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JOANNEUM RESEARCH

JOANNOVUM

THE MAGAZINE FOR TECHNOLOGICAL INNOVATIONS
COOPERATION

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ARTIFICIAL INTELLIGENCE

Cognitive robotics

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IN FOCUS

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Editorial


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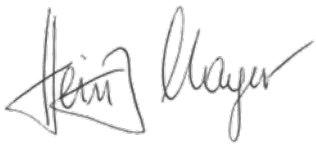
Heinz Mayer
Managing Director, JOANNEUM RESEARCH

Staged jointly for the first time by JOANNEUM RESEARCH and the Styrian Business Promotion Agency SFG, this year's Zukunftstag – Innovations- und Wirtschaftsregion Süd innovation and business event will be held under the banner #bettertogether. Much more than just a slogan, "bettertogether" also sums up the culture that shapes everything we do at JOANNEUM RESEARCH and – in particular – across the southern Austrian business and innovation region. As an applied research company, we play a special role in combining research and business and leveraging synergies. JOANNEUM RESEARCH is a key hub in the network that extends across southern Austria, and further afield, too. We work closely with universities, in particular TU Graz, Med Uni Graz, the University of Graz and Montanuniversität Leoben, as well as the FH JOANNEUM and FH CAMPUS 02 universities of applied sciences. We also cooperate with non-university institutions, including the COMET Centres, Silicon Austria Labs and the Austrian Institute of Technology (AIT). This enables us to implement groundbreaking technologies and innovative solutions at domestic companies. The key focuses are aligned with our business areas: health and care, mobility, politics and society, production and manufacturing, security and defence, environment and sustainability, and space. Alongside our activities in Austria, we are also a driving force in the international research community, and a highly sought-after partner for programmes operated by the European Union – including Horizon Europe and the EDF – and the ESA. This geographical reach and the diverse range of institutions we cooperate with, as well as the outstanding capabilities of our employees, are all key success factors – not only for us, but also for the competitiveness of the entire innovation and business community in southern Austria.



Heinz Mayer

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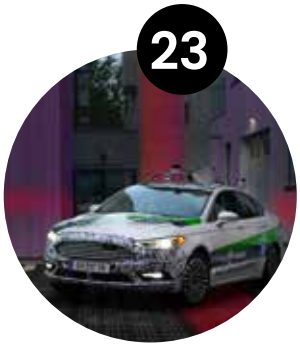

MAST
TRAN

Watersports enthusiast **Michael Ploder** loves challenges and pushing himself to the limit. Born in Graz, he can often be seen driving around with his gear on the roof of his car in Vienna, where he also has an apartment. 50-year-old Ploder spoke to us about how he aims to overcome the demanding conditions and turbulent shifts in his job.

TERING THE SITION...

...calls for lots of bright ideas and hard work. Economist Michael Ploder took over as head of the POLICIES Institute – which has 36 employees spread across three sites in Graz, Vienna and Klagenfurt – on 1 July 2024. Decisiveness and creative drive are key elements in the approach of the new Head of Institute, who has worked in the policy field since 2010. His focus is on understanding, driving progress, working hard and having an impact. Standing still is something he definitely doesn't like.

Interview: Renate Buchgraber

Analysis and evaluations provide guidance and create leeway for adaptations in complex policy environments, as well as supporting responsible handling of public money. The options available for collecting, integrating and using data are increasing all the time. Analysis, policy consulting and policymaking support are already a step ahead of the growing demands being placed on public administration and our society. What is your vision for the POLICIES Institute? We serve as an independent partner for policymakers and office holders, and we want to carry on doing so in the future. The economy, society and public administration are about to be confronted with radical changes – climate-related, geopolitical, economic and social – that will call for systemic transformations. POLICIES is an experienced, forward-looking partner that supports, enables and accompanies evidence-based, academically sound policy development. Our vision is aligned with the requirements of society and we're guided by its demands and needs. We carry out research and technology development, as well as promoting the evolution of ecosystems and domains. This requires an integrated approach in order to overcome the monumental tasks posed by demographic, climate and geopolitical transformation. It's a social challenge that we're happy to take on.

And take that one step further: how do you view the task of overcoming demographic and economic change in connection with JOANNEUM RESEARCH? As far as JOANNEUM RESEARCH is concerned, there is huge potential in supporting social transformation. Our diversity allows us to find creative solutions, but at the same time, as a small outfit we're able to stay in contact with one another and set up flexible teams.

What are the core competences of the Institute for Economic, Social and Innovation Research? As a specialist in economic, social and innovation research, our institute provides administrations and policymakers with support in a variety of areas related to science and the economy. We offer a broad range of services related to research, technology and innovation (RTI) as well as regional policy, but it's also important to us that we operate in different domains – in other words, specific industrial and technology fields and corresponding policy specialisations. We need to build an even broader network so that RTI and economic policy can be aligned with the focuses of specific sectors, like agriculture, tourism and defence. Research, technology development and innovation need to be promoted using a targeted, integrated approach that also includes structural and regulatory adjustments. Instruments – such as research funding with related regulatory changes and structural adaptations – need to be much more closely integrated than has been the case up to now. So in this respect, our job

PHOTO: JOANNEUM RESEARCH/BERGMANN

is becoming bigger and more fascinating. Carried out in conjunction with other JOANNEUM RESEARCH institutes and with external specialists, data analysis and independent evaluations, especially for public-sector clients, are enriching our work. This creates a win-win situation for everyone involved. It's essential that we take an integrated approach in order to meet our ambitious targets.

The experts at POLICIES evaluate, support and accompany policy development. Are you seeing any trends in political decision-making? Definitely. Fortunately, decisions are now taken using evidence-based, considered and ex-ante approaches[1] that take stakeholders into account. Decision-makers are also more likely to have to justify their adoption of these approaches, and underline the careful handling of their remit and of public funds. But this can also deter them from making bold decisions. The overwhelming challenges we are currently addressing – climate change adaptation, demographic transformation and geopolitical changes – require new forms of state intervention and directional measures. In many cases, these will extend far beyond long-established departmental responsibilities or allocations of duties. The population needs to be more closely involved, but at the same time people are overwhelmed in many respects.

What other trends and developments are you seeing in RTI policy? We actively support major developments, in particular transformative policies and directional measures. In the past, the focus was on creating effective frameworks by means of public-sector measures and closing gaps in systems, such as promoting the transfer of ideas inside companies. But these approaches alone are not sufficient to overcome fundamental problems like climate or demographic change.
These problems demand new approaches. Dependency on resources and international supply chains also represents a major challenge. Competitiveness, quality of life and sustainability are all being put to the test simultaneously. As far as these challenges are concerned, new mission-based approaches are being adopted, and the common focuses of public administrations, researchers, entrepreneurs and society are being realigned. Here in Austria, we've got off to a good start in many areas.
Another important area is strategic autonomy and technological sovereignty, where new types of industrial policy are being developed and supported. Here, the emphasis is on creating a new relationship between politics and industry. It's an exciting and highly promising field, where significant efforts are being made to promote innovation and new action programmes.

How would you define mission-oriented policymaking? Mission-oriented policymaking is a new, participative style of policymaking geared towards addressing major, transformative tasks – it's focused on goals and impacts, and straddles various policy areas. This approach need not be confined to the five EU missions, which are focused on cancer prevention, climate change adaptation, ocean and water regeneration, soil health, and climate-neutral cities. Increasingly, many states and regions are developing their own missions, which frequently correspond with those of the EU. Austria is regarded as a pioneer in the European Union. The POLICIES institute has participated in studies and discussions at an early stage, and we have worked with the Austrian Federal Ministry of Education, Science and Research, the Ministry of Climate Action, Environment, Energy, Mobility, Innovation and Technology, and the Ministry of Agriculture to lay the basic foundations for decision-making. One example is the baseline study that was carried out in conjunction with our counterparts from the Austrian Institute of Technology (AIT) on behalf of those three ministries, and with additional support from the health ministry. At present, we are assisting the implementation and adaptation of the EU missions, both in Austria and at the European level. Our wide-ranging involvement and expertise is enabling us to contribute to advances in mission-oriented policymaking by supporting innovative approaches and accelerating the development of instruments and programmes.

> The public needs to be more closely involved, but at the same time people are overwhelmed in many respects.

Can you give us an example of your involvement in mission-oriented policymaking in the EU? We are playing a central role in the partnership that is being spearheaded by the Mission Facility in Austria and is a core element of mission governance. Over a period of four years, we will be supporting the stakeholders for the five EU missions, as well as the Mission Management Unit, which is based at the Austrian Research Promotion Agency (FFG). In our role as a partner, we identify challenges at the intersection of RTI and sectoral policies, promote a whole-of-government approach, and devise impact pathways, including mission design, planning, evaluation and communication.

Our responsibilities include training programmes and citizen participation, and we hold courses for members of the Mission Action Groups. On top of this, our forecasts, monitoring and evaluations support forward-looking planning and assessment. We act as a cog in the mechanism, helping to promote development through our workshops, evaluation of measures and various studies. But our role isn't about being the driving force – instead, we're on hand to offer support in the right places.

This is a more intensive form of participation and involvement. We know what we're doing when it comes to instruments and programmes, and that is something very special.

Which other special projects are you participating in? We're involved at the European level, helping to advance various projects, including the EHESO[2], which POLICIES built the data infrastructure for. On the domestic side, we are assisting the Federal Ministry of Education, Science and Research with the preparations for the 10th Framework Programme. And we also operate internationally, particularly in Germany, where we are supporting the design and evaluation of ERDF programmes in the country's federal states. In connection with the Public Employment Service Austria (AMS) Qualifications Barometer, POLICIES tracks the structural and cyclical changes on the Austrian labour market.

There's also a lot going on in the field of data-based modelling and analysis. For instance, as part of the IMPROFE project, we worked with industry partner Miba Automation Systems, using a data-based model to support optimisation of the manufacturing process for hairpin stators for electric engines. In this particular field, we have significantly enhanced our activities and partnerships in the areas of resource-saving agriculture and plot-specific soil management. This means we are also making a contribution to the EU's soil mission – thanks to technological innovation. Overall, our focus is on effectively combining our data and knowledge of the research and innovation, industry and production, and work and living environment domains, as well as playing a part in devising holistic and transformative solutions. To achieve this, our three research groups[3] cooperate closely with one another, and with numerous external partners.

