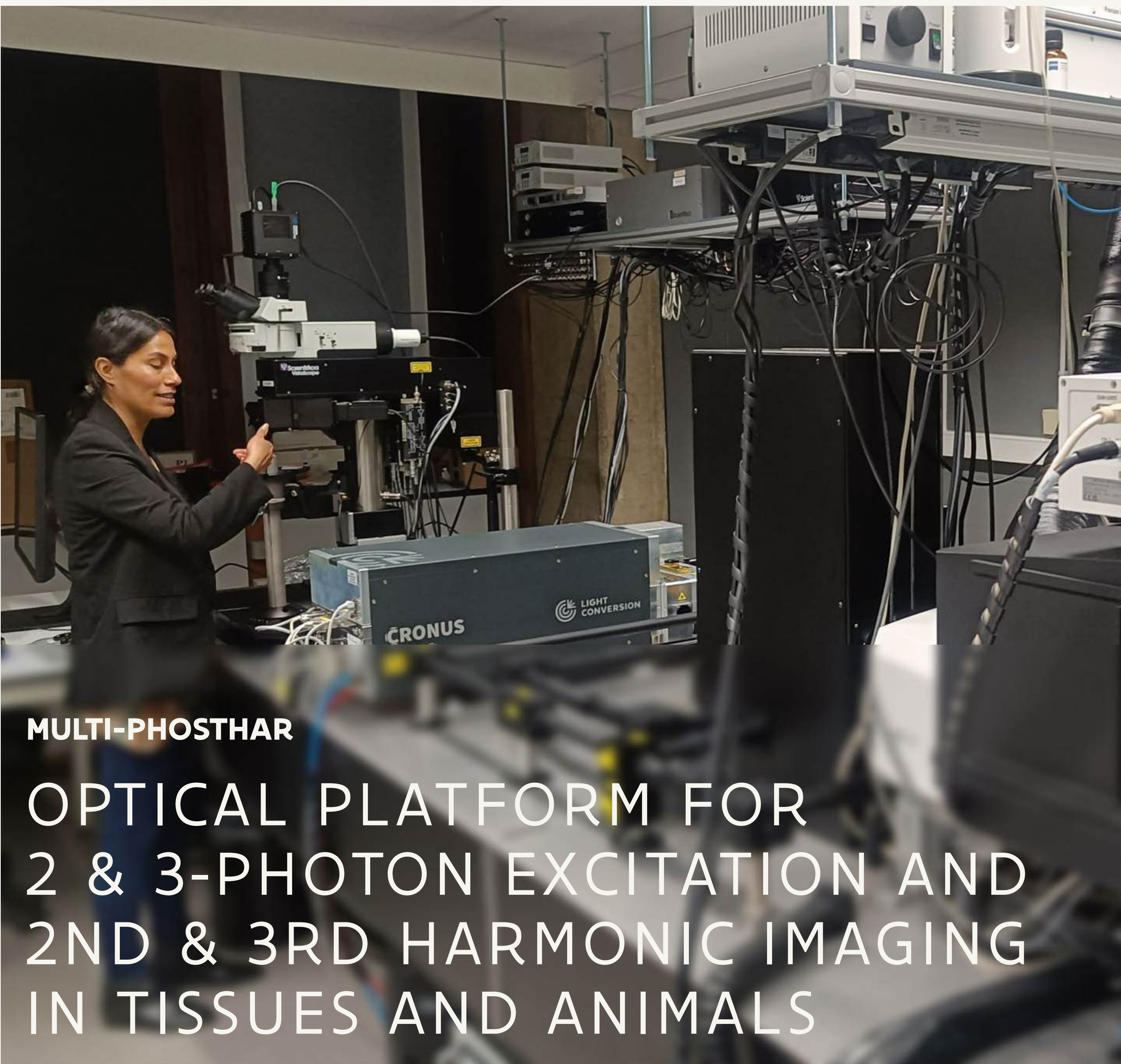


PRACTICAL INFORMATION

Core facility
VIB Metabolomics Core - Leuven
www.metabolomicscore-leuven.sites.vib.be/en

CONSORTIUM

Flemish coordinator
• Bart Ghesquière (Vlaams Instituut voor Biotechnologie - VIB)
Flemish consortium members and their institutions
• Liesbet Temmerman, Johan Swinnen, Devang Mehta (KU Leuven)



MULTI-PHOSTHAR

OPTICAL PLATFORM FOR 2 & 3-PHOTON EXCITATION AND 2ND & 3RD HARMONIC IMAGING IN TISSUES AND ANIMALS

LIVE MICROSCOPIC IMAGING: DEEPER AND CRISPER THAN EVER BEFORE

This infrastructure established an advanced and multimodal non-linear optical (NLO) imaging platform for microscopic imaging of cells in their native, intact, 3-dimensional (3D) environment over extended periods of time using 2-photon (2P) and 3-photon (3P) excitation principles, while providing extra structural context and label-free information by exploiting 2nd and 3rd harmonic signals generated by endogenous molecules, nanomedicines or pollutants.

Activities and services

The platform enables microscopic imaging on both inverted and upright microscope systems and supports live imaging, including the possibility of long-term observations. Through 3-photon excitation of fluorescent molecules, tuneable up to 1700 nm, imaging can be performed deep within biological tissues, enabling deep intravital imaging of living systems. Thanks to dedicated optical configurations, detection systems and beam path arrangements, the platform allows combined single-, two- and three-photon imaging. In addition, the integration of fluorescence imaging with higher harmonic signal detection enables the simultaneous

recording of fluorescence and second- and third-harmonic signals, providing enhanced structural information and label-free insights into biological samples.

Impact

The platform, with its dual 2P and 3P imaging capabilities, aims to enable imaging deeper within intact biological tissues while making full use of harmonic wavelengths as additional observables. It allows researchers to explore the full range of single-, two- and three-photon excitation possibilities, thereby expanding experimental opportunities in advanced optical imaging. At the same time, the platform provides access to advanced non-linear optical (NLO) microscopy for researchers in Flanders and Europe through its node within Euro-Biolmaging. In this way, it acts as a catalyst for future research funding opportunities and collaborative project development.

PRACTICAL INFORMATION

 **Website**
www.gbiomed.kuleuven.be/english/corefacilities/microscopy/cic/cic.htm

 **Website access modalities**
www.gbiomed.kuleuven.be/english/corefacilities/microscopy/cic/cic.htm

 **Core facility**
Cell & Tissue Imaging Cluster (CIC)

CONSORTIUM

Flemish coordinator
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Flemish consortium members and their institutions
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• Kevin Braeckmans (Ghent University)
• Colinda Scheele, Vincent Bonin (Vlaams Instituut voor Biotechnologie - VIB)



MULTI-SCALE

MULTI-SCALE OPTICAL IMAGING CORE:
INFRASTRUCTURE FOR NANO- TO
CENTIMETRE-LENGTH SCALE MICROSCOPY
AND ANALYSIS OF LARGE 4D DATASETS

BIOMEDICAL RESEARCH
IN A BRILLIANT 3D FOCUS

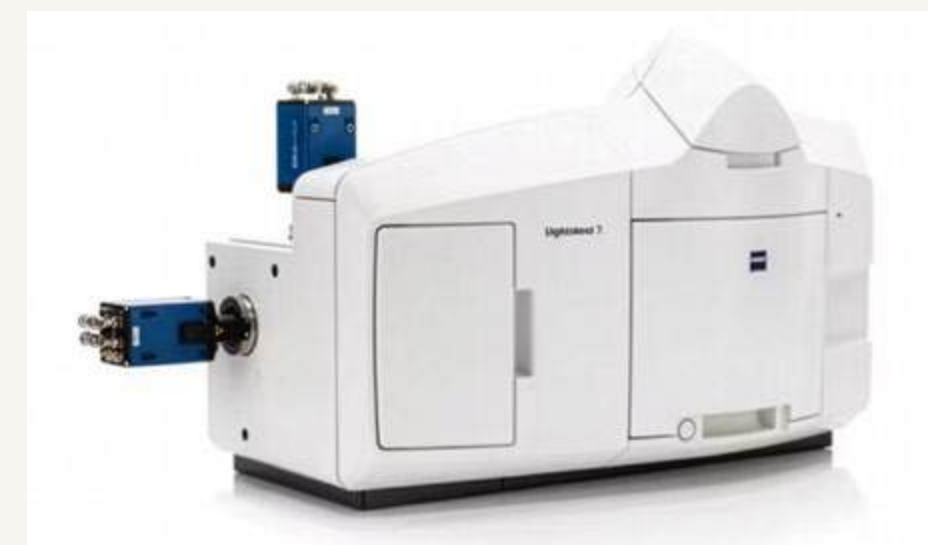
To address the lack of large-volume 3D imaging, the AOMC core facility is expanding its portfolio with a state-of-the-art hard- and software infrastructure for light sheet fluorescence microscopy (LSFM). It uniquely combines fast and sharp imaging of large samples such as organoids, organs, small organisms and patient-derived biopsies, advancing studies in neurobiology, regenerative medicine and toxicology.

