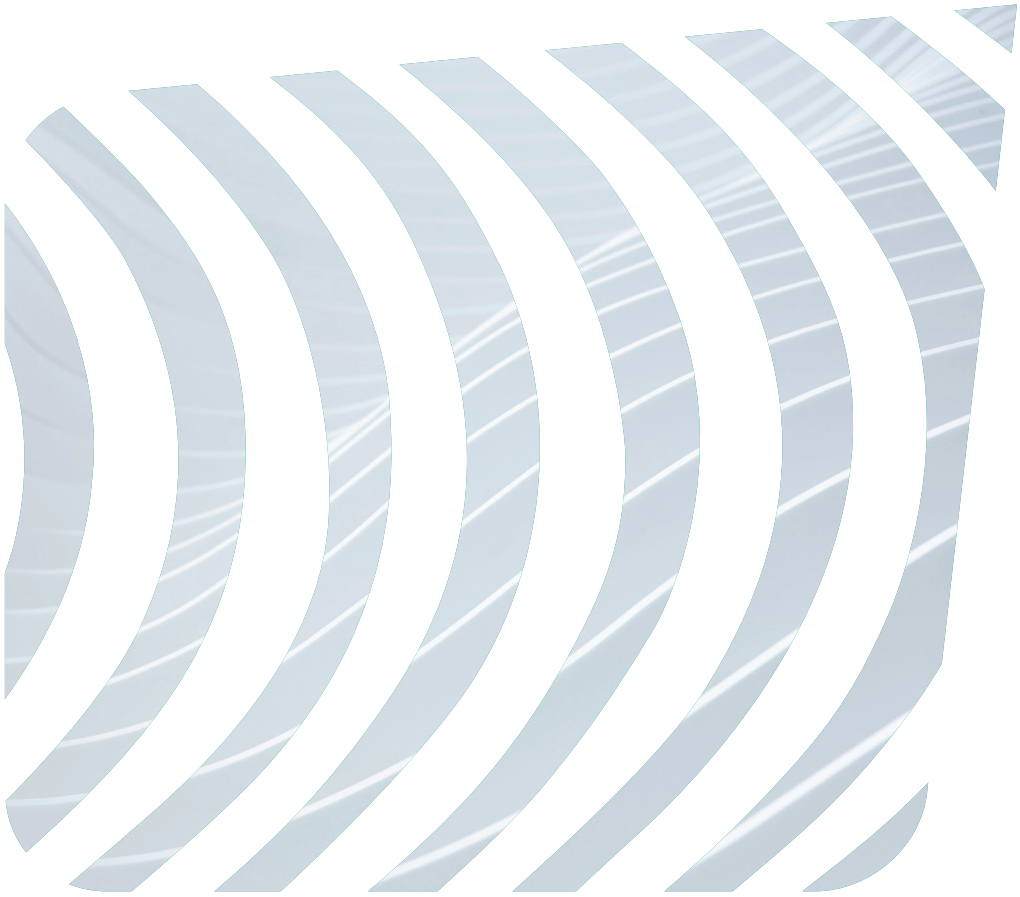
SHAPING THE FUTURE,
TOGETHER

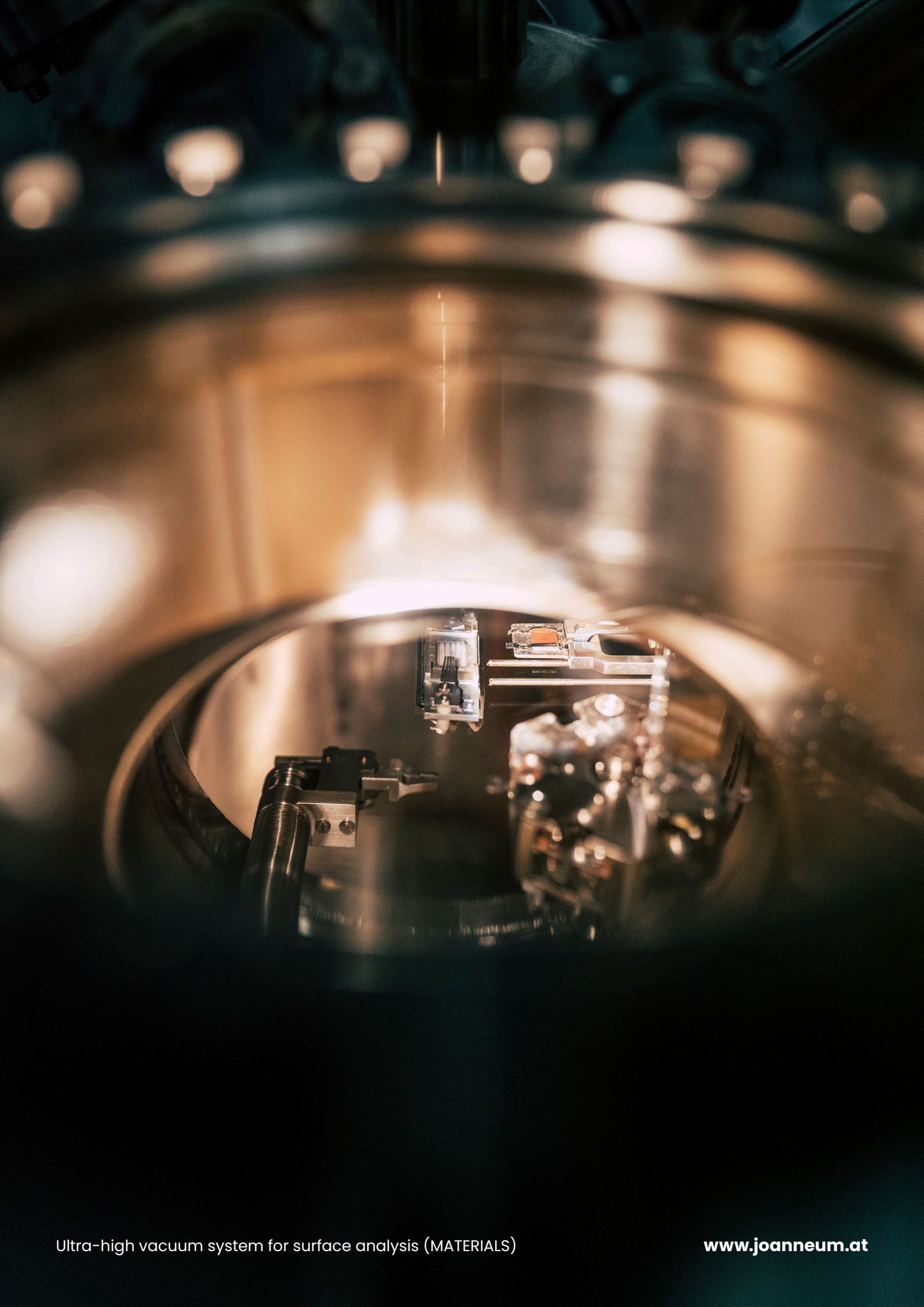
JOANNEUM
RESEARCH



Annual Report 2024

JOANNEUM RESEARCH

Table of contents



Ultra-high vacuum system for surface analysis (MATERIALS)