PHOTO: JOANNEUM RESEARCH/RAISER

POLICIES also helps third countries to build structures that we've had in this country for many years. That's right. As part of a twinning project in Georgia, we made decisive recommendations for strengthening cooperation between science and business. And our recommendations have been implemented successfully. This sent a signal regarding policy development, and represented a commitment to Europe – while people took to the streets to demonstrate against the recurring shifts towards isolation. In Albania, we helped the National Agency for Scientific Research and Innovation (NASRI) to define and improve the frameworks for research and funding – for example, in relation to selection procedures, evaluations and research statistics. Some of the aspects that we take for granted here and in many other places are by no means a given in emerging countries.
Our unique advantage is the ability not just to perform academic research, but also to play an active role in the development of society. Our younger colleagues appreciate this opportunity because they can see more clearly than they would in a pure research setting that their work has a direct, positive influence on society.
Developing the requisite policies calls for the implementation of frameworks and provision of funding, as well as hands-on support for change processes. This means moving in a clear direction, making compromises in other areas, and overcoming the uncertainty associated with change.

Can you have a positive impact on major political decision-making projects as a purported small cog in the machine? Political decision-making processes always evolve over a longer period of time. They are driven forward by coalitions of supporters, but slowed by groups who are more resistant and question the change. POLICIES steps in precisely at the point where a small cog would be missing, in order to keep up the level of momentum. From this point of view, it's very important that we recognise and support trends at a very early stage, and don't just jump on the bandwagon when they are on everybody's lips.

What are the strengths of the POLICIES Institute? Being well versed in start-up policy, higher education policy or collaborative research just isn't enough. Our strength lies in the ability to work as a small group at all levels, thanks to our high degree of self-financing and the resulting focus on demand as well as contract research. The institute's core competences allow us to combine various fields.
We're used to working in challenging environments, so we have an advantage over other organisations who are still working to reach that position. We aim to be an attractive partner and to develop solutions in cooperation with other organisations. Nobody can solve the problem of climate change adaptation on their own. That calls for lots of bright ideas and hard work. Successful change is only possible if it is rooted in decisions taken on the ground. The number of challenges is multiplied in an environment that comprises different structures in Austria's nine federal provinces – so it's important that we remain flexible and agile.

Where would you like to see the institute in five years' time?
In five years I would like to have moved further down the path that we've started out on. And as an employer I would like us to be just as attractive – if not more so – for young researchers. They should build up a passion for realising their potential with us and making things happen. In addition, we want to be just as active on the international stage as we are now.
We're able to make a valuable contribution because we have an international presence, as well as operating on the national level and working for individual regions. I think that being even more firmly rooted in the various sectoral domains, alongside the other JR institutes, will play a decisive role. This will enable us to leverage our capabilities externally, outside the three federal provinces in southern and eastern Austria that own JOANNEUM RESEARCH, and also work more closely with southeastern Europe. For me personally, it's very important that we build a strong network.

Hermann Katz will remain Deputy Director of the POLICIES Institute, while Eric Kirschner will continue as Deputy Director at the POLICIES site in Carinthia.

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1. Ex-ante assessment: prior to implementation, measures are assessed to determine how they can be effectively positioned and embedded in order to deliver the optimum effect.

2. European Higher Education Sector Observatory

3. Technology, Innovation and Policy Consulting; Data Analysis and Statistical Modelling; and Regional Economy and Structural Policy

PHOTO: MICHAEL FIEDLER

Years of success

Under Wolfgang Polt, who served as an authorised signatory, Ethics Officer, Scientific Ombudsman and Director of POLICIES, the institute raised its international profile and carved out a strong position on the market. He has now handed over responsibility for the institute to Michael Ploder.

Wolfgang Polt can look back on an outstanding professional and scientific career. He has worked for various organisations, including the Austrian Academy of Sciences, the Austrian Research Centre in Seibersdorf and the Organisation for Economic Co-operation and Development (OECD). Under his management, POLICIES has become one of Austria's top research and policy consulting organisations, as well as a leader in research, technology and innovation policy evaluation. He was responsible for coordination of the Austrian Research and Technology Report for many years, and was also involved in establishing the Austrian Platform for Research and Technology Policy Evaluation.
In his role as Ethics Officer and Scientific Ombudsman, Polt played a key role in drawing up JOANNEUM RESEARCH's ethics guidelines. He also took part in discussions on the drafting of Austria's Responsible Research and Innovation guidelines, including as the representative of JOANNEUM RESEARCH at the Austrian Agency for Scientific Integrity. In recent years, he has focused on mission-oriented policymaking as a means to bring about ecological and digital transformation. He has carried out theoretical and practical work for the EU, the OECD and the Austrian government, as well as supporting the design of related policies. Wolfgang Polt has numerous academic publications to his name, with an emphasis on innovation systems, and he co-edited a series of books entitled Innovationsmuster in der österreichischen Wirtschaftsgeschichte (Innovation Patterns in Austrian Economic History).

SAFEGUARDING WATER SUPPLIES WITH AI

When it comes to water, we are facing some significant challenges. Climate change is endangering the supply of a commodity that we almost take for granted, while the increasing role of the digital world in our lives also means that vast quantities of this valuable resource are being used up. Researchers from the DIGITAL Institute are working with partners from the science sector and the water industry to find solutions to one particular part of the problem. Under a project called KI-WAZU, experts are utilising artificial intelligence (AI) as well as acoustic and visual monitoring to identify careful, forward-looking approaches to water management.

Text: Elke Zenz

Structure-borne sound sensors, cameras and anomaly detectors are now able to identify malfunctions at such an early stage that issues can be spotted before significant damage occurs.

Stefan Grebien of the Intelligent Acoustic Solutions research group is the coordinator for the KI-WAZU project, in which several partners are collaborating with a view to improving future water supply management. "We're working with the Intelligent Vision Applications research group to develop a real-time acoustic and visual monitoring system for the key sections of a water treatment plant as well as the pump stations. Thanks to 24/7 acoustic and visual monitoring – using structure-borne sound sensors, cameras and anomaly detectors – it's possible to detect malfunctions immediately and isolate anomalies early on. This means that repair work can be initiated – for instance, by ordering replacement parts – before a component actually breaks down," explains Grebien, an acoustics specialist. Suitably trained AI makes forecasting like this possible. By interpreting acoustic and visual signals, the AI learns that the operator needs to be warned before an actual outage occurs.

This is just one aspect of the groundbreaking KI-WAZU project. Due to climate change phenomena such as heavy rains and droughts, and related changes in consumer behaviour, new forecasting models have become necessary to predict the availability of water resources. And this is where project partner JR-AquaConSol comes in. As Hans Kupfersberger, who has been working with groundwater models for many years, explains: "We can calculate the future availability of water based on measurements of the water table in water level observations, weather forecasts, and water consumption forecasts, which allows us to draw up recommendations for the managers of water supply companies." The forecasting models are provided to the water utilities by the company DATAVIEW, which utilises innovative visualisation techniques. According to Franz Zeilinger of DATAVIEW: "In combination with the AI-based monitoring system, the forecasting models open up completely new options for water management. The results of the AI methods are presented in the form of recommendations, complete with information on their effects. The supplier always has the final say, including with regard to these new capabilities."

The KI-WAZU project partners are DATAVIEW, JR-AquaConSol and SETEC. The project clients are the Leibnitzerfeld Süd, Südliches Burgenland and Unteres Lafnitztal water authorities, and the municipality of Gmünd.

Groundwater issues in Europe

The European Environment Agency (EEA) has warned that groundwater supplies in many countries have been depleted as a result of overuse and climate change. Parts of southern Europe are increasingly being hit by water shortages, while regions further north are seeing more frequent flooding. Adapting to these changed conditions will require comprehensive action, including reducing leakage as well as water recycling.

A particularly dramatic example of the problem of water scarcity comes from Spain. Large data centres in the country consume massive amounts of water, putting already diminished water supplies under even greater pressure. In some regions, these facilities can consume as much as 600 million litres per year – equivalent to the water consumption of around 13,000 households (source: Der Standard).

These developments underline the urgent need for innovative approaches, such as AI-supported water management, in order to safeguard Europe's water supplies in the long term.

PHOTOS: JOANNEUM RESEARCH/RAISER

ARTIFICIAL INTELLIGENCE:

TURBO BOOST FOR SMART PRODUCTION

Cognitive robotics is the name of a pioneering technology that is helping to revolutionise production processes and boost Austrian manufacturers' ability to compete. The idea is that the addition of artificial intelligence to the equation will enable robots to communicate intuitively with human operators in future. A combination of hand signals and spoken language allows us to control robots, enhancing manufacturing flexibility while also cutting lead times. AI expert Thomas Gallien is establishing a competence group at JOANNEUM RESEARCH in Klagenfurt to take things to the next level.

Interview: Elke Zenz

Your vision is of flexible manufacturing processes where people tell – or show – robots what to do. The idea is that intuitive communication between humans and machines will make production flexible and dynamic. Both of which are extremely important in enabling Austrian companies to hold their own on the global market. How exactly could it work? The latest breakthroughs in language-based generative AI are real game changers when it comes to working hand-in-hand with robots. Text-based image generators like DALL-E2, Midjourney and Stable Diffusion interpret text prompts before going on to generate the image most likely to match the input. This is made possible by something called visual foundation models (VLFMs), which give images a meaning and enable machines to process this information. The special feature of this technology is the incredibly large volume of data that the models are trained on. To cite one such example, the data set for OpenAI's Contrastive Language Image Pretraining (CLIP) model comprised more than 400 million text-image pairs. A number of these VLFMs are in the public domain and are increasingly being used in machine vision algorithms. This means that once a robot has been "fed" this incredible corpus of image-text pairs, it is in a position to read a situation with the help of a camera and interpret it in real time. To put it another way, the robot immediately understands the scene in front of it. It knows what a glass, a table or a person is, and responds to visual commands captured by the camera. This functionality dispenses with the need to program basic tasks, and this is what elevates collaborative cognitive robotics to a whole new level.

What will it take to integrate modern robot systems into dynamic production processes? It's definitely a major challenge, given that dynamic production processes require such a high degree of flexibility and adaptability. A central aspect is real-time perception, interpretation and decision-making. To make this possible, autonomous robot systems process a wide range of sensor data from devices such as cameras, 3D scanners and radar sensors. The

PHOTO: JOANNEUM RESEARCH/BERGMANN

PHOTO: FIEDLER

Thomas Gallien is an AI and reinforcement learning expert. He joined JOANNEUM RESEARCH after spells at Infineon, Silicon Austria Labs and Virtual Vehicle. Part of the AI initiative at the institute's ROBOTICS Institute, he is building up a special focus area in this particular field.

term cognitive robotics applies to robot systems that primarily utilise machine vision methods to process data before arriving at an appropriate interpretation of the scene at hand. Semantically, it is linked to the visual language foundation models, which industrial robots can be equipped with. It's a genuine revolution!