Impact

The MULTI-SCALE infrastructure at UHasselt strengthens biomedical research in the Meuse-Rhine Euroregion. In Europe, it integrates into the Euro-BioImaging European Research Infrastructure Consortium (ERIC) as a member of the Belgian Flanders Bioimaging node. Flanders Bioimaging fosters collaborations with other ERICs (e.g., ELIXIR, INSTRUCT, BBMRI, AnaEE, EMPHASIS) by organising an annual joint networking event.

Activities and services

In the framework of the infrastructure, workshops and symposia were organised (e.g. ICALM '22, '24 workshop for researchers, LSFM Launch event in '23 for students and researchers, LSFM Mini-Symposium for students and researchers in '24, Flanders Bioimaging LSFM symposium in '23), accompanied by SciComm (e.g. Children's University in 2023, Science Day '22, '23, '24) and professional networking events (Flanders Bioimaging '22, '23, '24). The AOMC is currently offering LSFM expertise and practical guidance to both industry and academia in more than 10 collaborative projects.



PRACTICAL INFORMATION

-  **Website**
www.uhasselt.be/aomc-ls7
-  **Website access modalities**
www.uhasselt.be/aomc-collaborating
-  **Core facility**
Advanced Optical Microscopy Centre
www.uhasselt.be/aomc

CONSORTIUM

- Flemish coordinator**
 - Jelle Hendrix (Hasselt University)
- Flemish consortium members and their institutions**
 - Werend Boesmans, Annelies Bronckaers, Bieke Broux, Ilse Dewachter, Karen Smeets (Hasselt University)



NEXT-MRMS

NEXT-GENERATION MAGNETIC RESONANCE MASS SPECTROMETRY

INNOVATION BEYOND THE LIMITS OF TODAY'S MEDICINE

This research infrastructure enables advanced tracer-based metabolomics and magnetic resonance mass spectrometry to map metabolic networks in health and disease. Key objectives include imaging, full-atom mapping and high-throughput screening. The platform addresses major scientific challenges in pathway activity, nutrient usage and enzyme regulation, supporting interdisciplinary research at national and international levels.

Activities and services

The platform offers open-access metabolomics services, including tracer imaging, full atom/isotopomer mapping, and high-throughput metabolic screening. It supports technology co-development with academia and industry, enabling intuitive visualisation and analysis tools. The infrastructure enhances workflows for drug discovery, systems biology and clinical research through collaborations across national and international networks.

Impact

This first-in-Belgium infrastructure will elevate Flemish metabolomics to a global level, attracting international collaboration and industrial interest. It strengthens the strategic research capacity of VIB-KU Leuven in acquiring biomarkers and key biochemical insights in the various disease models studied. It also contributes to European consortia like ELIXIR and supports high-impact, cross-border science in cancer, metabolic disease and drug discovery.



PRACTICAL INFORMATION

 **Core facility**
VIB Metabolomics Core - Leuven
www.metabolomicscore-leuven.sites.vib.be/en

CONSORTIUM

- Flemish coordinator**
- Bart Ghesquière (Vlaams Instituut voor Biotechnologie - VIB)
- Flemish consortium members and their institutions**
- Johan Swinnen (KU Leuven)
 - Sarah-Maria Fendt (Vlaams Instituut voor Biotechnologie - VIB)



SMASH

A HIGH-THROUGHPUT AUTOMATED SMALL-MOLECULE SCREENING PLATFORM

ULTRAFAST ANALYSIS ENABLING BIOMARKER DISCOVERY AND VALIDATION

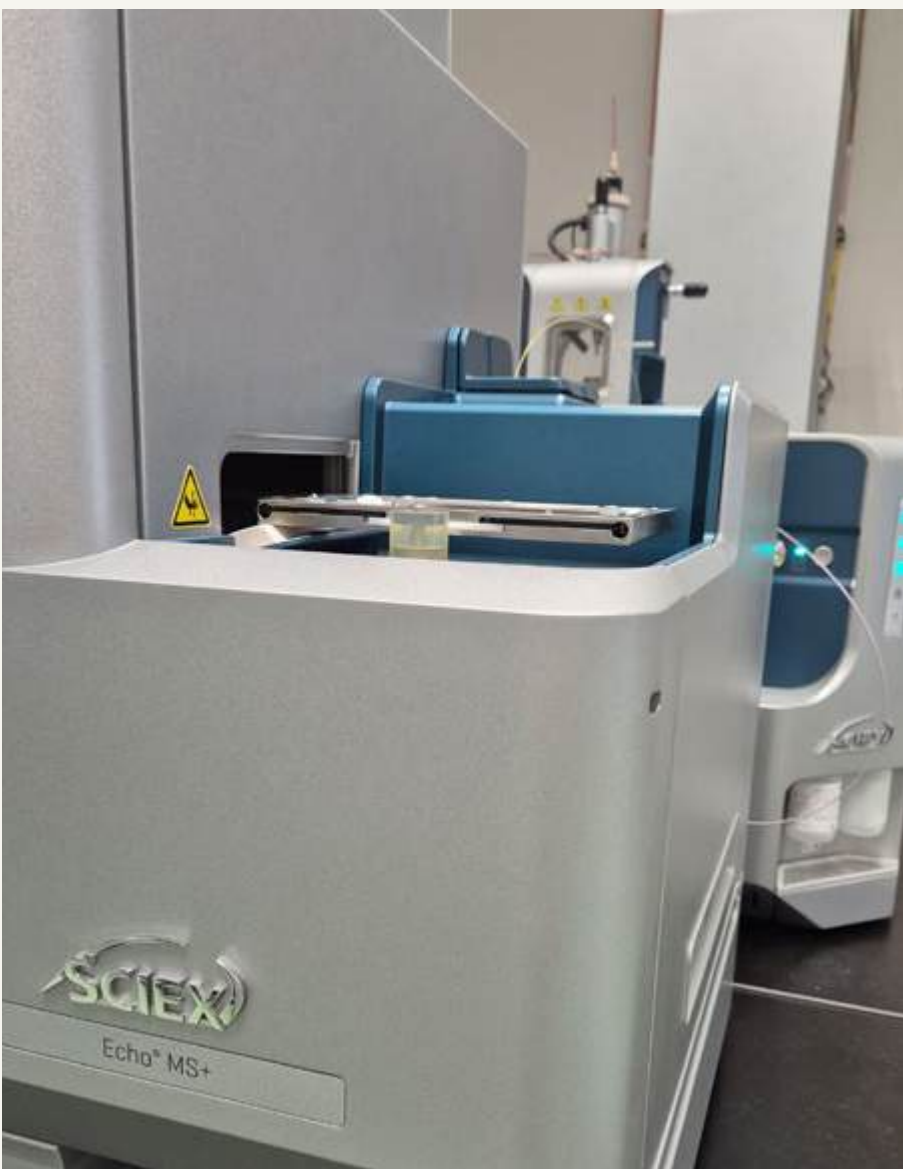
In small molecule research, the number of samples per study has surged, driven by global efforts to biobank diverse specimens. However, current technologies struggle with this scale due to bottlenecks in sample prep and mass spectrometry throughput. This infrastructure offers a robotic sampler and high-throughput mass spectrometer to enable automated, large-cohort screening and fully leverage existing sample collections.

Activities and services

This platform enables high-throughput screening of small molecules – such as metabolites and lipids – in large sample cohorts. It combines automated sample preparation via robotic handling with rapid mass spectrometry analysis. Services include untargeted and targeted metabolomics, method development and data processing for clinical and research studies. The platform supports large-scale biobank projects and accelerates biomarker discovery and translational research.

Impact

This platform accelerates academic research by enabling rapid, large-scale analysis of small molecules. It lowers the barrier for small spin-offs to screen compound libraries efficiently, supporting early-stage discovery and innovation. By automating workflows and increasing throughput, it shortens project timelines and makes high-end analysis accessible to the broader scientific community.