www.joanneum.at

HEINZ MAYER
MANAGING DIRECTOR
JOANNEUM RESEARCH

Foreword

We are currently facing very dynamic times both globally and nationally. Thus, research must flexibly respond to rapidly changing societal and economic challenges and find solutions and answers. This is JOANNEUM RESEARCH's aspiration. As a company that is engaged in applied research we deliver bespoke innovations for the industrial and business sectors, while at the same time forming a critical mass at and for the research location.

Upon the takeover of the majority interest in Virtual Vehicle Research GmbH we succeeded in bringing about a collaboration in the mobility sector through a joint research group. With some 800 highly qualified staff a unique strategic opportunity to use synergies and significantly increase national and international visibility in the research environment is developing.

Another milestone was reached by our investment in Wood Vision Lab, a pioneering centre for wood as an innovative material in product development. Even now there are numerous connecting factors to JOANNEUM RESEARCH, which will allow us to implement pioneering research cooperation, focusing on wood as a sustainable and recyclable material for new high-tech lightweight construction applications.

Collaboration is the key to success of the Styrian research and business landscape. With this in mind we have joined forces with Steirische Wirtschaftsförderung GmbH (SFG) and established an innovative platform in the form of the first joint Future Day in November of last year. This Day provided important impetus for Styria as a centre of research and business and underscored Styria's position as a dynamic hub for innovation and cooperation.

The motto was #bettertogether, because only by working together and having a certain impact can we shape the future sustainably and change it for the better in these dynamic times.

Heinz Mayer

The J**R-IcoDome32 3D microphone** array was developed as part of the MMCUAS and BARAKUDA projects for stationary and mobile operation for drone localisation.

SOUTHERN RESEARCH AXIS

#better together

© Lunghammer

JOANNEUM RESEARCH plays a central role as a driving force in the innovation region of Southern Austria and acts as an important point of contact for businesses and the public sector as regards pioneering topics such as digital and green transformation. Its excellent cooperation with national and international companies, universities and research institutions is a role model. Moreover, JOANNEUM RESEARCH is the lighthouse for cooperation across the states of Carinthia, Burgenland and Styria. Thank you all for your great commitment. I wish you every success for the future.

BARBARA EIBINGER-MIEDL
MEMBER OF THE STYRIAN GOVERNMENT FOR ECONOMY, TOURISM, REGIONS, SCIENCE AND RESEARCH

© Rauchenwald

The future is not something that just happens - the future is what we are shaping today. A good future requires conscious and informed steering. Thanks to the Koralmbahn railway, a new Southern business region is emerging encompassing more than 1.1 million inhabitants that will reach the critical mass for international visibility and attractiveness. JOANNEUM RESEARCH is a particularly important partner in shaping the transformation of this future shared space for research, work and living. It provides both politicians and businesses with the tools they need to set the right course.

GABY SCHAUNIG
DEPUTY GOVERNOR OF THE STATE OF CARINTHIA

© Büro Schneemann

Research and innovation are decisive for economic success, social progress and sustainable development. The last few years have shown how important technology transfer, digitalisation and sustainable innovation are for the competitiveness of our country. Through excellent research work, JOANNEUM RESEARCH makes a significant contribution to the development of future solutions for businesses and institutions. Research continues to be a political priority – only by investing in knowledge and innovation will we secure our prosperity in the long term. I would like to thank all staff members and the management of JOANNEUM RESEARCH.

LEONHARD SCHNEEMANN
MEMBER OF THE GOVERNMENT OF BURGENLAND FOR RESEARCH MATTERS AND DIGITALISATION

© TinePhoto, Martin Steinthaler

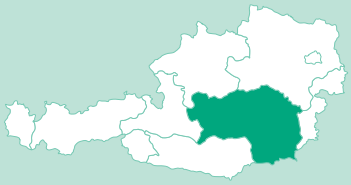
JOANNEUM RESEARCH is an innovative research and cooperation partner that remains future-oriented even in challenging times and contributes to the competitiveness of the region. In 2024 it implemented pioneering activities and initiatives. First and foremost the acquisition of a majority interest in Virtual Vehicle Research GmbH. That link to a large research group makes Styria even more visible in the mobility sector, including as a research location. Another milestone is the investment in Wood Vision Lab GmbH. Wood as an innovative material for product development creates regional and supraregional added value.

MARTIN WIEDENBAUER
CHAIRMAN OF THE SUPERVISORY BOARD

© ÖRK Nadja Meister

JOANNEUM RESEARCH looks back on an active financial year 2024, during which work on the ongoing strategy for 2023-2027 was consistently implemented. The highlights were definitely the takeover of the majority interest in Virtual Vehicle Research GmbH and the investment in Wood Vision Lab. In a constantly changing world where technological progress and social challenges go hand in hand JOANNEUM RESEARCH is a research institution that not only develops innovative solutions but also actively contributes to shaping a sustainable future.

GERALD SCHÖPFER
CHAIRMAN OF THE SCIENTIFIC ADVISORY BOARD



WEIZ
NIKLASDORF
GRAZ

JOANNEUM RESEARCH IN

Styria

Together

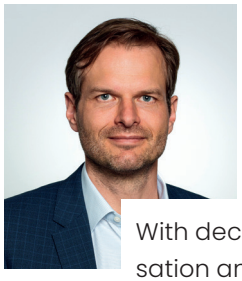
In 2024 Styria established itself as a leading location for applied research and innovate cooperation. Through close cooperation between JOANNEUM RESEARCH, the business sector and the industrial sector, pioneering projects that strengthen and elevate the business location were realised. Cooperation was the unifying and overarching theme throughout the year.

The projects listed below are just a few examples of the wide range of Styrian research and highlight the central significance of cooperation between science and economy.