What role could this collaborative synergy between humans and machines potentially play in modern production processes? The advantages are clear enough: robots could come preinstalled with extensive basic semantic knowledge, paving the way for the design of zero-shot models. These would enable them to carry out tasks that they have not been specifically trained to complete. This is an extremely important step for modern production processes, as there is simply no longer enough time for lengthy programming work. In future, robots will be able to find their own way around dynamic environments thanks to their ability to perceive and interpret their surroundings in real time. Instructions can be issued verbally or through hand signals, which allows for intuitive and natural control of robots in complex production environments. These new features significantly expand the potential applications for assistive production robotics.

Could you give us an example? Thanks to the turbo boost that AI provides, it is now possible to talk to a robot and tell it to perform various actions, such as picking up objects. That's it. The robot will do what it is told to do. Previous object-detection models required complex pre-training. The major disadvantage here is that the data sets need to cover each of the different object classes to a statistically meaningful degree. As a result, these methods are unable to adapt to previously unknown environments. On top of that, annotating each individual data set is a tedious and time-consuming process. The difference in terms of the amount of time required is plain to see.

What is the situation in Europe, and in Austria specifically? The effects of digitalisation and, in particular, rapid advances in the field of artificial intelligence extend to all areas of our lives and are behind profound changes in the manufacturing landscape. And it goes without saying that this applies to Europe, too. But Europe is going to have to up the ante if it is to keep pace with the USA and China, where huge sums are being invested in AI. We are seeing industrial companies based in Austria sourcing their expertise from the USA – although that's a pity, it also an incentive for us to sharpen our focus on collaborative cognitive robotics here in Austria.

At JOANNEUM RESEARCH ROBOTICS we specialise in collaborative robotics and flexible production methods. Now, the logical extension of this is to take the available expertise up a notch and build on it with the help of artificial intelligence. By working with DIGITAL (Institute for Digital Technologies) and MATERIALS (Institute for Sensorics, Photonics and Production Technologies) and drawing on the infrastructure available to us, we are in the ideal position to take robotics to the next level.

JOANNEUM RESEARCH COREMED

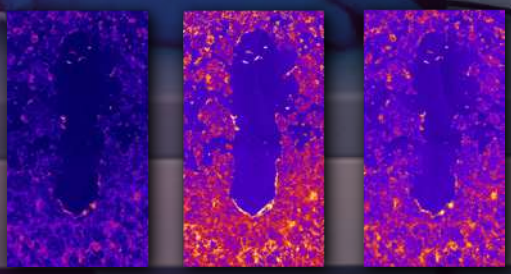
Testing active agents for wound healing

At the Centre for Regenerative Medicine and Precision Medicine, we focus on techniques for healing the human body with the help of regenerative technologies – instead of simply treating symptoms. Our research is centred on gaining deeper insights into core processes such as wound healing, scar formation and skin ageing. And the expertise we build up feeds into the development of new, customised treatments, with a view to promoting precision medicine. We work with scratch assays in order to test active agents for wound healing.

How does it work and what are the advantages?

- A wound is simulated by making a scratch in a confluent cell layer.
- Cell proliferation and migration within this area can then be observed and analysed.
- Scratch assays deliver precise, reproducible results that make a decisive contribution to research into wound healing mechanisms and cell motility.
- Our approach allows for rapid testing of new active agents.
- Animal testing is avoided.
- This cost-effective method also enables simple, direct monitoring of cell migration.

Scratch Assays



Find out more:

Contact:
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Better together

The Zukunftstag – Innovations- und Wirtschaftsregion Süd innovation and business event will take place on 9 October in Graz. For a whole day, everything at Messe Congress Graz will revolve around the topic of cooperation. Representatives of the owners of JOANNEUM RESEARCH outline why the entire region benefits if business and science work together.

Barbara Eibinger-Miedl

State Councillor for Economics and Research Styria

PHOTO: LUNGHAMMER

Cooperation between science and research, and business and the public sector is key to Styria's success as a research and innovation location. The Styrian culture of cooperation has emerged as a genuine trademark over recent years, and has come to serve as a model for numerous other regions. In light of this, we will continue to build on this effective approach and work on taking it to the next level. Ultimately, though, we will only be in a position to meet the major challenges of our time – such as the digital or green transformation – if we work together. In addition, we will also continue to expand the scope of our cooperation activities to include other federal provinces – the Forschungsachse Süd southern research axis with Carinthia and Burgenland being a case in point.

The topic of cooperation is also at the heart of this year's Zukunftstag event. It is visible in various ways, including the fact that the event is being jointly organised – by the Styrian Business Promotion Agency (SFG) and our research company, JOANNEUM RESEARCH, for the first time. It is also reflected in this year's clear focus on established and new partnerships. The Zukunftstag is the largest platform for connecting science and business in Styria. It helps us to further enhance the province's international profile when it comes to research and innovation, and enables us to continue on our successful path in the future.


PHOTO: HELGE BAUER

Gaby Schaunig

Deputy
Governor of Carinthia

Innovation and cooperation are the core topics that have been driving Carinthia's development since 2013. Partly through establishing and expanding key non-university research institutes such as JOANNEUM RESEARCH, and partly through the establishment of and investments in clusters and networks – both at the national and international level. In parallel, the completion of the Koralm Railway will give rise to a new economic area – Wirtschaftsraum Süd – with access to the Baltic-Adriatic axis, which has a catchment area covering more than 1.1 million people. This will help us to achieve the oft-cited critical mass needed for greater international visibility and appeal. The Koralm Railway will be an economic and employment driver as well as a catalyst for cooperation and innovation in southern Austria, which has been confirmed in various ways – not least by a comprehensive study conducted by the POLICIES Institute at JOANNEUM RESEARCH.

Thanks to its broad portfolio of research topics, JOANNEUM RESEARCH is a valuable partner that will help business and policymakers shape both the green and digital transformations. Adopting a conscious and well-informed approach to managing this process of change is essential for the positive and sustainable development of southern Austria. The future is not something that just happens – it is what we shape today. Whether it's building infrastructure for generations to come, conducting research into technologies designed to tackle the challenges of our time, or – critically – ensuring that our children can enjoy a good upbringing. I firmly believe that we can do all of this better if we work together, cooperate and all pull together in the same direction.


PHOTO: LAND BURGENLAND

Leonhard Schneemann

Provincial Councillor for Research Affairs and Digitisation Burgenland

In today's world, we are confronted with complex global challenges. Which is why science and research are so invaluable for the society we live in. They provide the basis for innovative approaches in many areas, including business, health, environmental protection and technology. And innovations are especially important in times of uncertainty, as a way of securing jobs in the region in the long term. After all, research and development form the foundations for technological change, while also leading to economic growth and increasing the attractiveness of a location for companies.

Besides the digital transformation, the green transformation is bringing fundamental changes to our economic and social system in its wake. And that calls for numerous technology, manufacturing and lifestyle innovations. However, it is precisely this shift that compels us to think outside the box and actively focus on cooperating with one another. Working with other stakeholders makes developing and implementing innovative solutions possible. Cooperation is the key to success. It allows us to unlock synergies, pool resources and transfer knowledge. In R&D in particular, cooperation projects are invaluable. They drive progress and lay the groundwork for trailblazing innovations.

Our own partnership with Styria and Carinthia is a shining example of what working together to develop innovative, long-term solutions is capable of achieving. Over the coming years, the Forschungsachse Süd research hub will ensure that numerous innovative projects are developed and implemented in these groundbreaking domains, in order to make our province of Burgenland an even more attractive location for research and business.

ISABELL M. WELPE

"We talk too much and act too little."

Isabell M. Welpe issues a plea for greater freedom and dynamism in Europe. A German-citizen, she is an expert on digital transformation in business, professor at the Technical University of Munich and one of the speakers at the 2024 Zukunftstag event. Her key points are outlined here.

Text: Sigrid Gaisch-Faustmann

On the digital transformation in the world of work: The most important innovations of the past 15 years have not been technologies, but new ways of working and thinking that give rise to new business models. In the past, the most valuable companies in the world were the technology leaders. But today it is companies that offer tailored solutions for customers – whenever and however they need them. In many cases, companies founded before 2006 were characterised by things that no longer constitute success factors today: while having lots of employees on permanent contracts used to be a sign of strength, these days a large payroll is often simply expensive, inhibits flexibility and makes it more difficult for businesses to make the necessary adaptations to established models. Regulation was once seen as a protective measure against things like the rise of digital companies – but today we know that it has not worked. The principle of compartmentalising company information has had its day in many industries because being as transparent as possible and sharing knowledge is more advantageous. Anyone who wants to come out on the winning side needs to be prepared to question everything: how we think, work, lead and organise.

On the potential of blockchain technology: Blockchain technology has the potential to completely transform the exchange of goods, services, rights and money. People who create real assets and intellectual property will be among the main beneficiaries of this new virtual technology. The revolutionary innovation behind blockchain is that we no longer need intermediaries. After the hardware and software revolution came a wave of platform companies such as Google, Facebook and the like, which operate with centralised data storage that gives them a great deal of influence. Blockchains, by contrast, clear the path for a decentralised economy: data, information and rights can be managed in the form of legally binding smart agreements concluded between individuals – that is to say, much smaller entities. Business transactions and information are at the heart of economic activity. If sending money or transferring rights of use or disposal becomes as easy as sending an email on the blockchain internet, it will trigger a paradigm shift.

On the challenges in Europe: Europe has a great deal going in its favour, primarily a very good training environment that helps to produce outstanding talents and specialists. Secondly, Europe is a continent that is defined by the rule of law: there is a prevailing principle of trust in the economy, agreements are honoured and the legal framework is binding.

"We train outstanding specialists in Europe. And we have to do everything we can to keep them here in Europe." — ISABELL M. WELPE

None of which can be taken as read on a wider, global level. Our problem is the human factor: we are unable to keep hold of the talented people we educate and train; instead, we end up losing them to other locations, chief among them the USA. There are attempts to respond to democratic change by getting students from China, India or Turkey to attend our specialist institutions. But we are still unable to meet demand fully. And on top of that, we are not a very attractive prospect for skilled workers from abroad: besides the rising cost of living, this is mainly due to excessive red tape – the bureaucracy that slows everything down and makes everything that much more difficult. At the end of the day, it is talented individuals who are behind success, innovation, new companies and business models. So the question is not just what resources and people are available to me at a given location, but how much room for manoeuvre do I give them so that they can make an impact? As one joke puts it, in which the USA, Asia and the EU throw a party together: the USA brings the software, Asia the hardware, and the EU says: "I'll bring the regulations."

