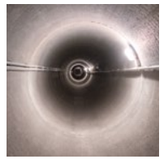
RheinlandPfalz

EXCEPTIONAL.
RHINELAND-PALATINATE.

THE CENTER OF INNOVATION.

CONTENTS



DEAR READER

Welcome!

Rhineland-Palatinate is the right choice for you – for small and medium sized enterprises, for international corporations, and for scientists and students – whether choosing a location to live, to study, or to work. We make an effort to ensure people and companies have outstanding opportunities – those being here for some time and those arriving with fresh new ideas.

Together, we have established Rhineland-Palatinate as one of Europe's leading centers for innovation. Our economic, innovation, and research policies reflect the State Innovation Strategy – developed in collaboration with companies, universities, and research institutes. The strategy enables us to promote the areas we believe have the highest potential in our region. Turn the pages to learn why we selected these areas and which future markets we are addressing with you in mind.

We invite you to get to know us, meet our companies and scientists, and experience the many benefits of Rhineland-Palatinate.

Contact us, become a part of our success story!

Sincerely,

DR. VOLKER WISSING

Minister of Economic Affairs, Transport, Agriculture and Viniculture

You should know that, …

99.7%

of all companies in Rhineland-Palatinate are SMEs!

Thanks to their great flexibility these companies react quickly to global challenges.

»THE MAGNETIC ATTRACTION«

DR. ROLF SLATTER

As managing director of Sensitec, a leading high-tech company in the field of magneto resistive technology with 160 employees, Dr. Slatter is also the chairperson of the InnoMag innovation network.

Dr. Slatter, you moved to Rhineland-Palatinate more than twenty years ago – with the intent not to stay. What keeps you here? Well, my wife is originally from Rhineland-Palatinate and is, in fact, quite proud of it and I can see why. I find the people are simply nice – particularly, of course, my wife. But, in all seriousness now: The state has some features that I really like, for example, the good educational opportunities available to people of all ages. The people here are friendly and down to earth, in both an industry and government context. Instead of listening to themselves talk, they prefer to take action.

Can you give us an example? Unbureaucratic and rapid assistance is the order of the day, especially, when it comes to SMEs. A short story illustrates the point: The opening of a Sensitec facility here was actually the result of a coincidence. The original intent was only to purchase the machinery from the former IBM plant in Mainz. Then the company's founder, Karl-Heinz Lust was so impressed with the highly skilled, local work force that he decided to trust his gut feeling and buy a suitable site as well. A very big step for Sensitec – and, we are also very grateful for the support of the state of Rhineland-Palatinate in making everything go so well.

A gut decision for a business location – did that really pay off? Now years later, my answer is still, absolutely! I find the location hard to beat – for many reasons. One of these is the state promotes a very close cooperation between universities and businesses. At

"CMS3000 current sensors from Sensitec are dynamic, precise and compact. The sensors are used in servo controllers, electrical motor controls or for condition monitoring."

Sensitec, for example, we provide the universities in Mainz and Kaiserslautern with the most advanced machines and measuring technologies; this results in a higher quality research. In return, we get to meet highly talented young people and offer them employment – a real win-win-situation.

The government also encourages close cooperation between companies. Do you benefit from this, too?
Yes, in all cases! Rhineland-Palatinate supports the expansion of our InnoMag network. For us in InnoMag – with very different perspectives and various priorities, application areas, and target groups – the world is a magnetic place. Together, we are able to respond quickly and easily to new developments and establish consortia, etc. It is an idea that is catching on: meanwhile, we are hearing from companies in other countries that are expressing an interest in our network and want to join. Rhineland-Palatinate seems to exert a quasi-magnetic attraction of its own on all who bring something new to this field and want to jointly develop new applications – for the benefit of all!

One of the most complex projects in the history of space exploration: The Mars rover "Curiosity" launched from Cape Canaveral in November 2011. On board: miniaturized magneto resistive sensors from Sensitec. (NASA/JPL-Caltech)

WHAT MAKES RHINELAND-PALATINATE SUCH AN OUTSTANDING BUSINESS LOCATION?

1. Location: Rhineland-Palatinate is situated in Germany's **dynamic southwest,** just next door to France, Belgium, and Luxembourg. As part of Europe's Rhine-Main metropolitan region, the state is an exceptional location for all who seek to enter and conquer the (foreign) market.

2. Education: The state boasts **more than 40 research institutes and universities**, and a tuition-free first degree policy. The higher education and dual training system produces the skilled labor force and well qualified experts *(meisters)* that are the envy of the world.