Resilience of critical infrastructure
The global crisis made protecting critical infrastructure against external disruptions an important issue. In the **CATCH-IN** KIRAS project a multidisciplinary team developed a sensor system for real-time identification and localisation of interferences in global navigation satellite systems (GNSS). Such disruptions may be caused by interferences, jamming or spoofing, and have significant economic and security-related consequences. For instance, interferences in the GNSS signals at an airport may result in delays, cancellations and increased security measures, which in turn entails considerable financial losses for airlines, as well as logistical challenges. The first test run involving sensor boxes took place at Graz Airport with the aim of precisely identifying the location of interference sources.

Securing water supply in view of climate change was another key issue. In the **KI-WAZU** project, researchers used artificial intelligence and acoustic monitoring to make the operation of water treatment plants and pump stations more efficient. By means of a specifically developed real-time monitoring system including structure-borne sound sensors faults can be detected at an early stage and preventive measures can be taken.

This innovation helps to utilise water resources more sustainably and to minimise supply disruptions.
In addition, the use of IoT sensors for monitoring groundwater levels was tested. These sensors enable continuous real-time data collection, which allows changes in the water balance to be detected at an early stage.



With decades of experience in digitalisation and artificial intelligence we promote the development of new economic strengths in the region.
Matthias Rüther, DIRECTOR DIGITAL

This allows targeted measures for water supply and flood control to be implemented more quickly, which has both ecological and economic benefits in the long term. These sensors continuously provide data on the condition of water resources and enable public authorities and utilities to make well-founded decisions on distribution and utilisation of water.

Photo: Virtual Vehicle

Research group: since 2024 JOANNEUM RESEARCH has been a central strategic partner of Virtual Vehicle (ViF) as a result of the takeover of 50.1% of its shares.

Photo: Stadt Weiz

Wood Vision Lab: the pioneering centre in Weiz is a cooperative initiative to turn wood into the high-tech material of the future. JOANNEUM RESEARCH is part of the project.

Photo: ©Lebensressort/Fischer

Excellency: in March the KI-WAZU DIGITAL project of DIGITAL was awarded the „Wasserland-Steiermark-Preis" of Styria. The project won first place in the „Water projects of the future" category.

In 2024 we were once again highly successful in bringing expertise from Styria to Europe and thus raising the profile of the state beyond its borders.

Paul Hartmann,
DIRECTOR MATERIALS

Such a complex project can only be carried out through cooperation with excellent partners, in this case JR-AquaConSol. Data is a particularly valuable commodity, including in agriculture.

In November, POLICIES presented a **project together with Maschinenring** and the State of Styria which is setting new standards in resource-conserving agriculture through innovative AI-supported soil mapping. By using state-of-the-art technologies, farmers can save up to 20% on seed, 9% on nitrogen fertiliser and 15% on diesel consumption.

New materials for the medical, aviation and industrial sectors

In material research, intensive work was done on new antibacterial surfaces. Inspired by the **micro- and nanostructure of Cicada wings**, researchers developed materials with bacteria-resistant properties without chemical additives. These innovative structures could primarily be used in medical technology to prevent infections and to better comply with hygiene requirements.

An example of successful cooperation is also the **cooling clothing** sustainably developed by COREMED. The textile, which received the German Sustainability Award, improves regeneration by targeted temperature regulation and is proof of the potential for interdisciplinary cooperation between material research and medicine.

Another example of innovate medical materials is **EVOCellic**, a new cell therapy for wound healing developed by COREMED in cooperation with EVOMEDIS GmbH and the Medical University of Graz. By means of **EVOCellic**, cell-based therapy is possible exactly when patients need it. Thus, waiting times can be avoided as well.

Aviation is facing a paradigm shift: in order to implement the zero-emission strategy, aircraft must become lighter and switch to new propulsion technologies. In the **3D-Strain-Sense** FFG research project MATERIALS researchers are developing

COREMED conducts networked cutting-edge research on regenerative medicine and precision medicine at Medical Science City Graz, a place where innovation and cooperation are shaping the future of medicine.

Lars-Peter Kamolz, MSc
DIRECTOR COREMED

manufacturing of ultra-lightweight free-form components and new methods for condition monitoring of components through sensors. The free-form geometries required for this are virtually impossible to produce using traditional manufacturing methods, which makes the use of additive manufacturing, such as 3D printing, indispensable. In this project specialists from Weiz and Niklasdorf work closely together.

Circular economy as a strategic focus

The steel industry accounts for over 7% of global carbon emissions. Various approaches are being pursued to reduce these emissions.

The **InSpecScrap** project aims at precisely analysing scrap composition through the use of artificial intelligence and hyperspectral multisensors. This technique allows for detection of impurities and an automated assessment of quality features, which leads to more efficient and more environmentally friendly steel production. By using recycled scrap steel instead of iron ore, carbon emissions may be reduced by up to 75%. Another approach examines partial replacement of coal with waste wood to fire blast furnaces. However, the social impact of this transition varies depending on the region and suppliers. As part of the EU's **TORERO** project, waste wood is being used to heat blast furnaces in Belgium. Moreover, in the RecHycle project use of green hydrogen and recycled steel mill gases as substitutes for coke and coal dust is being investigated to further reduce carbon emissions. These measures contribute to making steel production more sustainable and minimising environmental impact.

We are very pleased with the first two platinum partnerships with Austrian businesses, which guarantees that our successful European projects will very quickly benefit our local partners.

Franz Prettenthaler, M.Litt,
DIRECTOR LIFE

JOANNEUM RESEARCH is involved in the enhancement of sustainable use of resources also in other areas: in the **CircEl-Paper** project LIFE is scrutinising the recyclability of cellulose-based printed circuit boards developed by MATERIALS.

The EU project **EXCESS** led by LIFE demonstrated how vintage buildings can be converted into sustainable energy generators. Upgrading instead of demolition is the motto: resources are saved, materials are recycled and old buildings are equipped with new technologies. The aim of **EXCESS** was to use four buildings in four European climate zones to demonstrate that buildings can produce more energy from renewable sources than they consume in one year. In future the remaining energy will be used to supply neighbouring buildings with green energy.

For better healthcare

The future of healthcare will be significantly shaped by technological innovations and interdisciplinary collaboration. Progress in biomedical research, digitalisation and artificial intelligence offer new ways of making more accurate diagnoses, developing personalised therapies and optimising care processes. One example of this is research on fasting and Spermidine, which plays a key role in cell regeneration and was investigated in studies on autophagy. The key role of Spermidine in the health-promoting effects of fasting is now becoming more and more clear. HEALTH has been involved in research on the correlation of fasting, von Fasten, Spermidine and autophagy using special analytical methods for several years.