On the power of action: "We talk too much and act too little." We often regulate too much and enable too little. We're not lacking the talent, resources or opportunities! So we would be well advised to adopt the American "Let's do it!" mentality. Regulation and controls can still make sense and be appropriate – provided that you don't end up holding yourself back as a result. Data protection is one example that illustrates this kind of approach in Europe: we can't afford to screen ourselves off from everything, instead we should use the data sensibly in a way that benefits all of us. Connections, dialogue and networks – as we've experienced at the Styria's Zukunftstag – are what propels us and does us good. The importance of cooperation and communication has increased enormously. It's about expressing a certain culture and becoming active, leading by example. If I want to support start-ups, I invest in good ideas myself, as far as I have the opportunity to do so. Take action and stop all the talking is my urgent appeal to us all.

The original article was written for the Styrian Business Promotion Agency (SFG) website and is republished here as part of the 2024 Zukunftstag cooperation.

PHOTO: WELPE

Prof. Isabell M. Welpe heads the Strategy and Organisation Research Group at the Technical University of Munich. Her current projects focus on the digital transformation of companies, the impact of digital technologies on businesses and organisations, and the future of leadership and work/organisational design. Isabell M. Welpe is on the board of the Centre for Digital Technology and Management and a member of Münchener Kreis, an association which styles itself as one of the leading German platforms for "designers and decision-makers in a digital world". She will be a guest in Styria for the Zukunftstag future day event and will give one of the two keynotes.

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HERMANN STEFFAN

A question of trust

Hermann Steffan is Professor of Vehicle Safety at TU Graz and Scientific Director of Virtual Vehicle Research GmbH.
He is also Austria's representative on the Euro NCAP committee.

Today more than ever, driving rapid implementation from the initial idea through to utilisation on the market is critical for the success of any innovation. And for more complex systems and projects, this is almost entirely predicated on cooperation between complementary partners whose work is rooted in mutual trust.

Safety Labs Austria – which is now accredited to rate new vehicles for the European New Car Assessment Programme (Euro NCAP) – is a prime example of this in action. Euro NCAP evaluations are the global standard for assessing the safety of cars and lorries. In addition to occupant safety, the tests also take "partner protection" into consideration, i.e. the safety of other groups including pedestrians and cyclists.
At Safety Labs Austria, the DSD test centre partners with ALP.Lab for active safety, TECCON Austria GmbH for passive safety, as well as the VIRTUAL VEHICLE research centre and TU Graz, putting their collective expertise to work in the field of virtual testing. This cooperation saw the Austrian Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology become the eighth state institution to be made a full member of the Euro NCAP programme.
The expertise and methods developed in the virtual testing of passive and active vehicle safety in particular are crucial to ensuring that radically new approaches are not just available, but actually accepted and implemented by the various experts working in the relevant international institutions. This approach massively increases flexibility, reliability and efficiency when it comes to safety assessments both for individual components and complete vehicles.
A willingness to cooperate and take a bold viewpoint that broadens technical and geographical horizons is a core building block for the kind of outstanding applied – and, above all, effective – research conducted at TU Graz and the VIRTUAL VEHICLE centre. From the outset, the stated aim was to work there in international partnerships and innovation networks.

PHOTO: VIRTUAL VEHICLE

PHOTO: VIRTUAL VEHICLE

FASHION INDUSTRY:

Robots for the textile industry

Making the textile industry more sustainable – the goal at the heart of the multi-province CoboSort research project. With the support of a robotics system, items of clothing are automatically sorted, no matter whether they are fully packed, partially packed or not packed at all.

Mountains of garments end up dumped in remote locations around the world because sorting and recycling is widely seen as unprofitable. But now cost-effective automated sorting has the potential to make the fashion industry more sustainable.

Text: Petra Mravlak

Olaf Kähler is a key researcher at DIGITAL and a 3D data interpretation specialist.

Sorting returned and pre-owned garments from collection bins is a repetitive, labour-intensive and exhausting task for workers. But now the introduction of collaborative robots (cobots), also known as companion robots, that combine image processing sensors, grab arms and AI is providing a viable alternative. It is also expected to have a positive impact on the distribution of second-hand items on the fashion market, and is opening up additional possibilities for affordable business models that are centred on a low ecological footprint.

CoboSort: recognition, handling, discarding and learning

The focus of CoboSort is on machine learning models and robotic grippers as well as their integration into a reliable and comprehensive collaborative robot system. This enables automated picking for use in the sorting of fully, partially or non-packed items of clothing. "This is becoming increasingly important in the online retail era because large quantities of returns are generated – and in many cases they are no longer packaged properly," explains Olaf Kähler from DIGITAL. An AI-supported, intelligent image recognition system (for garment identification) and a gripper system work together to sort the clothing. All of this takes place in an environment in which humans and robots work directly alongside one another. "Our institute's contribution to the project is the software, which can be compared to a brain that tells the robotic arm where to reach next," Kähler says. "The difficulty here is that garments are soft and cannot simply be picked up with a suction pad if they're not packaged in a plastic foil like new items are. Ensuring that items are picked up and placed on the conveyor belt individually is also critical, since double picks can trigger a backlog at a later stage."

Eco-friendly business models

The collaborative robot system is able to sort mixed and randomly arranged packages of clothing, requires little space, is modular and safe, and its functions are reconfigurable. It represents a relatively moderate investment compared with the sorting solutions currently on the market. The system also opens the way for decentralised and flexible redistribution systems that support new forms of e-commerce involving unworn or pre-owned clothing, as well as recycling. Cutting the continuous production of new garments also lessens the industry's impact on the environment.

> "The software can be compared to a brain that tells the robotic arm where to reach next."

Shift in the fashion industry

This new approach unlocks fresh synergies between fashion companies and consumers by pushing down the production costs for new clothing while indirectly reducing both the use of raw materials and waste generation. It also brings a number of positive social effects: instead of being assigned exhausting, repetitive tasks, workers are given a more proactive role to play. Using an interactive interface which can also be operated by non-specialists, they help to train the machine learning model, and are also on hand to support the cobot in the event of any errors. A number of major international fashion chains have already shown an interest.

Project partners

UNIMORE – University of Modena and Reggio Emilia – Italy (Modena)
Mobile Biometrics – Spain (Barcelona)
ShonMott – Spain (Barcelona)
KattyFashion – Romania (Iași)
SIR – Italy (Modena)

CoboSort is co-financed by EIT Manufacturing and the European Union
www.cobosort.unimore.it

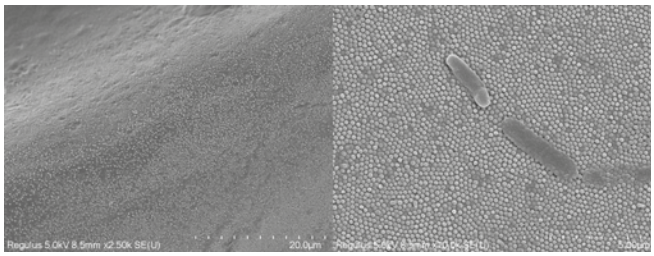
AI-GENERATED PICTURE GALLERY: PHILIP RAISER / JOANNEUM RESEARCH

BIONICS

The nanostructure of cicada wings

In her Master's thesis, Tina Spirk looked at how pathogenic microorganisms can be eliminated from various surfaces including mobile phones and food packaging. The fascinating nanostructure that makes up the surface of cicada wings served as a model.

Text: Elke Zenz



Special surface structures cause bacteria to die as they overstretch when trying to cling to them
.

Tina Spirk completed her Master's thesis on antibacterial surface structures at the MATERIALS Institute.

Cicada wings contain cone-shaped nanostructures that act like tiny bactericidal needles by overstretching or even piercing the membrane of individual bacteria. These nanostructures are also hydrophobic, which means that they can repel water, creating a self-cleaning surface as a result. Researchers at the JOANNEUM RESEARCH MATERIALS Institute put these natural structures under the microscope before going on to artificially recreate them in the lab. Research group leader Barbara Stadlober explains the process: "We transferred the nanostructure of the cicada wing surface onto a larger film using a procedure known as roll-to-roll (R2R) UV nanoprinting. This enables the efficient production of an artificial cicada wing film which, when applied to the surface of everyday objects, items of furniture or finishes in public transport, gives them antibacterial properties without the use of chemicals, and is also water-repellent and anti-reflective."
The researchers demonstrated the surface's hydrophobic properties through the measurement of a high angle of contact for water and oil droplets on the artificial cicada wing film. Light reflection was reduced by one to two percent thanks to the nanostructured film surface, a finding confirmed through optical transmission measurements. In addition, various tests including bacterial colony counts, fluorescence and scanning electron microscopy were conducted to determine the behaviour of bacteria on the films bearing the nanostructure. It also emerged that the cicada wing structures lead to a significant die-off of gram-negative bacteria, such as E. coli. These pathogens overstretch their cell membrane in an attempt to cling to the flexible nanocones, which ultimately causes them to die.

How is the structure added to the film? Committed to pursuing a sustainable approach, the researchers used a bio-based UV coating consisting mainly of soybeans and castor oil, as well as pyruvic acid as a bio-based, light-sensitive starter for polymerisation. There are multiple steps to replicating the complex hierarchical structure of a cicada wing, including fixing and planarising the wing as well as different non-stick coatings. Challenges during the upscaling process, which include incomplete dampening of the nanostructure and accumulation of paint residues, were overcome through iterative improvements. The interplay between the varnish, non-stick coating and curing parameters needed to be optimised to facilitate clean stamp removal and ensure optimal impression quality when producing the large, final stamp, which was created using step & repeat UV nano-embossing.

Produced continuously with this stamp in a roll-to-roll process, the film roll has a slightly non-homogeneous nanostructure, which is caused by the different heights (up to 140 nm) and angles of the nanocones it replicates. Even so, the R2R cicada wing film has promising hydrophobic, antireflective and antibacterial properties, which are similar to those of the original biological cicada wing. "Application of our research could potentially have a major impact in numerous different areas, from medical technology to food packaging. Our goal is to bring the technology to market maturity and make a significant contribution to improving hygiene and safety standards," says Tina Spirk, looking to the future.