PRACTICAL INFORMATION

 **Core facility**
VIB Metabolomics Core - Leuven
www.metabolomicscore-leuven.sites.vib.be/en

CONSORTIUM

Flemish coordinator
• Bart Ghesquière (Vlaams Instituut voor Biotechnologie - VIB)
Flemish consortium members and their institutions
• Johan Swinnen (KU Leuven)



T2T-BIOLOGY

COMPREHENSIVE GENOMICS VIA ACCURATE SINGLE- MOLECULE SEQUENCING

REVEALING COMPLETE GENOMES THROUGH PRECISE SINGLE- MOLECULE SEQUENCING

T2T-Biology offers PacBio Revio long-read sequencing to Flemish researchers for comprehensive (epi)genetic variation analysis. This technology accurately reads native DNA fragments and their modifications with single-molecule resolution. Our consortium spans diverse fields: human genetics, cancer genomics, single-cell omics, microbial genomics and evolutionary biology. The platform uniquely detects all genetic variation types, from single nucleotide changes to complex structural rearrangements.

Activities and services

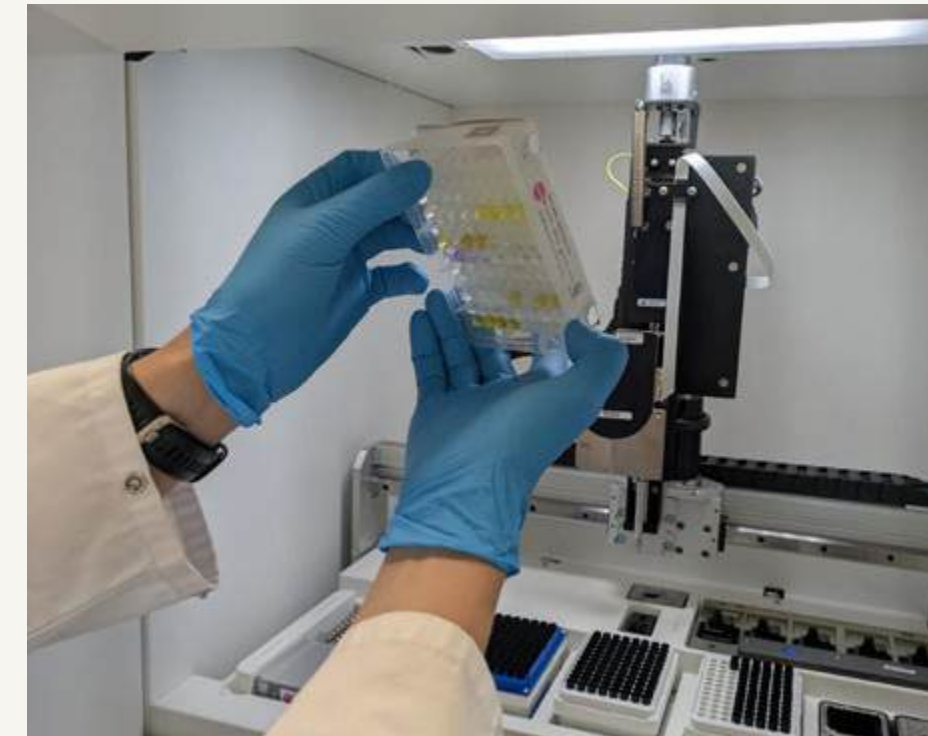
The PacBio Revio system is jointly run by the UZ/KU Leuven Genomics Core and VIB Nucleomics Core, serving academic and industry researchers. Our services include:

- Genome sequencing for humans and non-model organisms
- Variant detection including previously inaccessible regions
- Epigenomic analyses
- Full-length RNA sequencing
- Metagenomic sequencing
- Method development
- Bioinformatics support.

The infrastructure offers training and collaborative project development.

Impact

T2T-Biology enhances Flemish (epi)genomic research capabilities across diverse fields. It strengthens regional competitiveness and enables participation in European networks like EMBRC, ERGA and EASIGenomics. As Belgium's first high-accuracy long-read sequencing platform, it drives discoveries in medicine, biodiversity and biotechnology. Flemish researchers gain leadership in genomics, advancing personalised medicine, conservation efforts and sustainable biotechnology applications.



PRACTICAL INFORMATION

 **Website access modalities**
www.genomicscore.be/
www.nucleomicscore.sites.vib.be/en

 **Core facility**
Genomics Core Leuven |
VIB Nucleomics Core

CONSORTIUM

Flemish coordinator
• Jonas Demeulemeester (KU Leuven)

Flemish consortium members and their institutions
• Joris Vermeesch, Thierry Voet, Eve Seuntjens, Steven Van Belleghem (KU Leuven)
• Stein Aerts, Kevin Verstrepen, Diether Lambrechts (Vlaams Instituut voor Biotechnologie - VIB)



ADVANCED PACKAGING PILOT LINE – APPL

ADVANCED PACKAGING PILOT
LINE FOR SEMICONDUCTOR
SYSTEM SCALING

ACCESS TO STATE-OF-THE-ART
PACKAGING TECHNOLOGIES
FOR CHIPLETS

This collaborative pilot line combines three newly introduced tools with an extensive set of existing equipment to enable advanced chiplet integration. The new additions – a laser solder jetting system, a sub-micron flip-chip bonder and a 3D nanoprinter – expand the capabilities already available in the ecosystem. Together, these resources will support breakthroughs in integrated photonics, wireless communication, AI and MedTech—creating opportunities for academia, start-ups and innovators across Flanders and the EU.

Activities and services

This facility delivers scientific and technological value by enabling advanced packaging processes for a wide range of semiconductor research fields. It supports integration of multiple chiplet technologies (CMOS, SiGe, III-V, Si and SiN photonics) and interposer types (glass, Si, organic), ensuring flexibility for diverse applications.

Impact

The advanced packaging pilot line will strengthen the Flemish semiconductor ecosystem and directly support EU Chips Act objectives. As part of the broader vision of the Flanders Chips Competence Center (FC3) – a key player in the Chips for Europe Initiative – this pilot line contributes to making FC3 the go-to hub for expertise, collaboration and innovation in semiconductor design and system integration. Its open-access model ensures that start-ups, established companies and research institutions alike can access advanced packaging capabilities without heavy upfront investment, helping attract global industry leaders, stimulate investment in Flanders and accelerate semiconductor research.



PRACTICAL INFORMATION

- Website**
www.fc3.be
- Core facility**
www.ugent.be/namifab

CONSORTIUM

- Flemish coordinator**
 - Geert Van Steenberge (Ghent University)
- Flemish consortium members and their institutions**
 - Bart Kuyken, Johan Bauwelinck, Herbert De Smet, Jeroen Missinne (Ghent University)
 - Marian Verhelst, Patrick Reynaert (KU Leuven)
 - Joris Van Campenhout, Piet Wambacq (Interuniversity Microelectronics Centre - IMEC)



MARVEL
MEASURING
EXOPLANETARY

WEIGHING EXOPLANETS AT
THE FLEMISH MERCATOR
OBSERVATORY

Since the first discovery of a planet outside our solar system, exoplanet research has shifted from detecting to characterising exoworlds. Dedicated space missions are launched to find exoplanets efficiently, but radial velocity measurements from the ground are needed to characterise their orbits and masses. That is where MARVEL comes in. MARVEL was designed and constructed by a KU Leuven-led collaboration, with contributions from the UK, Australia, Austria, Sweden and Spain.

Activities and services

We have formed a strong international collaboration to build and deploy MARVEL, a new infrastructure for spectroscopic monitoring of planet hosting stars. MARVEL is an array of four 80-cm telescopes coupled with a common, highly efficient, stabilised spectrograph with high resolution delivering a routine radial velocity accuracy of 1 m/s. Thanks to the small telescope size and optimised design, MARVEL's high throughput and operational efficiency will be competitive in the landscape of 4m+ telescopes. MARVEL will be deployed at the Mercator Observatory in Spain.

Impact

Installed as part of the Flemish Mercator Observatory in La Palma, MARVEL will be a unique infrastructure in the Northern hemisphere to enable the scientific harvest of ongoing and future ESA and NASA exoplanet missions. MARVEL will further strengthen Flanders' leading role in these space missions, adding a key role in the acquisition of ground-based data. MARVEL initiates a multiplication factor in the science return from these missions.