Digital assistance systems, such as intelligent use of routine data in care, show that it is possible to organise the health sector more efficiently and relieve the burden on the health sector. These developments in digitalisation underscore that forward-looking healthcare requires both technological and organisational rethinking. Close cooperation between research institutions, administrators and nursing staff is a key factor for the success of this transformation. Scientific findings must be integrated into everyday practice and tested for applicability, while at the same time the administration plays a central role in the implementation and financing of new models. Projects such as **N!CA**, which was started in 2024, prove that digitalisation in care has the potential not only to boost efficiency, but also to improve the staff's working conditions. Intelligent use of data, digital documentation systems and predictive analyses can minimise administrative work and allow for more time for patient-centred care.

Interdisciplinary cooperation thus provides for a practical and sustainable development of new care models. Through projects in digital health monitoring, in particular carried out by the HEALTH Institute, JOANNEUM RESEARCH shows that intelligent solutions for real-time detection of health risks are suited to making a significant contribution to prevention even today

Cooperation as a success factor

Through an exchange of knowledge, technologies and resources, innovative solutions can be developed that contribute

Photo: JOANNEUM RESEARCH/Raiser

Long Night of Research: 36,000 interested people visited over 60 locations in Styria. JOANNEUM RESEARCH was once again responsible for Styria-wide coordination.

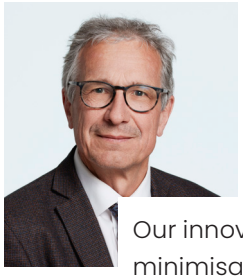
Photo: Photo Fischer

Climate Pact: on 27 June, many businesses and organisations based in Graz signed the Climate Pact of the City of Graz. JOANNEUM RESEARCH also set an example.

Photo: Alexander Müller

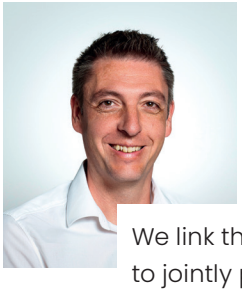
Highly honoured and excellent: our HEALTH Institute won first place of the Houska Prize in the „Non-university research" category for the „Dermal Open Microperfusion – Demonstration of the Effectiveness of Medications" project managed by Katrin Tiffner.

to strengthening Styria as a research location. The successful cooperation between JOANNEUM RESEARCH and its partners demonstrates that interdisciplinary approaches are key to overcoming current challenges. One example of successful cooperation is the Koralmbahn railway, which improves connections between peripheral regions and urban centres. According to a study carried out by the POLICIES Institute, it promotes demographic development and economic stability. This could not be realised without strategies coordinated between infrastructure operators and decision-makers. Joint projects with universities and businesses from other countries have intensified knowledge transfer, which will strengthen the region's competitiveness in the long term.



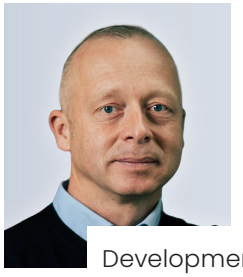
Our innovative methods contribute to risk minimisation in the translational development of new drugs.

Thomas Pieber
DIRECTOR HEALTH



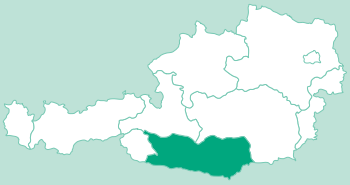
We link the industrial and research sectors to jointly promote innovation and develop solutions for tomorrow's health.

Franz Feichtner, DIRECTOR HEALTH



Development at the POLICIES Institute was successfully continued by appointing a new Institute Director, who works at all three locations, and through the soliciting of large-scale projects, such as Mission Facility, European Higher Education Register or projects in the area of „Digitalisation in agriculture".

Michael Ploder, DIRECTOR POLICIES



JOANNEUM RESEARCH IN

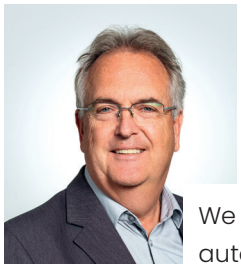
Carinthia

Moving together

Four Institutes of JOANNEUM RESEARCH in Carinthia research into innovations and technologies for improvements for the economy and society. The world is changing, our gaze is fixed on the future, everything is in motion. This is also reflected in the core research topics in Carinthia: robotics, digitalisation, sustainability and mobility.

Robotics of the future

The ROBOTICS Institute conducts research in the area of AI-supported automation solutions for the industrial sector and medium-sized businesses. Advances in artificial intelligence enable machines to better understand their environment. The combination of robotics and Visual Language Foundation Models (VLFMs) opens up completely new possibilities in flexible robotics that are also practicable for small enterprises. In 2024 ROBOTICS focused on smaller businesses, for example in the hotel industry, to identify solutions to the shortage of skilled labour and support implementation of the same.



We develop innovative solutions for automation and robotics to support businesses and strengthen the business location.

Anton Scheibelmasser,
DIRECTOR ROBOTICS

Another focus was on research into working with modular robot systems, primarily to support industries such as metal and wood processing and the food industry.

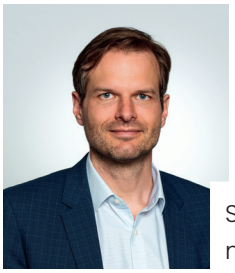
Carinthia is a dynamic research location. The JOANNEUM RESEARCH Institutes develop practical solutions supporting the economy and society and in this way sustainably strengthening the location.

Digital twins for sustainable development

The Digital Twin Lab in Klagenfurt operates a unique infrastructure for high-precision 3D digitisation of suburbs or motorways. Digital twins enable simulations for adaptations to climate change, sustainable maintenance of infrastructure and in disaster management. They support water management in Carinthia and the development of autonomous driving systems on Austrian motorways. The survey of the municipal roads of Frantschach - St. Gertraud was a success. **High-precision digitalisation of the traffic routes** allows for better maintenance planning and enhancing safety on municipal roads. This cooperation with the municipality was widely covered by the media. Expansion and development of other applications is in progress.

Mobility of the future

The LIFE Institute worked on innovative traffic forecasts under the **KASSA.AST** FFG project. Experts explored ways to better use motorway interchange hubs as transfer points. A model calculation for the Klagenfurt West interchange hub illustrated the Park & Ride demand for 2024 and a scenario with automated shuttles to Klagenfurt University and Lakeside Science & Technology Park. It will now be supplemented by demand modelling for the integration of rental e-scooters into a mobility-as-a-service platform.