ILLUSTRATION: JOANNEUM RESEARCH/RAISER

Sebastian Seebauer is an environmental psychologist whose work centres on assessing the impact of consumer-facing climate policy. He is heavily involved in transdisciplinary climate research with a focus on Austria and Europe, including in his role as a member of the scientific committee of the 2022 Austrian Klimarat citizens' assembly.

CLIMATE CHANGE ADAPTATION:

CHANGE ON THE GROUND

Municipalities use local expertise and cooperation to take action in the face of climate change. LIFE set out in search of answers to the question of why some local authorities take a more active approach than others.

Text: Elke Zenz

Climate change poses a number of major challenges for communities around the world. Local authorities in particular are being called upon to institute climate change adaptation and mitigation measures. Now, researchers from JOANNEUM RESEARCH LIFE, BOKU - University of Natural Resources and Life Sciences, Vienna, and the Bruck an der Leitha Energy Park, working together on the ACCORD (Aligning risks and coping appraisals to kick off local climate action) research project, are investigating why some municipalities take a more active approach to climate protection than others, while also looking at ways to develop coping strategies and a common understanding of climate risks.

Research approach and methods

The ACCORD project brings together two research strands: Climate Governance Capacities and Protection Motivation Theory, or PMT for short. "Governance capacities" is the term used to describe the structures, resources and networks needed for effective political action. Originally from the health sciences, PMT explains protective behaviour through the prism of threat appraisal and coping appraisal options. Six municipalities in the Marchfeld and Römerland Carnuntum regions of Lower Austria were selected to test these theories at a local level. These communities are highly exposed to climate-related natural disasters such as heatwaves, drought and flooding.

Participatory process

One central component of the project is the focus on participatory involvement of local stakeholders. Workshops and risk analyses were carried out in two of the municipalities to establish a common understanding of climate risks. With the support of the Federal Environment Agency's "natural hazard precaution check" tool, the municipalities mapped their present-day and future

climate-related risks and pinpointed specific risk-reduction measures. This process is supplemented by a series of qualitative interviews with key stakeholders from the third sector as well as people working in agriculture, the emergency services and politics. Environmental psychologist and LIFE project manager Sebastian Seebauer was put in charge of conducting and analysing the interviews: "It became clear that perceptions of risks – as well as the willingness to implement measures – vary greatly from municipality to municipality.
The threats posed by extreme heat and droughts are still not seen as being very severe. There was a shift last year, though, because it was a dry year. But this year, the rainy spring has pushed this threat into the background." The research team was also able to identify the extent to which collective action is conditional on local social networks. "Key individuals, such as mayors or local environmental councillors, play a central role in raising climate-related topics. We call them 'policy entrepreneurs'. What was surprising, however, was that these innovative individuals are only effective if they are able to connect with local social structures that go on to spread their ideas. If this part of the equation is missing, engagement with the topic ebbs away," Seebauer explains.

"The threats posed by extreme heat and droughts are still not seen as being very severe. There was a shift last year, though, because it was a dry year. But this year, the rainy spring has pushed this threat into the background."

The importance of collective action

Collective action at the local level has a central role to play in the fight against climate change. "As part of our experience of working on the project, we were confronted with the fact that, for the majority of the municipalities that were surveyed, climate change adaptation is a less pressing topic than more immediate concerns such as daycare, unwanted immigration and the closure of the local supermarket. A shared understanding of the issues – and possible solutions – is an essential starting point for joint climate action."

Better together

The effectiveness and long-term impact of measures can be enhanced through the involvement of the community, as well as by drawing on local expertise. The success of climate protection and climate change adaptation measures largely hinges on the willingness and ability of municipalities to pinpoint risks and take action together. After all, it is only through a common understanding and coordinated action that municipalities will be able to meet the challenges of climate change.

Hans-Peter Ellmer is a researcher in the International Climate Policy and Economics group. He was responsible for the ACCORD project podcast.

ESSENTIALS

Podcast: Klima Praxis – identifying and overcoming local climate threats (German language)

Heat, drought, heavy rainfall and loss of biodiversity – small and medium-sized municipalities in Austria in particular face a host of challenges when it comes to climate change mitigation and adaptation: what can we do? What should we do? And where should we start?

But there are certainly good examples out there of a proactive approach to climate action at the local level. In this four-part (German-language) podcast series, a group of experts with a proven track record in this area report on some of the success stories and challenges as well as the support options that are already available. It also shows how decision-makers and local people can successfully initiate or continue to build on the positive changes in their community.

The Klima Praxis podcast is part of the ACCORD project, which is exploring the question of why some municipalities take climate protection and adaptation measures while others are not doing anything.

PHOTO RIGHT: JOANNEUM RESEARCH/BERGMANN PHOTO LEFT: FIEDLER

TWINS!

The municipality of Frantschach-St. Gertraud is having twins! Digital twins. Together they are revolutionising road repairs by enabling precise analyses and predictions based on evidence of wear. DIGITAL's Digital Twin Lab is part of the project.

Text: Elke Zenz

The municipality of Frantschach-St. Gertraud in Carinthia has entered into an innovation partnership with JOANNEUM RESEARCH which will see it use the Digital Twin Lab and the data generated by it to help optimise the way it plans its infrastructure repair and revitalisation measures.

Under the project, a team from JOANNEUM RESEARCH is using a surface condition assessment vehicle to carry out a high-precision 3D survey (Digital Twin Lab) of the municipal roads and subsequently create a digital twin of the entire road surface, which provides a detailed visualisation of any damage it finds. This information is then evaluated with the support of AI algorithms and the precise models they create are used to optimise planning. Patrick Luley, head of the Digital Twin Lab in Carinthia, explains: "We're working on the development of AI-based detectors and classifiers for road damage that can access 3D survey data and automatically determine the condition of the road surface." The advantages of this technology are obvious: damage is identified at an early stage and repairs are planned efficiently. This saves time and money. At the same time, precise planning enhances safety as roads can be better maintained, meaning that damage as a result of wear and tear, as well as road closures can be kept to a minimum.

How does it work? Every centimetre of the approximately 60 kilometres of municipal roads in Frantschach-St. Gertraud are driven along once, in both directions. The process only has to be repeated if there is so much traffic that individual vehicles obscure damage to the surface. The outcome is a grid from above where colour is used to indicate any damage. A traffic light system is used to show which damage is most critical.

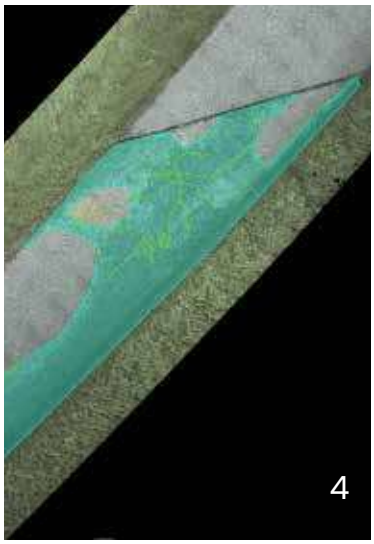
Impressed by the successful innovation partnership, Mayor Günther Vallant says: "The targeted data from the Digital Twin Lab puts us in a position to create an objective assessment of the damage and gives us a decision-making aid that lets us prioritise upcoming repairs. This allows us to put the budget to work in a tar-

geted, transparent and prudent manner." Daniel Fellner, the Provincial Councillor responsible for the roads, confirms: "Using data from digital twins is a cost-effective way of monitoring the condition of roads and it should be employed more frequently going forward. Taking care of the worst of the damage first makes the roads safer and saves money."

A glimpse of the future reveals even more potential. Autonomous systems in which robots work independently could soon take over road repairs. They could use the data from the digital twin to identify damage and repair it directly at the affected location. Even though these technologies are still in the development phase, the various pilot projects and prototypes are showing promising results. The trends towards smart, connected cities suggest that AI and digital twins are poised to soon start playing a central role in road maintenance.

Patrick Luley
heads the Digital Twin Lab in Klagenfurt.

"We are developing AI-based detectors and classifiers for road damage that can access 3D survey data and automatically determine the condition of the road surface."



1. The Digital Twin Lab team: Patrick Luley, Werner Pretscher and Daniel Maurer (l-r)
2. Everyone involved in the innovation partnership: Provincial Councillor Daniel Fellner, Second Deputy Mayor Nina Asprian, Mayor Günther Vallant, the JOANNEUM RESEARCH team and Head of Office Roland Kleinszig (l-r)
3. The Digital Twin Lab's measuring vehicle will cover around 60 kilometres of roadways, capturing the surface with millimetre precision.
4. Close-up of road damage

PHOTOS: JOANNEUM RESEARCH

CHANGE OF


Photo: Marija Kanizaj

Ariane Pfleger

Managing Director of RLB Styria

The partnership between JOANNEUM RESEARCH LIFE and Raiffeisen-Landesbank-Steiermark is a prime example of a successful regional development model. We work together closely to promote business, help community life to thrive and give young talents access to training and education. Innovative and sustainable projects actively shape the future of our home region. We highlight scientific achievement through the Raiffeisen Talent Award and are an enabler in the fields of sustainability and digitalisation. Ultimately, it is only by working together that we can create a world worth living in for future generations.


Photo: Slaven Stekovic

Slaven Stekovic

Molecular biologist, author and entrepreneur

MultiOmic Health Limited is an AI-enabled drug discovery (AIDD) company with a focus on the development of therapeutics for novel endotypes of diabetic nephropathies. JOANNEUM RESEARCH HEALTH has been supporting us in the generation of metabolome datasets from a range of patient cohorts since 2023. Their long-standing sample and data processing experience has helped carry forward our efforts to develop customised precision medicine solutions for patients with diabetic kidney disease – which is a source of enormous added value for society.


Photo: G² Industrial Engineering GmbH

Manfred Gerger

Managing partner of
G² Industrial Engineering GmbH

We launched our first joint project with the Smart Connected Lighting research group back in 2020. This marked the start of the successful ongoing collaboration between the MATERIALS Institute and G² Industrial Engineering GmbH. The sheer complexity of the topics in our key lighting technology and innovation focus areas calls for a strong research partner. Specialists with an industry background or an academic career are what makes this collaboration between research and industry possible in the first place. The state-of-the-art infrastructure and expertise found in the region are also essential for short-notice enquiries or research projects.