PRACTICAL INFORMATION

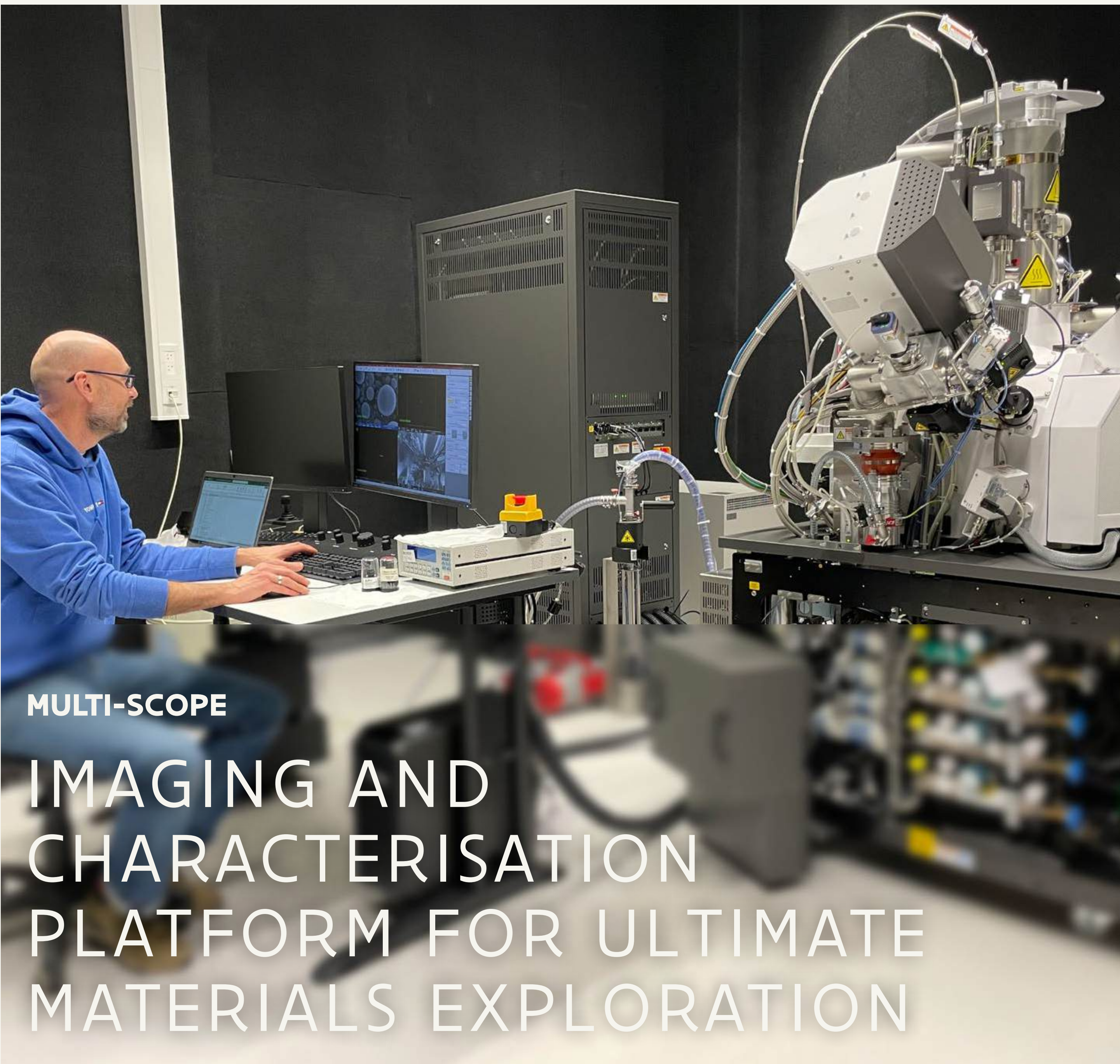
 **Website access modalities**
www.mercator.iac.es/
www.mercator.iac.es/instruments/marvel/

 **Core facility**
MARVEL at the Mercator Observatory

CONSORTIUM

Flemish coordinator
• Hans Van Winckel (KU Leuven)

Flemish consortium members and their institutions
• Hugues Sana, Conny Aerts, Leen Decin, Bart Vandenbussche, Joris De Ridder, Pierre Royer, Andrew Tkachenko, Gert Raskin (KU Leuven)



MULTI-SCOPE

IMAGING AND CHARACTERISATION PLATFORM FOR ULTIMATE MATERIALS EXPLORATION

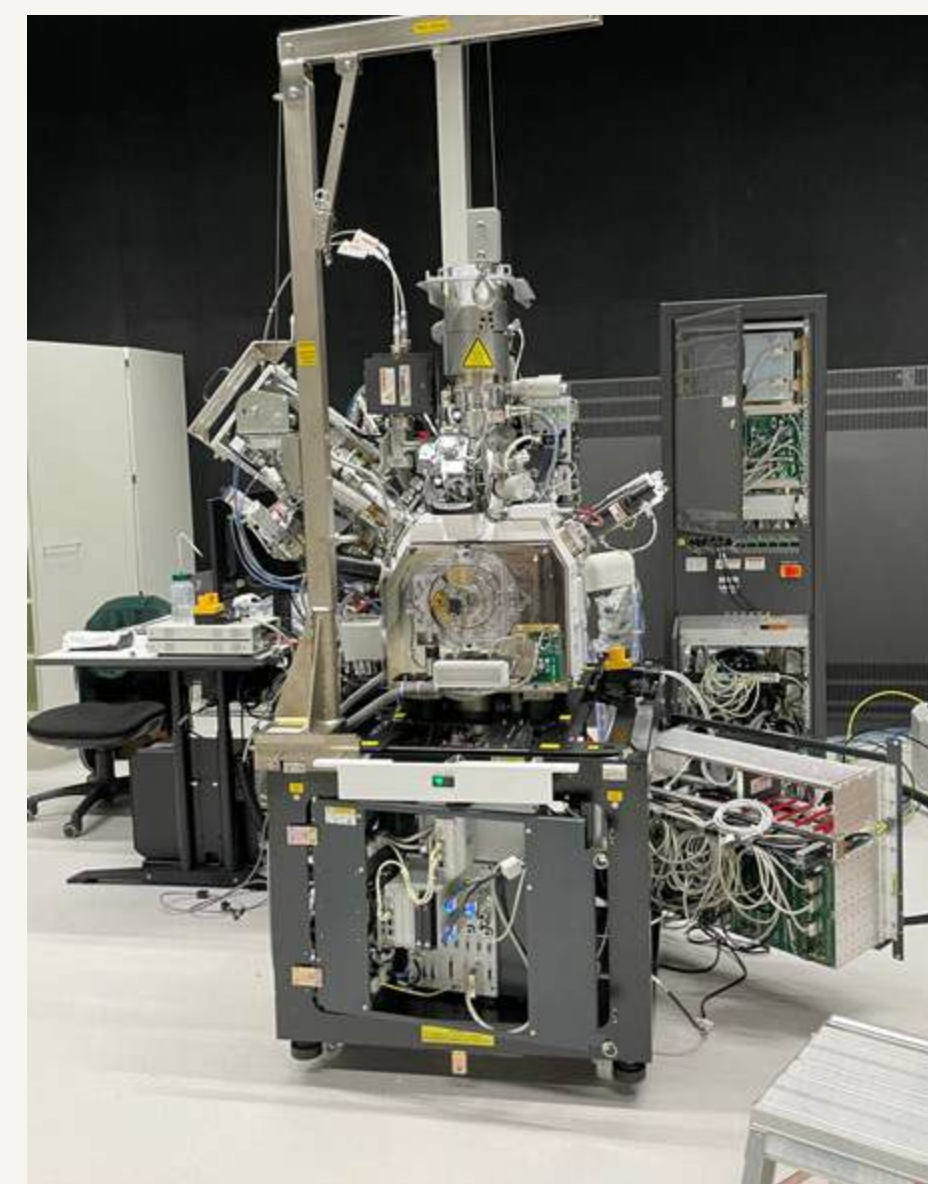
A MULTITOOl FOR UNLOCKING MATERIAL INSIGHTS

Multi-SCOPE aims to establish an innovative, multi-scale and comprehensive characterisation platform that seamlessly integrates diverse techniques into a unified workflow while preserving sample integrity across instruments. At its core, Multi-SCOPE leverages the cutting-edge capabilities of a cryo plasma Focused-Ion Beam Scanning Electron Microscope (pFIB-SEM), enabling precise site-specific sample manipulation and analysis at the micro- to nanoscale with low damage.

Impact
This platform is unique in Belgium with an impact on various research fields (e.g. microelectronics, energy, structural & functional materials, transportation, construction and biomedical applications). With this broad applicability across materials and industrial challenges, Multi-SCOPE aims to advance fundamental and applied materials research in Belgium, Europe and globally. It is also aligned with the Flemish IRI initiative, supporting key technologies for the Einstein Telescope.