3. Companies: The economy, mainly **driven by SMEs**, is a global leader in innovation and closely integrated with the research community. The mix of leading small and medium sized companies along with global leaders like BASF, Daimler Trucks, and Boehringer Ingelheim and many hidden champions is truly unique.

4. Infrastructure: **Rapid transportation** – via air, land, and water – saves time and effort: Mainz is only 30 minutes away from the Frankfurt International Airport; we are connected to the European high-speed railway network, and the city is located on the banks of the Rhine River, the most important waterway in Europe.

5. Mentality: The people of Rhineland-Palatinate are known for their open-mindedness and the warm welcome given to others from around the world. Rhineland-Palatinate is a popular **holiday destination**. Germany's largest wine export region is also host to four UNESCO World Heritage Sites, which means there is much culture to enjoy.

… AND WHY IS IT SUCH A REMARKABLE CENTER OF INNOVATION?

First: Concentration.

World class quality is awaiting companies, scientists, research institutes, and job seekers in particularly promising fields. We provide this by focusing on areas where our competitive advantage is greatest and where we clearly have a unique selling position. Always alert to opportunities that arise with global megatrends, technological advances, and the latest market leaders, we like to refer to these as **high potential areas.**

Subsequently: Consistency.

Our research, technology, and innovation funding is administered by a single source and our high potential areas are supported with every resource available to us. And those are many:

- We encourage and promote research and development in priority **infrastructure projects**.
- We support ambitious **research and technology** projects.
- We provide good support and opportunities to **innovative startups.**
- We create **access** to the latest knowledge and cooperative opportunities for all companies.

Finally:
Cooperation and networking.

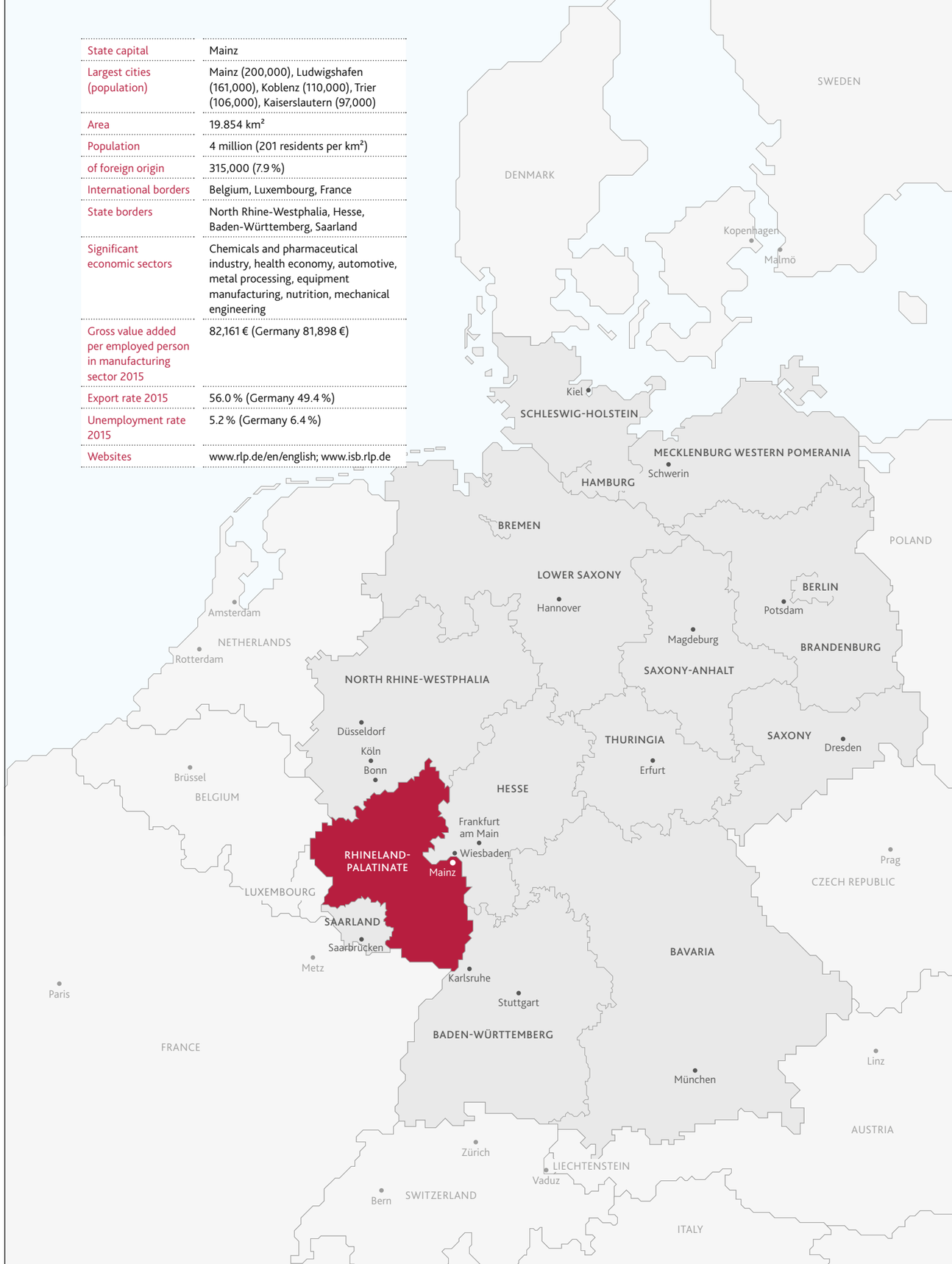
Joint efforts undertaken in Rhineland-Palatinate are quite unique and exceptionally strong in their composition – in terms of innovative capacity and intensity of cooperation. Our clusters and networks bring universities, institutes, and companies together and, in so doing, deliberately cut across industry and state borders. Our innovation and technology centers in Kaiserslautern, Koblenz, Ludwigshafen, Mainz, and Trier provide networking, consulting, and infrastructure to innovative technology spinoffs and startups. Support to such infrastructure and cooperation is a top priority in our innovation strategy.