Photo: Karo Pernegger

Holger Sicking

Head of Tourism Research & Data Analytics,
Österreich Werbung (Austrian National Tourist Board)

Österreich Werbung's cooperation with JOANNEUM RESEARCH started in autumn 2023 with the development of a forecasting model for overnight stays in tourism regions in Austria. During the application process, JOANNEUM RESEARCH – something of a dark horse for us – won us over through a combination of its comprehensive expertise, innovative thinking and deep understanding of the tourism system. Our cooperation with them has gave rise to a forecasting model for overnight stays that is not only of great benefit for tourism in Austria, but for European tourism as a whole, too. JOANNEUM RESEARCH also provided a documented programme code which enables us to expand the original scope and fine-tune the model in future.
Close cooperation and regular dialogue both within the core project team and with stakeholders played a decisive role in the success of the project. This collaborative approach made it possible to identify challenges and develop solutions quickly, such as the use of mobile phone data, as well as the selection of suitable forecasting methods and how to combine them. We would like to thank JOANNEUM RESEARCH for this successful partnership which we are looking forward to pursuing!


Photo: Arecor

Rafic Sukar

Researcher at Arecor

As a type 1 diabetic myself, I am proud to be involved in developing novel insulin products that have the potential to transform the lives of people with diabetes. I am therefore very grateful for the excellent contributions of JOANNEUM RESEARCH HEALTH in the clinical studies.


Photo: Arecor

Jan Jezek

CSO, Arecor

We have been working with JOANNEUM RESEARCH HEALTH for a number of years and have always been impressed with the breadth of their skills and professionalism. Their contributions to clinical studies aimed at advancing our innovative insulin products have been invaluable. HEALTH performed all of the bioanalytical testing associated with the studies. The quality of the work was always extremely high and they provided invaluable advice and support throughout all of these studies. We are currently expanding the collaboration into developing new delivery technologies for high value therapeutics and, yet again, find their expertise, skills and friendly approach extremely useful.

PERSPECTIVE


Photo: Gasser

Ralph Gasser

Project manager for the Kulturerbe Informationsmanagement (KIMnet) Schweiz network

We have been working with the DIGITAL Institute for more than 10 years now. At that time, the imdas pro documentation system was still very much on the periphery. Today, the software is widely used throughout Switzerland. Over the course of the partnership, we have jointly revolutionised digital object documentation and presentation for small museums in the affiliated Swiss cantons under the KIM.bl and KIMnet projects. For facilities like these that are called upon to achieve significant results with scarce resources at their disposal, imdas pro and its counterpart culture.web are the ideal solution, and JOANNEUM RESEARCH has proven to be a wonderful partner.


Photo: Lex Karelly

Christian Purrer and Martin Graf

Energie Steiermark Management Board

We are an "Official Partner of a Green World" and, as such, it stands to reason that we welcome innovative opportunities to cooperate with science and research. And as a preferential business partner from the very beginning, this approach gives us access to research findings and solutions connected to the burning issue of climate change. As a result, valuable expertise is refined into unique products and services through our leading innovation hub for sustainability, Next Incubator. Together, we are creating innovative, sustainable energy and mobility offerings that dovetail perfectly with the needs of our customers as they navigate their path to climate neutrality.


Photo: digifai

Michael Eberle

CTO at digifai

The development of modern special-purpose machines is presenting machine builders and automation engineers with new challenges all the time: high risk, lack of time and tight budgets. At digifai, we develop software and solutions that help machine builders to develop and operate their machines more safely and efficiently. twin, our simulation software, makes it possible to create physics-based digital twins of machines in 3D which – thanks to the latest technologies and research findings – behave exactly like their real-life counterparts, meaning that they can be used for digital engineering. The cooperation between digifai and JOANNEUM RESEARCH ROBOTICS is of great value to us. We share the same vision and benefit from the team's expertise. We are looking forward to building on our existing partnership.

ANKE DETTELBACHER

All together instead of all alone

Anke Dettelbacher is the Medical University of Graz's MD for the ZWT - Centre for Knowledge and Technology Transfer in Medicine project.

This could easily be the byline for the ZWT community. Because at the ZWT – the Centre for Knowledge and Technology Transfer in Medicine – research is not conducted in a metaphorical ivory tower. Instead, everything revolves around partnerships, connections and the exchange of ideas.

As a melting pot for innovative start-ups and established companies, we are not only the place to be in this sector – it's also a unique platform for growing alongside one another and driving forward pioneering projects. It is a climate that we are actively shaping through events, contacts and plenty of communication.

All easy enough to claim in theory, but the success stories coming out of it speak for themselves: one cooperation project between BRAVE Analytics and Ruth Prassl from the Medical University of Graz led to a patented technology for the visualisation of nanoparticles in liquids. COREMED and EVOMEDIS from the ZWT and ZWT ACCELERATOR are jointly developing wound healing innovations – such as a new, cell-based therapy for the treatment of patients with severe burns. Close cooperation with various incubators, including Science Park Graz and the University of Graz's Unicorn project, is another area that helps drive innovation for the benefit of society. What they all have in common is that they offer the ideal development conditions for visionary founders: to take one example, NORGANOID – a start-up which is conducting research into the possibilities of testing drugs and therapies with the help of organs-on-chips – emerged from a Science Park ideas competition. These endeavours are only a small selection of what is possible at the ZWT, which is supported by Med Uni Graz and the Styrian Business Promotion Agency (SFG).

Our community is not only a place where cooperation projects first see the light of day; they thrive here, too. Thanks to its strategically advantageous location close to University Hospital Graz and the Medical University of Graz, the ZWT also acts as a hub for exchange between different research institutions and companies in the life sciences sector. This fruitful connection generates a regular succession of innovations that are beneficial to society, as well as impressive success stories.

Newsflash: There's always room for new start-up ideas, innovations and new collaborations in the ZWT community. Sign up now! For more info and to sign up for NEWS Flash: https://en.zwt-graz.at/tenants/

Photos: ZWT/Lunghammer

PHOTOS: ALEXANDER MÜLLER

HOUSKA PRIZE 2024

First place for JOANNEUM RESEARCH

Award-winning research: our HEALTH Institute took home the winner's trophy at the Houska Prize award ceremony. The MATERIALS Institute, meanwhile, took fourth place. 400 guests from business and science attended the Houska Prize award ceremony on 25 April at the Aula der Wissenschaften in Vienna. HEALTH came first in the Non-University Research category and was awarded EUR 150,000. Headed by Katrin Tiffner, the winning project centred on the development of dermal open microperfusion to determine the efficacy of pharmaceuticals. This innovative method uses a minimally invasive probe to continuously remove interstitial fluid from the skin. The fluid enables researchers to establish whether a drug has penetrated the skin barrier, as well as the concentration levels when the active substance reaches the skin and what effect it has there. Besides significantly speeding up the drug development and authorisation process, this method also brings significant cost savings.

Further awards

Our MATERIALS Institute also won a prize, with project leader Martin Smolka and his team taking fourth place for their work on the NextGenMicrofluidics project. decide Clinical Software GmbH, a JOANNEUM RESEARCH and Medical University of Graz spin-off, took third place with GlucoTab in the R&D in SMEs category: the software facilitates blood glucose management for hospital patients with diabetes and also shows potential for use in mobile care. Awarded annually by the B&C Private Foundation, the Houska Prize is presented in recognition of pioneering research projects.

Fasting promotes health, and spermidine has an important role to play in the process

HEALTH

An international research team led by the University of Graz and 20 other institutes worldwide – including the HEALTH Institute – has investigated the effects of fasting on a molecular level. The researchers discovered that the concentration of spermidine increases in humans, mice, flies and worms as well as yeast cells during fasting. The research group headed by Christoph Magnes at the HEALTH Institute conducted the mass spectrometric analyses of spermidine in the various species covered by the project. Whether fasting actually boosts vitality depends on the increase in spermidine concentration in the body: if this process is interfered with through chemical or genetic interventions, an organism will no longer benefit from fasting. One important impact of fasting is that it triggers autophagy, a cellular cleansing programme that breaks down age-associated cellular waste. Organisms that were unable to produce spermidine during fasting did not trigger autophagy.

Spermidine is essential for fasting-mediated autophagy and longevity authors: Sebastian J. Hofer, Ioanna Daskalaki, Martina Bergmann, Jasna Friščić, Andreas Zimmermann, Melanie I. Mueller, Mahmoud Abdellatif, Raffaele Nicastro, Sarah Masser, Sylvère Durand, Alexander Nartey, Mara Waltenstorfer, Sarah Enzenhofer, Isabella Faimann, Verena Gschiel, Thomas Bajaj, Christine Niemeyer, Ilias Gkikas, Lukas Pein, Giulia Cerrato, Hui Pan, YongTian Liang, Jelena Tadic, Andrea Jerkovic, Fanny Aprahamian, Christine E. Robbins, Nitharsshini Nirmalathasan, Hansjörg Habisch, Elisabeth Annerer, Frederik Dethloff, Michael Stumpe, Franziska Grundler, Françoise Wilhelmi de Toledo, Daniel E. Heinz, Daniela A. Koppold, Anika Rajput Khokhar, Andreas Michalsen, Norbert J. Tripolt, Harald Sourij, Thomas R. Pieber, Rafael de Cabo, Mark A. McCormick, Christoph Magnes, Oliver Kepp, Joern Dengjel, Stephan J. Sigrist, Nils C. Gassen, Simon Sedej, Tobias Madl, Claudio De Virgilio, Ulrich Stelzl, Markus H. Hoffmann, Tobias Eisenberg, Nektarios Tavernarakis, Guido Kroemer & Frank Madeo / Nature Cell Biology, 2024

Publication:

Atopische Dermatitis und die Gabe des Wirkstoffs **Dupilumab** (Atopic dermatitis and the administration of the active substance Dupilumab)

HEALTH

Dupilumab, a monoclonal antibody, is authorised for the treatment of atopic dermatitis (AD). However, the effects of the treatment on a molecular, cellular and immunological level are yet to be fully understood. In the study, blood and interstitial fluid were collected from non-damaged and damaged skin from eight patients with moderate to severe atopic dermatitis before and at the end of 16 weeks of treatment with dupilumab. Its effectiveness was reflected by a significant reduction in the severity of atopic dermatitis at the end of the course of treatment. The study provides new insights by linking local changes in the immune system and metabolism to AD pathogenesis and treatment response.