Activities and services

Multi-SCOPE offers both direct access to the equipment and expert-supported measurement services. Activities include high-precision, low-damage sample sectioning and preparation – such as for TEM and APT – as well as multi-scale correlative microscopy, UHV-cryo or atmosphere-controlled transfers, in-situ probing of electrical and mechanical properties, EDS and EBSD, as well as postmortem 2D/3D failure analysis. These measurements can be combined with high and low temperatures.

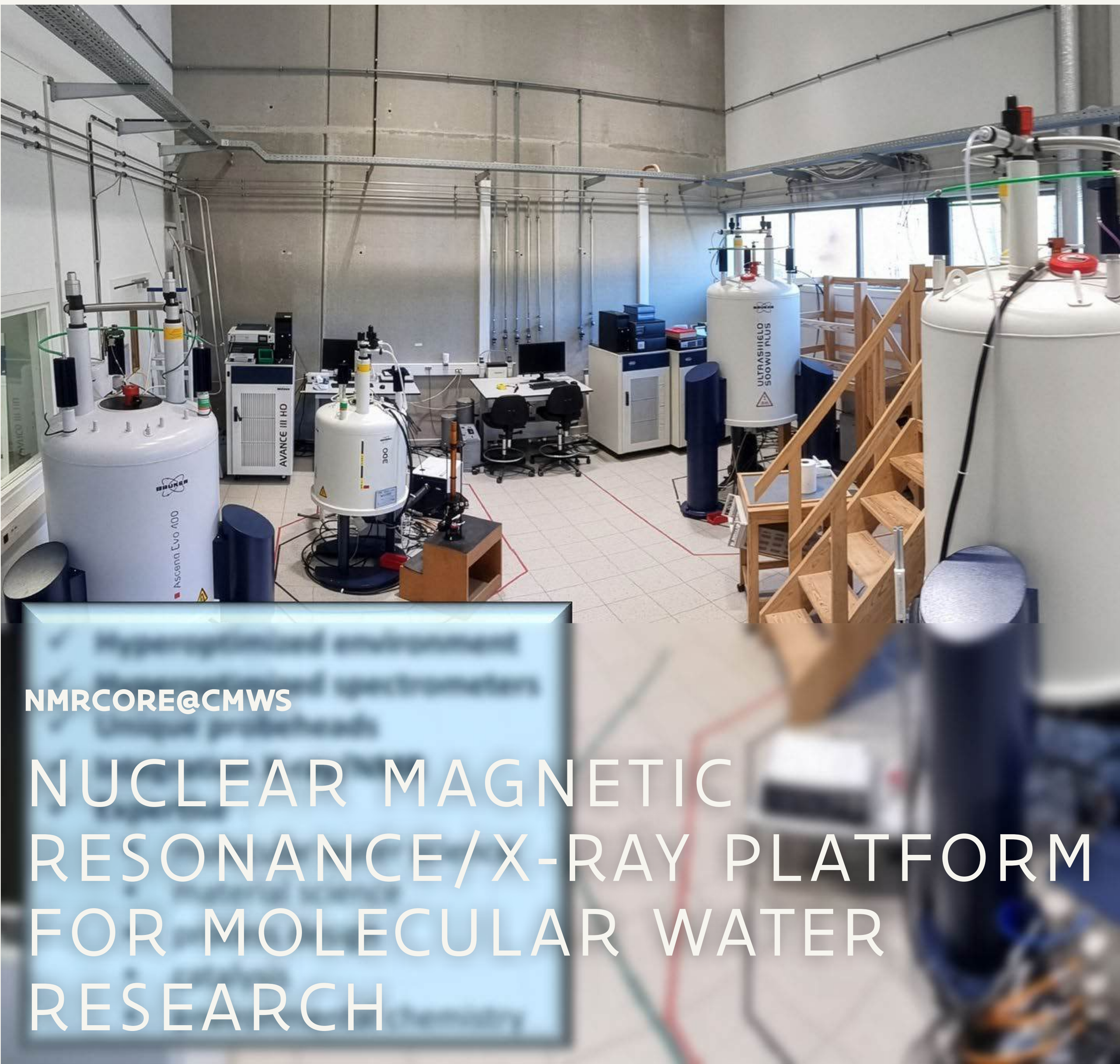


PRACTICAL INFORMATION

Website
www.mtm.kuleuven.be/english/research/scalint/NMDM/research/nanoscale/multi-scope

CONSORTIUM

- Flemish coordinator**
- Jin Won (Maria) Seo (KU Leuven)
- Flemish consortium members and their institutions**
- Annabel Braem, Joris Everaerts, Yentl Swolfs, Martin Diehl, Arn Mignon, Reza Talemi, Fei Zhang, Sylvie Castagne, Filip Tavernier, Özlem Cizer, Steven De Feyter, Josef Vleugels, Ruth Cardinaels, Jean-Pierre Locquet, André Vantomme, Johan Martens, Adrian Ranga, Kim Vanmeensel, Marc Seefeldt, Nele Moelans, Matthias Bönisch, Francisco Molina Lopez, David Seveno (KU Leuven)
 - Claudia Fleischmann, Ingrid De Wolf, Clement Merckling, Sreeprasanth Sree (Interuniversity Microelectronics Centre - IMEC)
 - Kim Verbeken, Tom Depover (Ghent University)
 - Jan D'Haen (Hasselt University)



NMRCoRe@CMWS

NUCLEAR MAGNETIC RESONANCE/X-RAY PLATFORM FOR MOLECULAR WATER RESEARCH

MULTI-DIAGNOSTIC NMR & X-RAY SCIENCE REVEALS THE UNDETECTABLE

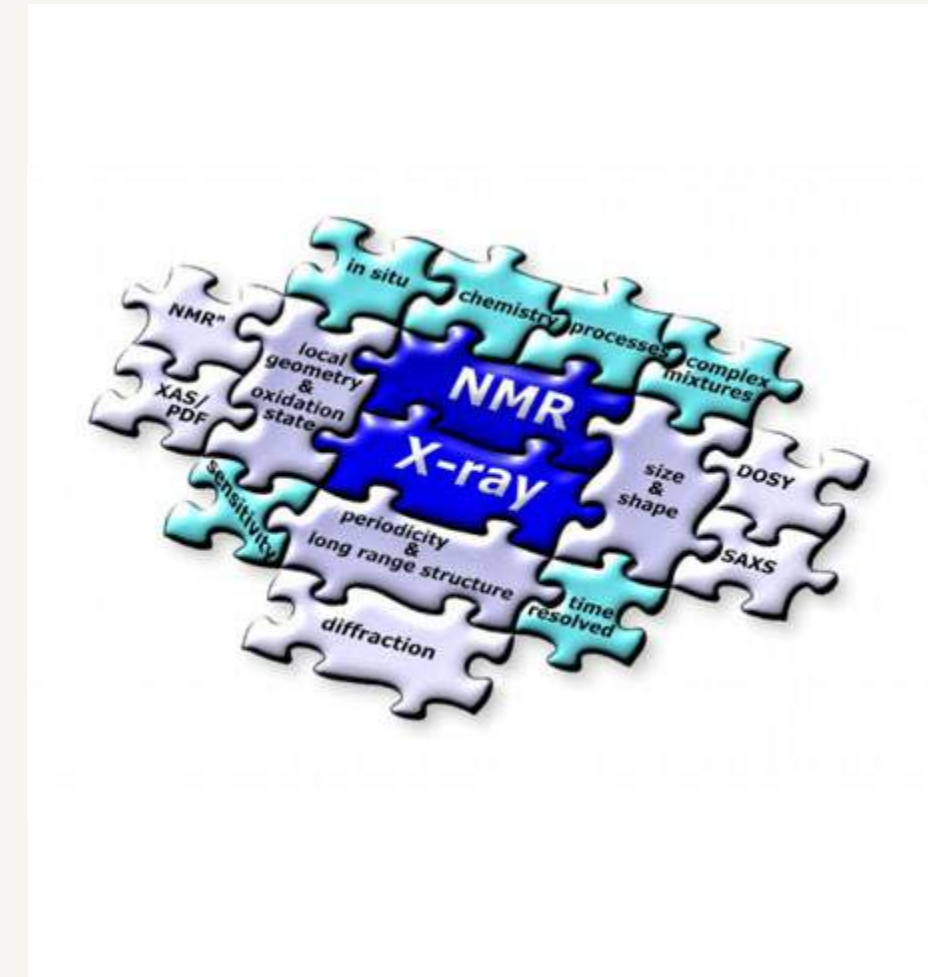
NMRCoRe@CMWS focuses on developing cutting-edge, in situ multi-diagnostic Nuclear Magnetic Resonance (NMR) and X-ray scattering and spectroscopy instrumentation, implementing optical and dielectric spectroscopies as additional metrics. This serves to enable investigation of the molecular level properties of water and all water-related materials and processes, to uncover its role in energy applications, nanotechnology, climate change processes and health research.