Spatial digital twins remain our main focus at this site and are highly in demand both regionally and internationally.

Matthias Rüther,
DIRECTOR DIGITAL

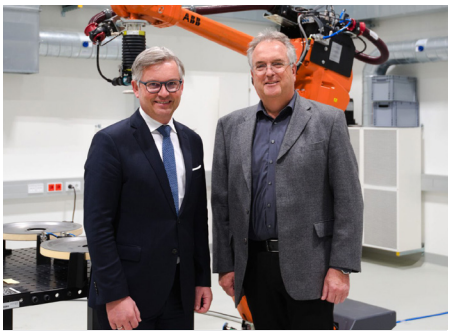


Photo: JOANNEUM RESEARCH/Holzfeind

Visit from the Minister of Finance: on 20 February 2024 Magnus Brunner made a stopover at ROBOTICS.

Photo: JOANNEUM RESEARCH/Raiser

Infrastructure: DIGITAL surveyed the municipal roads in Frantschach - St. Gertraud using Digital Twin Lab.

Photo: iStock

Koralmbahn & Co: POLICIES worked on mobility studies such as a demand survey for the people of Carinthia.

POLICIES of Carinthia developed successfully in 2024, which is also shown by the group's expansion in Klagenfurt at the end of the year.

Michael Ploder,
DIRECTOR POLICIES

In 2024, because of significant demand, we launched the „Center for Green Transformation (CGT)" with a number of project developments and now offer Carinthia far more than mobility solutions.

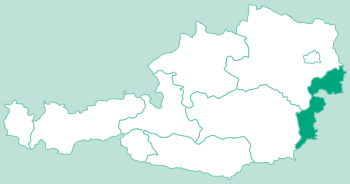
Franz Prettenthaler,
DIRECTOR LIFE

Also in 2024 POLICIES' expertise was highly in demand with respect to the Koralmbahn railway, which is planned to become operational in 2026. The POLICIES team worked on **location analyses** concerning the new business agglomeration and was represented at many press conferences and events. POLICIES also carried out a survey of the **mobility behaviour** of the people in Carinthia. The survey showed that, above all, women highly depend on individual transport in rural areas as they need to run many different errands and public transport does not offer enough flexibility yet.

A changing economy

Also concerning economic and societal transformations POLICIES' experts were highly in demand. They accompanied the **economic survey** of the Carinthian Chamber of Labour, analysed the effects of AI on the labour market and assessed regional site developments such as tourism in Kötschach-Mauthen.

Many entrepreneurs wish to act more sustainably, a wish than can be fulfilled by the team of LIFE in Klagenfurt, who offer **life-cycle analyses and sustainability assessments.**



JOANNEUM RESEARCH IM

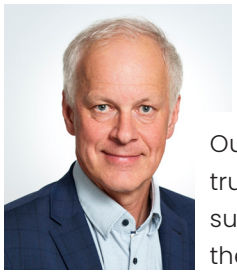
Burgenland

Growing together

Forward-looking projects in the areas of mobility and integrative lighting, as well as successful network meetings were the focus of Pinkafeld in 2024. Cooperation is the key to success, as emphasised at the Entrepreneurs' Day of the Burgenland Federation of Industries (IV).

Light and roads

The **DuAList** FFG project, which commenced in 2024, aims at more efficient design of street lighting by using LEDs not only as a source of light but also as sensors. This innovative approach makes it possible to identify, classify and track vehicles and to detect environmental and weather conditions.



Our established laboratory infrastructure allows us to optimally support domestic businesses in their product developments.
Paul Hartmann,
Director MATERIALS

A special advantage is the use of existing lighting structures without having to install additional sensors. Based on successful proof-of-concept MATERIALS and Montanuniversität Leoben collaborate to realise a new generation of lighting fixtures for road infrastructure.

Light and foodstuffs

Greenhouses and indoor farming make an important contribution to foodstuffs supply. By using LED technology and adapting the light spectrum to the specific needs of plants, photosynthesis can be designed more efficiently.

Also, the **Plamobvis** project works with backscattered visible light sensing (BVLS). This means that information on plant growth is gathered through the light they reflect. The method enables greenhouse monitoring in a way that saves resources and energy.

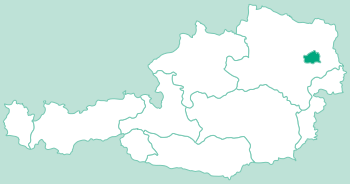
JOANNEUM RESEARCH coordinates the **LED4foods** FFG project, which aims at reducing food waste by using artificial LED light sources for fruit and vegetables at retailers. The optimised light spectra inhibit or stop germ growth and have a positive effect on breathing, ripening and aging processes of the products.

Photo: IV Burgenland

IV Entrepreneurs' Day: the Burgenland Federation of Industries (IV) invited to an Entrepreneurs' Day in Pinkafeld. Researchers and entrepreneurs used the opportunity for a successful exchange at the site of MATERIALS.

Photo: Schuller

30 years of Wirtschaftsagentur: by establishing Wirtschaftsagentur Burgenland a decisive cornerstone was set for the economic development of Burgenland. Heinz Mayer, managing director of JR, presented the historical milestones. A celebration was held in November.



JOANNEUM RESEARCH IN

Vienna

Shaping together

The focus of analytical and research work in Vienna was on mission-oriented policies and transnational cooperation, as well as on gender research.

In 2024 POLICIES in Vienna saw the successful conclusion of large-scale EU projects and a relocation to Sensengasse 3. At the beginning of 2025 the new management team of the cross-locational group Technology, Innovation and Policy Consulting took up its work.

Michael Ploder,
DIRECTOR POLICIES

The POLICIES Institute in Vienna focuses on research and innovation policy, labour market and equality policies, and innovation projects. Equality surveys are a key activity of the Institute. One of the study objects of the „**Equality Survey 2024**" project was the progress made in promoting women in non-university research. The results showed that, even though positive developments have taken place, there are still structural challenges, in particular in terms of job opportunities, leading positions or pay gaps.

INSPIRE analysed the way in which taking the gender dimension into account may contribute to tackling existing barriers and reducing discrimination experiences through an inclusive design. The study showed how gendered innovations may contribute to a fairer and more diverse design of products and structures.

Under the **FairCom** project the POLICIES team studied the way in which online meetings work for various types of users and their different needs. The results of those observations, online surveys and interviews revealed, among other things, that women and young people tend to have a lower share in conversations than men or older people.