Characterization of Inflammatory Mediators and Metabolome in Interstitial Fluid Collected with Dermal Open Flow Microperfusion before and at the End of Dupilumab Treatment in Atopic Dermatitis, authors: Fernanda Monedeiro, Barbara Ehall, Katrin Tiffner, Anita Eberl, Eva Svehlikova, Barbara Prietl, Verena Pfeifer, Julia Senekowitsch, Anu Remm, Ana Rebane, Christoph Magnes, Thomas Pieber, Frank Sinner, Thomas Birngruber / J. Proteome Res. 2024, 23, 8, 3496–3514

Publication:

Methodology for identifying **forest damage from satellite images**

DIGITAL

The publication by the Remote Sensing and Geoinformation research group headed by Janik Deutscher presents the results of the validation of forest disturbance maps. Created for four study areas in Germany, they are based on data collected by the Sentinel-2 satellites between 2018 and 2022. The researchers used a time series filtering method to map annual forest disturbances on plots of land of 0.1 hectares or over by focusing on spectral clustering and the extent of annual change. The method presented is part of a research study to develop a prototype for a nationwide forest disturbance monitoring system in Germany. Annual areas of forest change are used as the basis for estimating the amount of timber affected and calculating the associated economic losses. The system is now being rolled out across Germany.

Detailed validation of large-scale Sentinel-2-based forest disturbance maps across Germany, authors: Eike Reinosch, Julian Backa, Petra Adler, Janik Deutscher, Philipp Eisnecker, Karina Hoffmann, Niklas Langer, Martin Puhm, Marius Rüetschi, Christoph Straub, Lars T Waser, Jens Wiesehahn, Katja Oehmichen / Forestry: An International Journal of Forest Research, cpae038, 2024

Publication:

The project managers met at JOANNEUM RESEARCH HQ in Graz to present and discuss their digitalisation projects.

PHOTO: JOANNEUM RESEARCH/RAISER

Fast Track Digital:

Research boost for companies in the fast lane

The FFG Fast Track Digital programme is geared towards realising digitalisation projects by and with research, technology and innovation companies. And bringing them to market quickly. Project teams from business and research are encouraged to work closely alongside one another as a result. Over the course of the past years, this approach has given rise to a number of marketable and competitive products and processes thanks to the support of a team of experts from Eutema GmbH and JOANNEUM RESEARCH. The project presentations at the end of the programme took place in Graz on 11 June 2024.

Cooperation is the key: for their digitisation projects to qualify for funding, the project consortiums needed to consist of multiple partners who shared a common research objective. The digitalisation specifics differed from project to project, covering everything from energy, medical and health technology to the life sciences and IoT solutions. Numerous aspects were addressed including increasing efficiency through digitalisation, promoting sustainability, conserving resources, user centricity and inclusion. To ensure that the best possible support was available once the implementation stage was reached, the IMPACT support service was created, which was coordinated by Eutema GmbH's Erich Prem and Jürgen Streicher from JOHANNEUM RESEARCH's POLICIES Institute. This provided support with cross-project and specific problems and offered a networking platform where participants from the qualifying projects could compare notes. It also promoted a more rigorous examination of topics such as the legal framework, and ethical principles in research and development, as well as sustainability aspects. Support from IMPACT facilitated a deeper understanding of these areas. FFG programme manager Barbara Lohwasser summarises: "Digitalisation continues to be a major topic for companies and society. Supported by the Federal Ministry of Labour and Economic Affairs (BMAW), this programme was of particular benefit to small and medium-sized enterprises as it enabled them to test and implement their innovative ideas quickly. Beyond the original project goals, numerous additional ideas for further viable new products or services emerged."

News

Visit www.joanneum.at for all of the latest JOANNEUM RESEARCH news and events

Space tech mitigates climate change

This year, Graz once again hosted the annual United Nations Austria Symposium 2024 which drew numerous international participants. Held on 17 and 18 July, the 30th edition was again organised by JOANNEUM RESEARCH. The topic this time round was "Climate action: transforming space-based technology projects into sustainable services that support policy-making". Patron Michael Schönhuber (DIGITAL) welcomed 76 attendees from more than 15 countries.

In addition to the in-person participants, a further 1,700 people followed the symposium online.

Photo: JOANNEUM RESEARCH/KUBISTA

Leisure paradise doubles up as outdoor lab

In their book about the Schöckl – a recreation area on the outskirts of Graz – authors Elke Jauk-Offner and Harald Eisenberger included a whole chapter on one of DIGITAL's research projects. Karlheinz Gutjahr, an expert on the Schöckl's "corner reflector" contributes his unique insights. The corner reflector in question helps researchers to analyse and build up a better understanding of the wave propagation of SAR signal with a high degree of accuracy. It forms part of a network around the city that comprises a further two identical corner reflectors. The distances to the Sentinel 1 satellite are measured here at regular intervals down to the last millimetre. Besides its pinpoint accuracy, the special thing about this technology is that it works regardless of weather conditions and the time of day. The precision measurements it provides allowed researchers to draw conclusions about the current atmospheric conditions.

PHOTO: JOANNEUM RESEARCH/BERGMANN

Clara Fischer is researching robotics solutions for the tourism sector.

Robotics helping to combat staff shortages

Custom robotics solutions are being developed for the HotelRob project to help address staffing shortages in the tourism industry.

At many tourism businesses in Carinthia, staff shortages are leading to reduced opening hours and places a burden on remaining staff. Customised service robots can be used in a variety of ways: including welcoming guests, showing them to their rooms or camping pitches, transporting luggage and even taking on room service tasks when crews are overstretched. Robots can also provide entertainment, in various ways by assisting at reception or serving drinks. Another advantage of robot technology is its inherent flexibility. Hotel guests can take advantage of the services offered by the robots in line with their own specific requirements. Use of this technology aims to increase innovation and competitiveness for hotel and campsite businesses.

Climate Pact. We're on board!

Climate protection affects us all. And climate neutrality calls for cooperation.

Graz has set itself the goal of going climate neutral by 2040. Achieving this will require everyone to work together. On 27 June, JOHANNEUM RESEARCH Managing Director Heinz Mayer and 41 other company representatives co-signed the Climate Pact with the aim of continuously reducing our ecological footprint and driving decarbonisation.

PHOTO: FOTO FISCHER

41 representatives from Graz companies signed the Graz Climate Pact.

PHOTO: JOANNEUM RESEARCH/RAISER

36,600 visitors at the Long Night of Research

430 attractions and more than 60 participating locations in Graz, Leoben, Kapfenberg and Weiz – new records were set at the Long Night of Research (LNF) in Styria on 24 May. Taking part for the first time ever, Weiz attracted a high level of interest. Each of the locations adopted a hands-on, experiential approach to the fascinating subject matter. Visitors of all ages were captivated by the engaging lectures, workshops, experiments and exhibits which ran until the small hours. In addition to around 30 local companies, all of the universities and research institutions in Styria took part in the Long Night of Research. This year's event was coordinated by JOANNEUM RESEARCH once again In Carinthia, ROBOTICS opened its doors and invited visitors to take on a robot in a game of connect four.

PHOTO: FOTO FISCHER

JR authorised signatory Helmut Wiedenhofer is responsible for networks and cooperation and organised a focus group.

12th Pfingstdialog: the future of Europe

An annual red letter day for dealing with the burning issues of our time: the Pfingstdialog event at Schloss Seggau, which took place on 15 and 16 May with more than 50 speakers. The focus group organised by JOANNEUM RESEARCH was all about "Research cooperation across borders" this year. A number of keynote speeches set the tone for the two-day get-together: Thomas Krautzer (University of Graz) talked about transcending regional boarders as a social process while Eric Kirschner (POLICIES) talked about the role of infrastructure as a driver of regional cooperation. Werner Wutscher (Chair of the university council at Klagenfurt University) covered everything from university infrastructure to spin-off ecosystems. Lejla Pock from Human.technology Styria (HTS) reported on specific cooperation projects through the prism of the HTS cluster.

Slovakian Ambassador in Graz

On 27 May, the Ambassador of the Slovak Republic to Austria, Jozef Polakovič, visited JOANNEUM RESEARCH and other on-site institutions at the initiative of Honorary Consol Friedrich Sperl from the Consular Office of the Slovak Republic in Graz. JR authorised signatory Renate Reinisch and communications manager Gabriele Katz accompanied the delegation. The itinerary included stops at the HyCentA, followed by the Graz Adult Education Centre and our own DIGITAL Institute.

From left: Honorary Consul Friedrich Sperl, Deputy Chamber of Labour (AK) Director Bettina Schrittwieser, AK President Josef Pesserl, Ambassador Jozef Polakovič as well as Adriana Dubenova, Adnan Midzan (AK Styria), Provincial Councillor Ursula Lackner, Head of Corporate Communications Gabriele Katz, authorised signatory Renate Reinisch (both JR).

PHOTO: CHRISTIAN JAUSCHOWETZ

PHOTO: JOANNEUM RESEARCH

JOHANNEUM RESEARCH Diversity Officer Claudia Winkler (left) with Nastaran Hayatiroodbari

Women in Engineering

Equal opportunities, equality awareness and an appreciative approach to interculture were at the centre of the event at TU Graz.

23 June was International Women in Engineering Day. For years, JOANNEUM RESEARCH has partnered the event of the same name at TU Graz. This year's keynote speech was delivered by Nastaran Hayatiroodbari, Senior Researcher at MATERIALS. A chemist by background, her talk made a heartfelt case for knowledge transfer, teamwork and unlocking the power of diversity. The international participants in the Talk Show also emphasised the importance of taking small steps and having the courage and conviction to tackle challenges head on.

Transmissi failure?

Jamming and spoofing might sound like something you would encounter at a night club, rather than silent air space issues. To clarify, both are actually deliberate ways of unleashing chaos in time measurement and navigation systems. Even so, disturbances can also be unintentional – solar storms and defective devices also have the ability to trigger failures. Civil and military applications such as aviation and shipping, transport and general mobility, financial markets, agriculture and emergency services are all affected. The potential damage from such events is immeasurable. If, for example, an airport was affected, the consequences would include delays, cancellations, additional security measures, compensation payments, increased staffing costs and disruptions for freight traffic. And that is before reputational damage such as loss of trust even enters into the equation. Put simply, the total damages could amount to several million euros each day.

To help minimise these risks, a team at DIGITAL is conducting research into a sensor system that can detect and localise GNSS signal interference in real time. Project manager Susanne Schweitzer explains: "We are working on the provision of a network of measuring devices to pinpoint disturbances. The idea is for the data to be accessible to operators of critical infrastructure sites such as airports. To make this possible we are developing sensor boxes, which contain a small computer in addition to a GNSS receiver." The first test involving these boxes will take place at Graz Airport.