Activities and services

As a key infrastructure hub and founding member of the Center for Molecular Water Science (CMWS), NMRCoRe provides a step-up for the Flemish & Belgian science community: opening up international large-scale infrastructures and inviting participation in the CMWS science programme. NMRCoRe enables research into molecular water science & technology within the targeted scope: fundamental properties of water, water in geophysics, climate and environment, water in energy research and technology, real-time chemical dynamics, water in biochemical and biological function, and in theory and simulations.

Impact

NMRCoRe is the NMR/X-ray platform for convergence research, addressing global challenges through molecular level analysis of complex multi-phase systems. Its strategic alliance with the Centre for Molecular Water Science (47 European partners from 16 countries) makes Flanders a key international player that fosters collaboration between Flemish researchers with international large-scale facilities (NMRCoRe, Eu-XFEL, FLASH, PETRA, SOLEIL) and complementary spectroscopies.

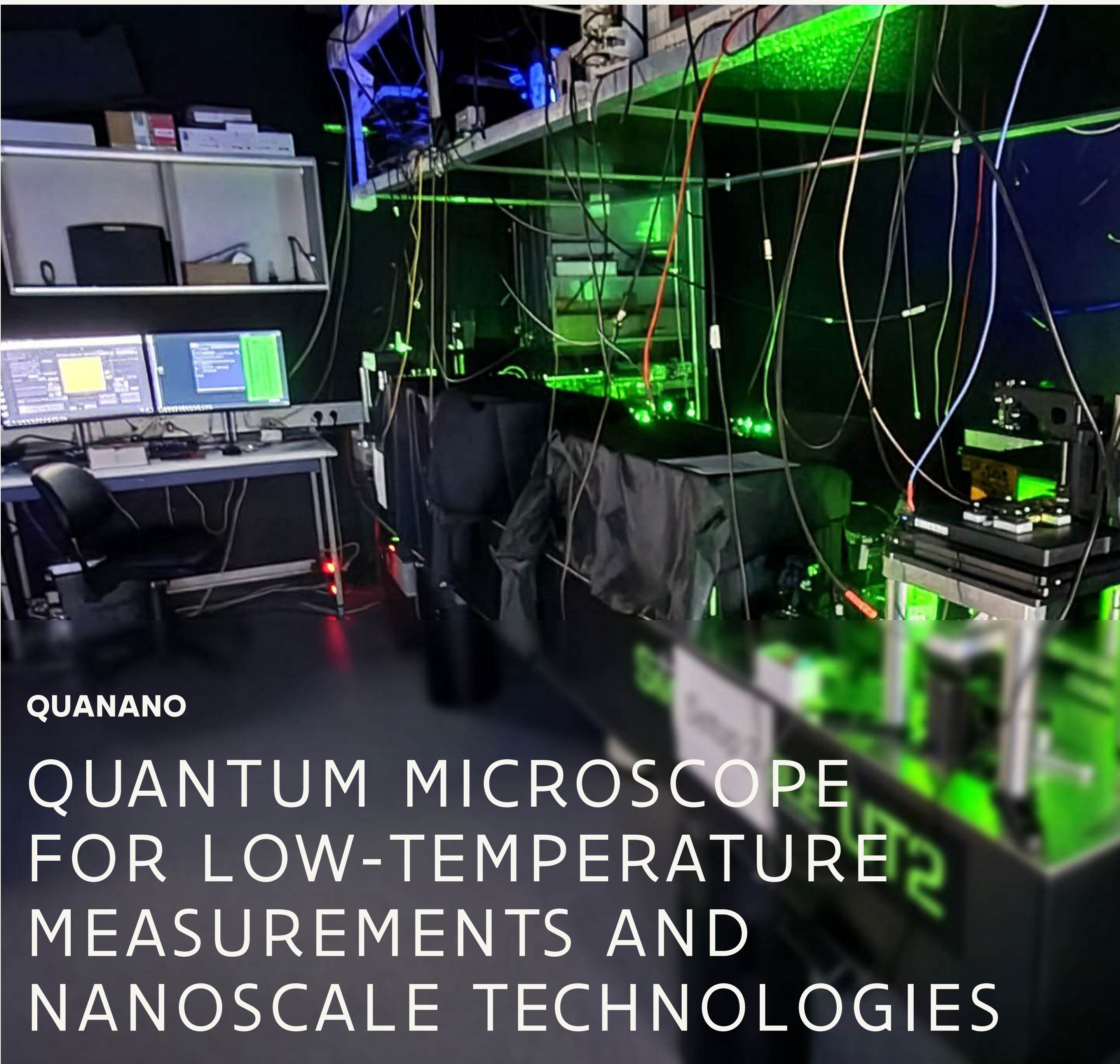


PRACTICAL INFORMATION

-  **Website**
set.kuleuven.be/nmr/nmrcore
-  **Website access modalities**
www.set.kuleuven.be/nmr/nmrcore-home/access
-  **Core facility**
Nuclear Magnetic Resonance/
X-Ray Platform for Convergence
Research (NMRCoRe)

CONSORTIUM

- Flemish coordinator**
 - Eric Breynaert (KU Leuven)
- Flemish consortium members and their institutions**
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 - Pegie Cool (University of Antwerp)
 - Veronique Van Speybroeck, Pascal Van Der Voort (Ghent University)
 - Joeri Denayer (Vrije Universiteit Brussel)



QUANANO

QUANTUM MICROSCOPE FOR LOW-TEMPERATURE MEASUREMENTS AND NANOSCALE TECHNOLOGIES

SPIN QUBIT CRYO-MICROSCOPY: EMPOWERING QUANTUM TECHNOLOGIES

This facility infrastructure consists of a quantum microscope integrated into a He-cryostat (1.6 K). It is designed to study solid-state spin qubits, in particular colour centres in diamond, and to develop techniques for quantum sensing, quantum communication and computing. The low temperatures enable the observation of the refined structure of colour centres and the discovery of novel point defects. The Dynamic Holographic Microscope (DHM) provides resolution below 1 nm and studies their dynamic behaviour.

Activities and services

The quantum microscope displays time-resolved photoluminescence spectra of point defects at low temperatures and the characteristics of spin states (T_1 -, T_2 - and T_2^* -measurements). The quantum microscope enables the development of quantum-sensing protocols and quantum magnetometers, as well as the development of quantum memories and quantum registers. It also allows the development and testing of quantum communication protocols. DHM provides a resolution below 1 nm, making it possible to study the behaviour of nanostructures.

Impact

This is a unique low-temperature quantum microscope, operating in confocal mode with the capability of applying a 3D vector magnetic field to study driven quantum bits based on colour centres in diamond. It provides access to the development of novel quantum technologies and participation in dedicated programmes such as Quantum Flagship, JU Quantum Chips Act or Pilot line, and to collaboration and developments with industries and national quantum initiatives.



PRACTICAL INFORMATION

Core facility
IMO-IMOMEC
www.uhasselt.be/en/instituten-en/imo-imomec

CONSORTIUM

Flemish coordinator
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Flemish consortium members and their institutions
• Michael Kraft (KU Leuven)



BELHISFIRM

LONG-TERM FIRM-LEVEL DATA FOR THE SOCIAL SCIENCES

EXPLORING FINANCIAL HISTORY TO ILLUMINATE CORPORATE EVOLUTION

BelHisFirm is an interactive database centralising all important financial and non-financial information on Belgian companies for the period 1873-2001. Data will be available in its original format, but also in a standardised format, enabling analysis over time. Its long-term data will allow interdisciplinary research on slow-moving socioeconomic developments.

Activities and services

With data that includes corporate events (such as mergers and acquisitions), accounting data from 1873 onwards, portfolio inventories, ownership data, geographical location, identity of administrators, directors and management, BelHisFirm complements the SCOB database on Belgian financial markets. BelHisFirm will also provide data on public and private banks.

An interactive interface allowing users to browse, visualise and download data is also under development. It will enable users to suggest corrections to the data and even to submit new data.

Impact

By unlocking the rich economic and financial history of Belgium, BelHisFirm will give an important impetus to interdisciplinary research in fields such as economic and financial development, income and wealth inequality, (de)colonisation, social and spatial network analysis, corporate governance and tax policy. As such long-term databases are not available elsewhere, the resulting research will have international relevance.