Apart from gender research POLICIES participates in the **evaluation of capital expenditure on research**. A study carried out in cooperation with WIFO and IHS showed that spending on basic research has positive effects on the economy and society. Such capital expenditure pays off in terms of the federal budget and benefits the innovation sector as well as the labour market.

POLICIES assumes a special role in supporting the **Mission Facility** in Austria. Over a period of four years the Institute has accompanied the players of the five EU Missions and the Mission Management Unit of FFG. In this way POLICIES contributes to the progress of mission-oriented policy by supporting innovative approaches and driving the development of tools and programmes.

Photo: Valerie Maltseva

Technology Talks Austria

In a workshop organised by JOANNEUM RESEARCH in connection with Technology Talks Austria, experts studied the factors that are decisive for successful implementation of the circular economy model in practice.

Photo: Luiza Puiu

Study on basic research

The study of WIFO, IHS and JOANNEUM RESEARCH was presented in Vienna on 27 November 2024 and proved that basic research strongly benefits the economy and society.

Think big,

code smart

JOANNEUM RESEARCH counters the disruptive technology of artificial intelligence (AI) by strategic integration into its research and corporate structure. AI is not only a tool but changes the way in which research is done, innovation is driven and business models are designed.

Andreas Windisch, Head of the „Intelligent Vision Applications" Research Group of the DIGITAL Institute, leads the AI@JR initiative. The objective of this working group is to establish standard procedures for the use of AI throughout the company. „We develop strategies and processes for the use of AI tools, take legal aspects into account and plan the setup of appropriate hardware," explains Windisch. A special focus is on responsible implementation of AI technologies to meet both ethical and regulatory requirements.

The development of AI technologies is progressing at breathtaking speed. Only ten years ago neural networks were a side issue, now they dominate many areas of research and industry. In the past twelve months alone new architectures such as transformer models have developed rapidly. Progress in quantum AI may enable other revolutionary applications in the years ahead. „We must constantly adapt ourselves because that which is considered innovative today may be obsolete tomorrow," says Windisch. This dynamic development poses challenges to business and researchers alike: on the one hand, unforeseen opportunities may open up, while ethical and regulatory issues have to be resolved more quickly than ever before.

Thomas Gallien, expert in AI and reinforcement learning at the ROBOTICS Institute, does research on one of those opportunities. He investigates the significance of visual language foundation models (VLFMs) which allow robots to interpret their environment in real time and communicate intuitively with humans. In a nutshell: the robot should thus be able to understand the scene in a room immediately. „This development would significantly reduce the programming work and allow natural interaction between man and machine, which is of particular advantage in dynamic production environments," explains Gallien.
In medical research the role of AI plays an ever more fundamental role. Franz Feichtner, the Director of HEALTH, wishes to intensify cooperation with DIGITAL to drive AI-based projects. The IDRIS project, which deals with the development of intelligent diagnostic systems, is one example. Machine learning is used to analyse enormous volumes of medical data to design personalised therapies. „AI has the potential to change diagnostics fundamentally by recognising patterns which human senses are unable to grasp," says Feichtner.

In the area of statistics AI opens up new opportunities as well. Ulrike Kleb, statistician at POLICIES, explains: „AI-based prognosis models are, in principle, based on data. The model learns patterns and projects them to the future or new objects." She warns, however: „You really need an extremely large quantity of representative data examples for a complex AI model to deliver good prognoses."

The research group counts on explainable AI, i.e. models which make decision-making paths more transparent and thus usable in practice.