During testing, the sensor boxes are positioned at defined points from which they measure and record all of the signals that occur in the range of the GNSS frequency bands. "If there is a disturbance, it shows up in the signal that is recorded, which makes it possible to calculate when and where the interference occurred by correlating the measurements from different points. This means that we determine both the physical origin and time of the disruption," Schweitzer explains.
The sensor technologies use by the system were developed by JOANNEUM RESEARCH and project partner IGASPIN. If irregularities occur in the GNSS spectrum, both the direction and distance of the source of interference

Text: Elke Zenz

A temporary failure of global navigation satellite systems (GNSS) would have a significant impact on countless areas of modern life that are reliant on highly accurate timing and position information. The consequences? Chaos and uncertainty. Involving a multidisciplinary team headed by JOANNEUM RESEARCH, the KIRAS CATCH-IN project has this important topic in its sights. The project's overarching aim is to build on existing expertise on GNSS disturbances such as interference, jamming and spoofing while developing suitable measures to counter these threats.

PHOTO: JOANNEUM RESEARCH/RAISER

Susanne Schweitzer (left) and Denise Koren
in the flight simulator at FH JOANNEUM, University of Applied Sciences

can be calculated using a custom algorithm developed for this specific purpose. Coupled with the psychological analyses carried out by FH JOANNEUM, University of Applied Sciences as part of the project, these technological developments are designed to increase security at airports in the long term. And this is the point where psychologist and researcher Denise Koren from FH JOANNEUM enters the picture. Her part of the project involves analysing the possible effects on the people involved. "We use the flight simulator and surveys to look at the different psychological stress factors for pilots and air traffic controllers when GPS navigation malfunctions occur. The information from these tests are subsequently integrated into flight crew training, which helps to further enhance air traffic safety," Koren explains. Tests are carried out in a flight simulator to monitor heart rate variability and sweat gland activity using electrodes and sensors. The data generated in the process can be used to determine whether additional training is needed in this area for aircraft crews, or if the checklists that have to be followed in the event of a failure need to be adapted," Koren continues. For both research groups, the goal is to make flying – which is already the safest mode of transport – even safer. A plus: the sensor network can also be extended beyond the scope of the original project in various ways including to create an interference map for Austria which would benefit all those involved in protecting critical infrastructure.

Funded by the Austrian Research Promotion Agency (FFG), the KIRAS project will run until the end of 2024. Project partners are the FH JOANNEUM, University of Applied Sciences aviation institute, ASFINAG, Austro Control Österreichische Gesellschaft für Zivilluftfahrt mbH and IGASPIN GmbH. The public sector customers are the Austrian Federal Ministry of Defence (BMLV) and the Austrian Federal Ministry of Finance, Telecommunications Authority (BMF).

RUPERT PICHLER

Cooperation – the key to new knowledge and innovations

Rupert Pichler is Head of Department in the Innovation and Technology section at the Austrian Ministry of Climate Action, Environment, Energy, Mobility, Innovation and Technology.

> **If we move along different paths, it's more likely that one of them will lead us to our destination. Which is particularly important in the early stages of innovation.**

The image of the reclusive scholar, a man (for many years, people only thought of men in this context) devoted entirely to the pursuit of knowledge, no longer shapes the way we picture science and research. And it was probably never true anyway. Insights in the academic sense are gained by sharing ideas with others, by putting hypotheses up for discussion on the broadest possible knowledge base. It's impossible to predict – and to find out on your own – which assumptions will ultimately turn out to be viable. This is why a wide variety of ideas is needed. Diversity doesn't emerge spontaneously – it's the product of dialogue, which repeatedly gives rise to fresh perspectives.

So, while cooperation and diversity are core scientific principles, they're not just restricted to knowledge-driven research. Testing innovative solutions also demands a variety of different approaches – if we move along different paths, it's more likely that one of them will lead us to our destination. This is particularly important in the early stages of innovation. We need to agree on the starting point and the desired goal – in other words, we have to cooperate.

These principles are also clearly reflected in practice: the research funding regulations in European state aid laws reward cooperation, creating incentives for generating knowledge and sharing it with others. Otherwise, companies would only invest in the pursuit of new insights in areas where they see opportunities to make a profit. However, the open innovation approach shows that sharing expertise and collaborating in order to generate knowledge can definitely deliver financial benefits, too. Because, broadly speaking, knowledge is a public good. Research partnerships are particularly promising if the parties involved are able to bring a range of different skills to the table. This is why cooperation between science and business is so important, and not because it's all about transferring academic knowledge directly into economic applications. Institutions like JOANNEUM RESEARCH, which are positioned at this particular intersection, give their clients access to a correspondingly broad knowledge base. Of course, these capabilities are the result of several decades of development, which has given rise to a unique cooperation ecosystem in the province of Styria. Its success is undeniable, and it represents a core asset for the whole of Austria as an RTI location.

LAGEBILD

Cyber Security

Mo, 23.9.2024 / Graz
Decrypting Cyber Security: Automotive Cyber Security

Mo, 14.10.2024 / Klagenfurt
Decrypting Cyber Security: Digitale Identitäten

Di, 28.01.2025 / Graz
Decrypting Cyber Security & Digital Dialog

Di, 25.03.2025 / Klagenfurt
Decrypting Cyber Security

Mo, 19.05.2025 / Klagenfurt
Lagebild Cyber Security: KPMG-/KSÖ-Studie

Mo, 26.05.2025 / Graz
Decrypting Cyber Security: Extended Version, KPMG-/KSÖ-Studie

ZUKUNFTS TAG

10.09.2025

N!CA – care can be revolutionised

Everyone is talking about the challenges facing healthcare systems right now. The term "care crisis" crops up on a daily basis. And there is no such thing as a quick and easy solution to it. A joint project between Med Uni Graz, JOANNEUM RESEARCH HEALTH and various other partners from business and science is looking at ways of rethinking old-school processes and structures with a view to relieving the burden on nursing staff through various measures, including digital support. An important area, given that around two hours of each eight-hour working day are currently accounted for by admin and documentation. Two hours that could be spent working with and caring for patients. The N!CA project is funded within the Competence Centres for Excellent Technologies (COMET) framework by the Austrian Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology (BMK), Federal Ministry of Labour and Economic Affairs (BMAW) and the Province of Styria. COMET is overseen by the Austrian Research Promotion Agency (FFG) and the Styrian Business Promotion Agency (SFG).

Any questions?

If you are looking for a reliable partner for your research project or would like to find out more about our technologies, please contact our institutes directly:

Info

Headquartered in Graz, JOANNEUM RESEARCH provides innovation and technology services in the field of applied research. Working as research company working on behalf of various federal provinces and regions in Austria, our expertise shapes the development of our modern society and economy – sustainably, and always with a focus on people. As a multidisciplinary team working in flexible structures that foster innovation, we always live up to the highest social and scientific standards. As a research institute backed by the public sector, JOANNEUM RESEARCH plays a key role in identifying and generating solutions for challenges facing society, including climate change, energy supply, digital transformation, mobility, civil and military security, and social change.

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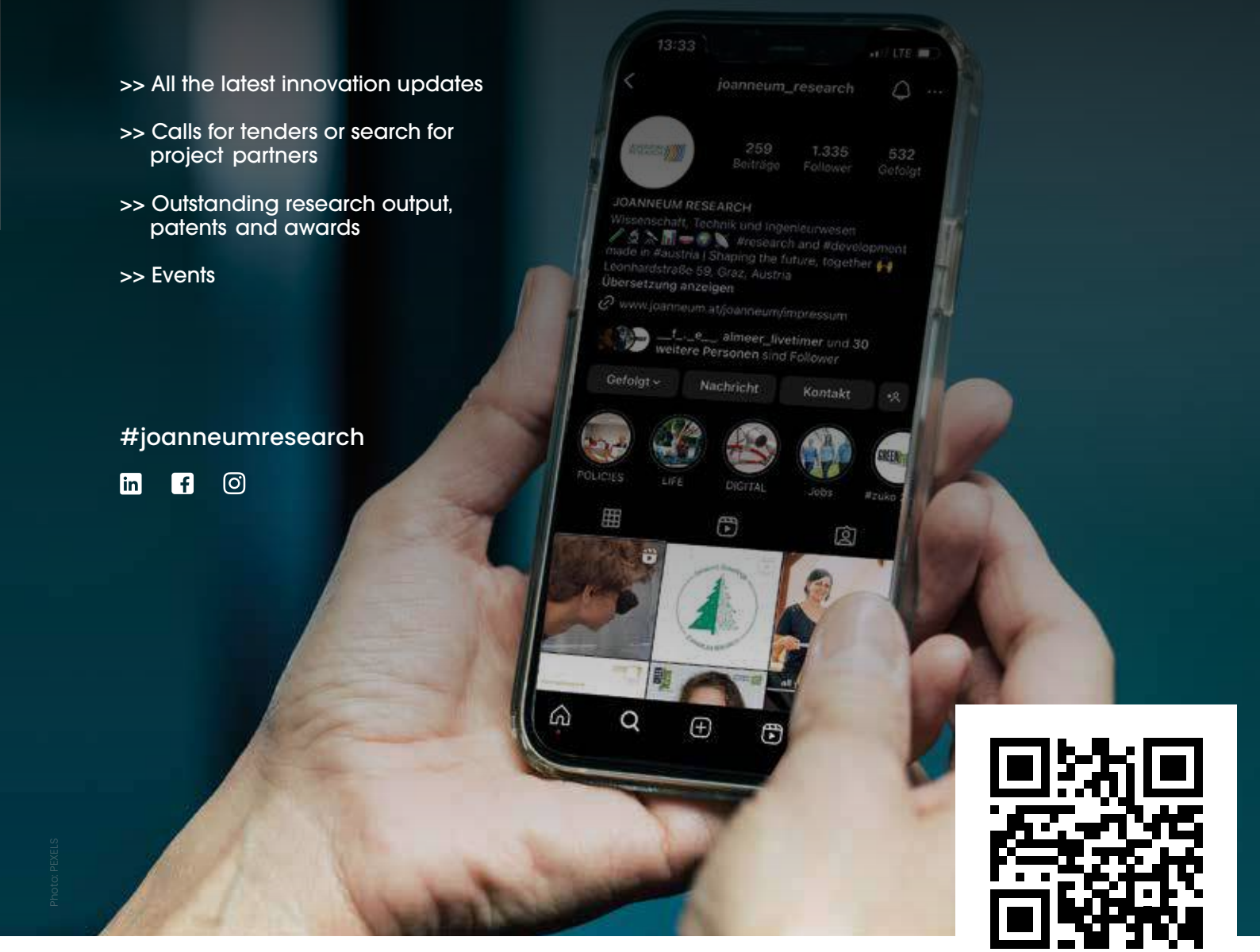

Photo: PEXELS

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