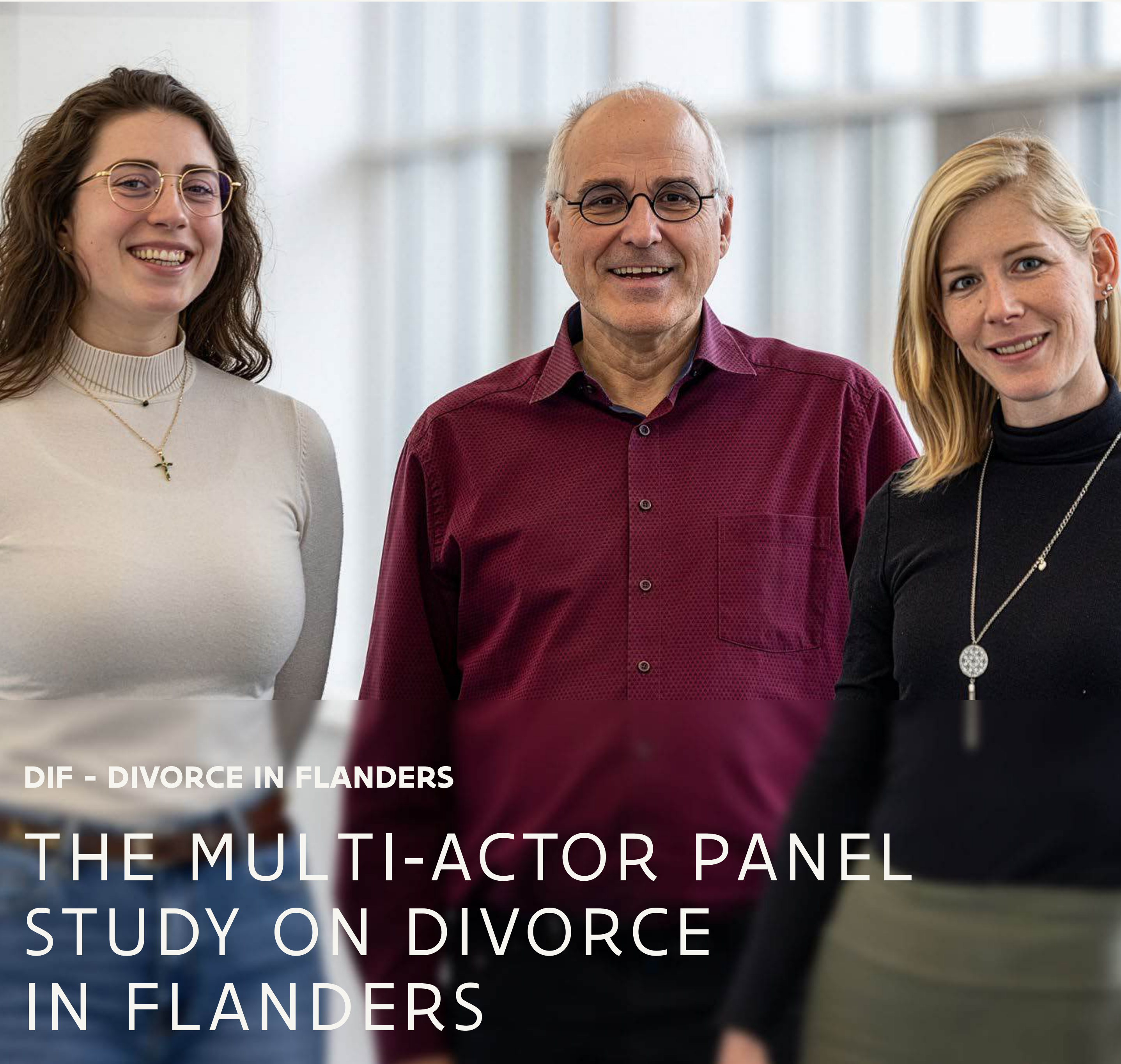


PRACTICAL INFORMATION

-  **Website**
www.belhisfirm.be
-  **Website access modalities**
www.belhisfirm.be
-  **Core facility**
BelHisFirm

CONSORTIUM

- Flemish coordinator**
 - Jan Annaert (University of Antwerp)
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 - Christophe Verbruggen (Ghent University)



DIF - DIVORCE IN FLANDERS

THE MULTI-ACTOR PANEL STUDY ON DIVORCE IN FLANDERS

OPEN DATA INFRASTRUCTURE FOR INSIGHTS INTO FLEMISH FAMILY DYNAMICS

DiF is a leading social science research platform in Flanders. It collects and analyses data through two cross-sectional rounds of multi-actor data collection on relationship formation, divorce, family structures and generational shifts. Through harmonisation with international studies, open data access via the SODHA archive and strong collaborations, DiF provides high-quality, socially relevant insights that support academic research and inform policy in a rapidly evolving society.

Activities and services

Divorce in Flanders (DiF) collects and analyses data on family and relational dynamics. It focuses on relationship formation and family change, and aligns with international surveys. The SODHA archive makes data freely accessible. The infrastructure supports researchers with multi-actor expertise and promotes collaboration and knowledge exchange, strengthening Flemish and European research infrastructure.

Impact

DiF collects essential data on family and relationship patterns in Flanders, offering key insights into a changing society. By aligning with international studies like FReDA, GGP, and New Families in the Netherlands, it strengthens Flanders’ role in comparative research. DiF fosters collaboration and supports policy and science with up-to-date and detailed data.

PRACTICAL INFORMATION

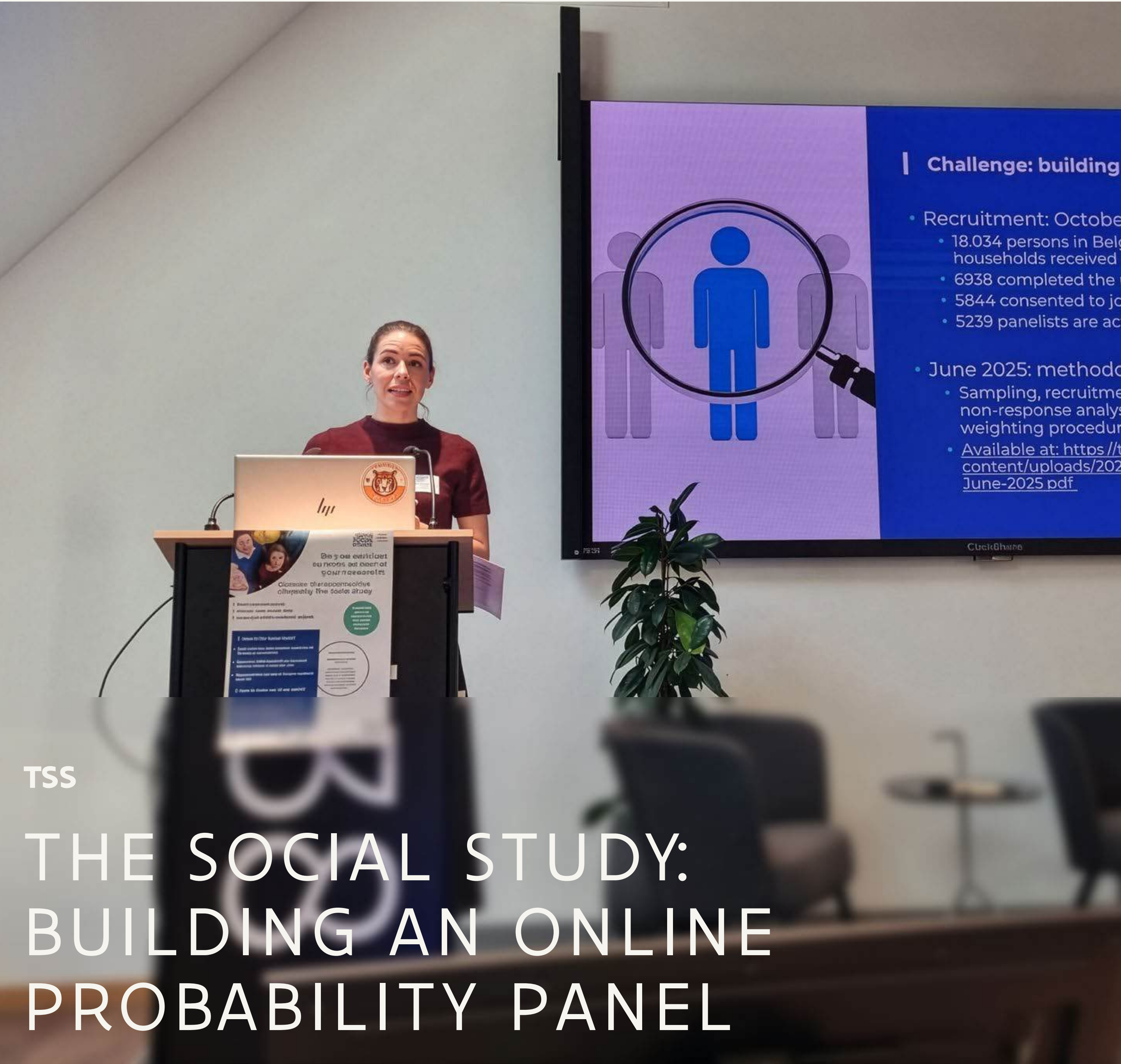
-  **Website**
www.divorceinlanders.be/
-  **Website access modalities**
www.uantwerpen.be/nl/projecten/relaties-in-vlaanderen/

The data of DiF are freely available for non-commercial use and are archived at the SODHA archive (www.sodha.be/).