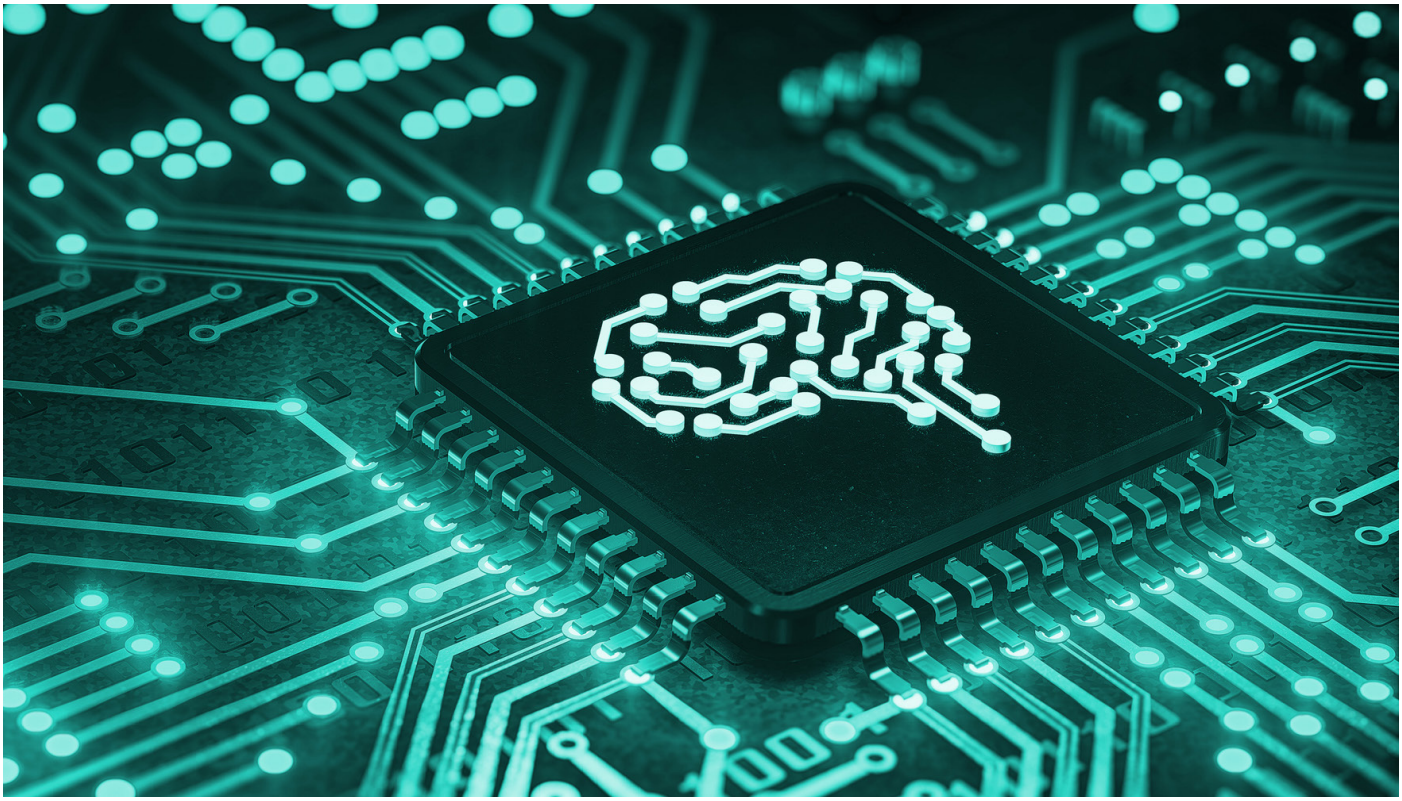


Photo: iStock

Concurrently with all research activities JOANNEUM RESEARCH has established an AI Task Force to analyse the requirements of the AI Act, which entered into force in August 2024, and to assess their relevance to the different business units. Katrin Gallé from the legal department emphasises: „For potential activities in a high-risk area the AI Act means extensive documentation and approval requirements, which must be integrated into the planning and research processes at an early stage."

The AI Act is the first comprehensive regulatory framework for AI worldwide. It follows a risk-based approach: different requirements apply depending on the area of application. High-risk AI systems, i.e. in critical infrastructure or the healthcare system, must meet strict requirements. The legislator demands transparency, quality controls and the protection of fundamental rights. Companies using AI technologies must document their algorithms and design decision-making processes in a traceable way.

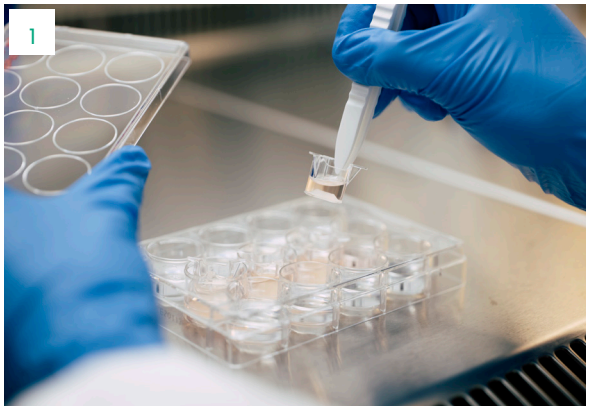
The challenge is that in some areas the AI Act has been worded vaguely. Similar to the General Data Protection Regulation (GDPR) many details will need to be clarified yet by legal precedents.

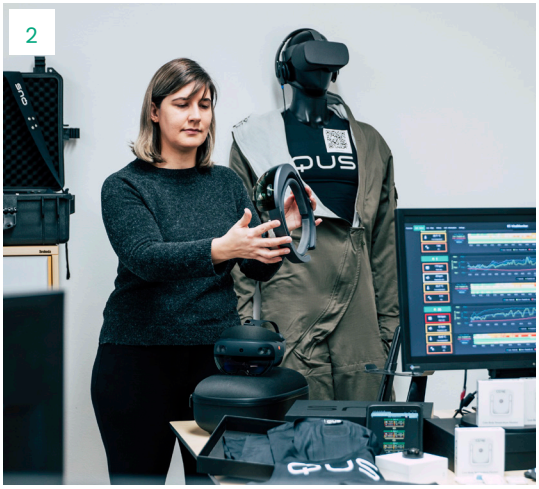
This means that enterprises have to face the difficult task of adapting to the new standard at an early stage, even though some interpretations have not been set in stone yet. Despite these uncertainties JOANNEUM RESEARCH sees great potential in the legislation: „Compliance with AI Act standards can be perceived as a quality criterion which has a positive effect on the market position and acceptance by customers," says Gallé.

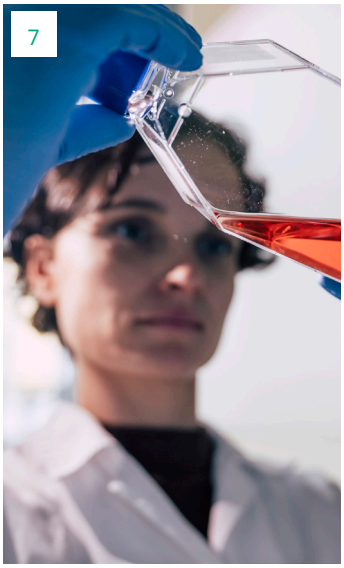
Integrating AI also requires measures in the area of cybersecurity. Peter Weber from the IT Services department emphasises: „From a technological point of view we are in a top position in terms of central services, and we constantly optimise the same. Organisation still has room for improvement." He points out the importance of raising awareness to protect employees against cyberattacks.

In the workflow of JOANNEUM RESEARCH the potentials of artificial intelligence are used while the related challenges are being dealt with responsibly at the same time. The combination of research, strategic planning and adaptation to regulatory framework conditions makes the enterprise fit for the future and a competent business partner.

We are JOANNEUM RESEARCH







1, 3, 7: COREMED runs a new, modern BSL-2 laboratory and uses methods for molecular-biological analyses and the cultivation and analysis of primary cells.

2: In connection with the RT-Vital-Monitor project a team from DIGITAL develops a portable monitoring system which measures vital data of soldiers in real time.

4: Under the CATCH-IN project a research team deals with temporary failures of global satellite navigation systems.

The demonstrator for the 3D-Strain-Sense project

The corner reflectors at Graz Thalerhof Airport help to understand the way in which radar signals spread in the atmosphere.

Photos 1, 2, 3, 5, 6, 7: Bergmann
Photo 4: JOANNEUM RESEARCH/Raiser

approx.
490
staff members

31
nationalities

16%
international
staff members

62
interns and
apprentices

366
staff members
in science

approx.
31%
thereof women
in science

Shaping the future together

882
projects were carried out in 2024

76
ongoing projects under EU programmes

approx.
270
academic lectures

approx.
217
projects commissioned by international customers

approx.
240
publications in journals, books and proceedings

11
awards, thereof 5 international ones

approx.
20
patents

approx.
58
bachelor, diploma or master's theses

469
public presentations and doctoral theses

approx.
58
million euros research output

approx.
9,3
million euros of project funds raised under EU programmes

approx.
2,8
million euros from ESA contracts

Photo: Alexander Müller

In 2024 HEALTH was awarded the Houska Prize for the technology of **open microperfusion** (1st place).