-  **Core facility**
Divorce in Flanders

CONSORTIUM

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- Flemish consortium members and their institutions**
 - Jan Van Bavel (KU Leuven)
 - Piet Bracke (Ghent University)



TSS

THE SOCIAL STUDY: BUILDING AN ONLINE PROBABILITY PANEL

A SCIENTIFIC PANEL THAT CAPTURES SOCIAL LIFE IN BELGIUM

The Social Study is an advanced interdisciplinary data collection infrastructure. The TSS panel comprises a probability-based sample of 5,000 Belgian residents. Panel members regularly complete surveys covering a wide range of social, economic and behavioural topics. All data can be cross-linked and is supplemented with administrative data. Combining longitudinal, experimental and administrative data offers researchers unique opportunities to gain insights in societal developments.

Activities and services

TSS efficiently collects high-quality survey data for scientific and policy-oriented research. TSS conducts a yearly core study to gather basic information from its panel members such as household composition, economic status, social attitudes, health and well-being,... TSS offers researchers from various disciplines the opportunity to field their own surveys (including longitudinal and experimental designs) through the panel. TSS is committed to Open Science and disseminates all collected data to the research community free of charge via the SODHA archive.

Impact

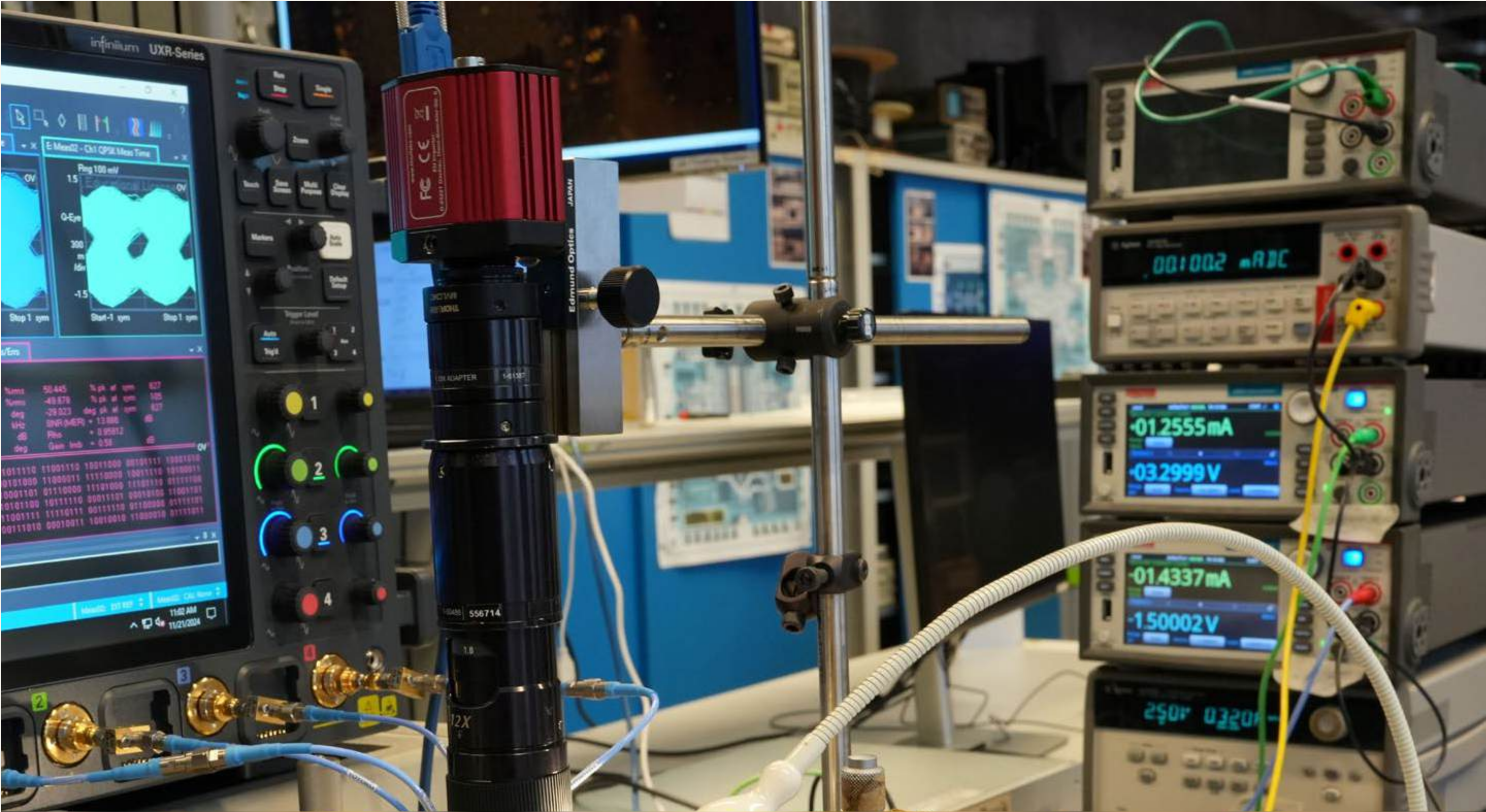
TSS is the only probability-based panel in Belgium accessible to the research community. By providing high-quality, rapid data collection at low cost, TSS radically improves the sustainability of survey research. TSS offers a database that connects longitudinal measurements with surveys commissioned by research teams and administrative data sources. This publicly available data source stimulates interdisciplinary research and is of high value to academic researchers and policymakers.

PRACTICAL INFORMATION

-  **Website**
www.thesocialstudy.be/
-  **Website access modalities**
www.thesocialstudy.be/website-for-researchers/

CONSORTIUM

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 - Dimitri Mortelmans, Sarah Van de Velde, Koen Decancq (University of Antwerp)
 - Dimokritos Kavadias, Lara Stas, Kim Willems (Vrije Universiteit Brussel)
 - Liesbeth Bruckers, Geert Molenberghs, Geert Wets (Hasselt University)



ROAMI

110 GHZ REAL-TIME OSCILLOSCOPE FOR ADVANCING FLEMISH MEASUREMENT INFRASTRUCTURES

REAL-TIME MEASUREMENTS DOWN TO 10 PS RESOLUTION

Communication is evolving towards a super-fast 6G mobile internet. In parallel, the exponentially increasing data consumption from social media and AI applications leads to higher speeds on the fibre-optic infrastructure. The four-channel 110 GHz real-time oscilloscope forms the core of this infrastructure and enables advanced research in these domains.

Impact

By embedding the instrument in multiple labs across Flanders, thereby enabling diverse measurement modalities, the infrastructure creates a unique research cluster in Flanders.

Activities and services

The partners, spread across four institutions in Flanders, develop a diverse range of measurement modalities by embedding this real-time oscilloscope in their lab infrastructures, enabling advanced research across the entire chain of metrology, device modelling, circuit design, to characterising wireless and optical channels. The measurement modalities are also offered as measurement services.

PRACTICAL INFORMATION

 **Website**
www.esat.kuleuven.be/wavecorearenberg/research/WaveTechnologies/lab/uxr_oscilloscope

CONSORTIUM

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 - Yves Rolain, Johan Stiens, Gerd Vandersteen (Vrije Universiteit Brussel)
 - Bertrand Parvais, Piet Wambacq (Interuniversity Microelectronics Centre - IMEC)



DEPARTMENT OF
WORK, ECONOMY
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SOCIAL ECONOMY

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