Holding shares together

Affiliates

100 % JR-AquaConSol GmbH	**50,1 %** Virtual Vehicle Research GmbH

COMET CENTRES

9 % ACIB GmbH	**10 %** BEST – Bioenergy and Sustainable Technologies GmbH	**10 %** Know Center Research GmbH	**17,5 %** Materials Center Leoben Forschung GmbH
17 % Polymer Competence Center Leoben GmbH	**15 %** Research Center Pharmaceutical Engineering GmbH		

Participating interests

20 % ALP.Lab GmbH	**12,5 %** CBmed GmbH	**10 %** decide Clinical Software GmbH	**26 %** DIH SÜD GmbH
25 % EPIG GmbH	**14,9 %** FH JOANNEUM Gesellschaft mbH	**10 %** Geo5 GmbH	**5,98 %** Holz.Bau Forschungs GmbH
7 % Human.technology Styria GmbH	**3 %** Pacemaker Technologies GmbH	**10 %** Wood Vision Lab GmbH	

Forming a research group together

JOANNEUM RESEARCH has grown more: by the takeover of 50.1% of the shares in Virtual Vehicle (ViF) in 2024 the research group, to which also JR-AquaConSol belongs, expanded significantly. More than 800 highly qualified staff form a strong research group of national and international visibility.

More than **800** highly qualified staff

With more than 300 employees **Virtual Vehicle GmbH** is the largest research centre for virtual vehicle development in Europe. The research focuses are on integration of numeric simulations and virtual validation in the automobile and railway industries with the objective of designing future mobility to be safer, more efficient and more sustainable.

The investment in Virtual Vehicle constitutes a unique strategic opportunity for both entities and for the research location. It allows the targeted enhancement of synergies and strengthens the research group's positions as an important player in the European research area. The close cooperation with businesses and the industrial sector is expanded in particular in the future fields of digital and green mobility, which means an important contribution to the competitiveness of Styria as a business and science location.

As a wholly-owned subsidiary JR-AquaConSol GmbH contributes its vast experience in the area of sustainable water management to the research group. Its focus is on exploring, protecting and qualitatively and quantitatively securing water resources and assessing infrastructure measures in terms of their impact on water as an asset that needs to be protected.

This will not only strengthen the research base but also intensify cooperation with the industrial and scientific communities, thus constituting a clear stimulus for a targeted enhancement of Styria as a research location that focuses on innovation and sustainable benefit.

Fu

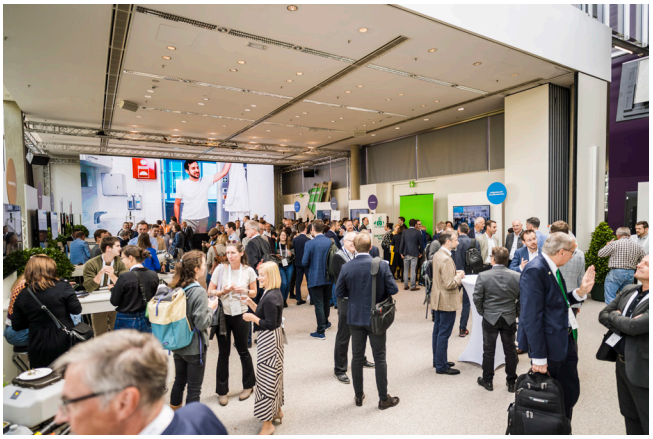
The Future Day of the Southern innovation and business region took place on 9 October 2024 at Messe Congress Graz and brought together approx. 1,200 representatives from the areas of business, science, research and politics. The event was organised for the first time by JOANNEUM RESEARCH and Steirische Wirtschaftsförderung (SFG) together under the motto of #bettertogether, putting the focus on the significance of cooperation across industries, states and countries. Speeches and discussions clearly showed the mutual benefits of synergies between economy and science and the importance of close cooperation for the innovative power of the region and Europe.

International keynote speeches by Jo de Boeck and Isabell M. Welpe shed light on recent developments, from nanoelectronics to artificial intelligence, and pointed out the opportunities for businesses and research institutions. The State of Styria is one of Europe's most research-intensive regions. It aims to further strengthen this position by targeted cooperation projects.

Photos: Bergmann, jack-coleman.com, JOANNEUM RESEARCH/Raiser

ture

#bettertogether



Day

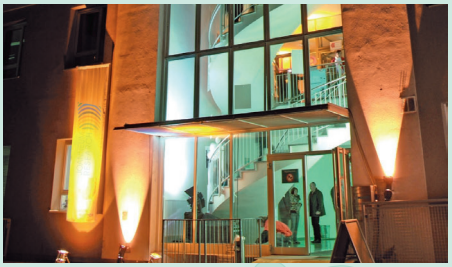
Locations

Graz

Leonhardstraße 59
A-8010 Graz
- Management
- POLICIES
- Staff functions

Zentrum für Wissens- und Technologietransfer in der Medizin (ZWT)
Neue Stiftingtalstraße 2
A-8010 Graz
- COREMED
- HEALTH

Science Tower
Waagner-Biro-Straße 100
A-8020 Graz
- LIFE



Steyrergasse 17
A-8010 Graz
- DIGITAL
- Staff functions

Hilmwarte
Roseggerweg 31
A-8010 Graz
- DIGITAL

Klagenfurt

Lakeside Science & Technology Park
Lakeside B13b
A-9020 Klagenfurt am Wörthersee

- DIGITAL
- LIFE
- POLICIES
- ROBOTICS

Pinkafeld

Technologiezentrum Pinkafeld
Industriestraße 6
A-7423 Pinkafeld

- MATERIALS

Weiz

Innovationszentrum W.E.I.Z.
Franz-Pichler-Straße 30
A-8160 Weiz

- MATERIALS

Niklasdorf

Impulszentrum Niklasdorf
Leobnerstraße 94a
A-8712 Niklasdorf

- MATERIALS

Wien

Sensengasse 3
A-1090 Wien

- POLICIES

Legal Information

Media owner, editor and publisher:
JOANNEUM RESEARCH
Forschungsgesellschaft mbH
Leonhardstrasse 59 | 8010 Graz
+43 316 876-0 | info@joanneum.at
www.joanneum.at

Responsible for the contents:
Heinz Mayer, Managing Director

Contact and editor:
Gabriele Katz, Head of Corporate Communications
+43 316 876-12 05 | gabriele.katz@joanneum.at

Layout
JOANNEUM RESEARCH

Photos
Cover: Jean-Philippe Delberghe on Unsplash
JOANNEUM RESEARCH | Bergmann

Published in: July 2025

Our annual report is also available online:
www.joanneum.at/fileadmin/Media_Center/ Geschaeftsbericht_2024.pdf