One thing in Rhineland-Palatinate is obvious: Government, business, and research communities respect and support each other and cooperate in the search for solutions. We welcome the opportunity to discuss an effective and prompt response to your concerns and questions – See contacts on page 16.

Levels of networking:

INITIATIVES	PLATFORMS	NETWORKS	CLUSTERS
► Initial interaction of associations, scientific institutes, companies, and/or public institutions for the purpose of advancing common goals ► Regional exchanges, joint marketing of common specialty fields	► Interactive forums for actors from research, industry, and government ► The aim is to jointly develop innovative concepts, strategies, and knowledge transfer	► Informal, sometimes formalized, associations of producers, suppliers, research institutes, service providers, and public institutions ► Broad cooperation and supply relationships within certain value chains	► Formal associations (e. g. registered associations, businesses) with a strategic focus and professional cluster management ► Regional site that has extra-regional to international reach ► Centered on specific value chains in one field with exceptional economic strength
Example: ► Textiles and Fashion Initiative Southwest (TFiSW)	Example: ► PharmaForum	Examples: ► Ecoliance Rhineland-Palatinate ► Smart Factory Technology Initiative ► INNOMAG Innovation Platform for Magnetic Microsystems	Examples: ► Leading Edge Cluster for Individualized Immune-Intervention (Ci3) ► Commercial Vehicle Cluster Southwest (CVC)

State capital	Mainz
Largest cities (population)	Mainz (200,000), Ludwigshafen (161,000), Koblenz (110,000), Trier (106,000), Kaiserslautern (97,000)
Area	19.854 km²
Population	4 million (201 residents per km²)
of foreign origin	315,000 (7.9 %)
International borders	Belgium, Luxembourg, France
State borders	North Rhine-Westphalia, Hesse, Baden-Württemberg, Saarland
Significant economic sectors	Chemicals and pharmaceutical industry, health economy, automotive, metal processing, equipment manufacturing, nutrition, mechanical engineering
Gross value added per employed person in manufacturing sector 2015	82,161 € (Germany 81,898 €)
Export rate 2015	56.0 % (Germany 49.4 %)
Unemployment rate 2015	5.2 % (Germany 6.4 %)
Websites	www.rlp.de/en/english; www.isb.rlp.de



We are proud that, …

every 7th

employee in Rhineland-Palatinate
is in a high-tech job!
That puts us right at the top
of national rankings …

»THE OUTSTANDING CONDITIONS«

PROF. KATALIN KARIKÓ,

Ph. D., head of mRNA-based Protein Replacement Program at BioNTech RNA pharmaceutical company in Mainz. Her previous employment includes 25 years on the faculty of the University of Pennsylvania in Philadelphia. Together with her team, she has demonstrated the use of nucleoside modified mRNA in protein replacement, which has created a new field of therapeutic treatment.

Prof. Karikó, you are an expert in one of today's most promising fields of pharmaceutical research and could have worked at one of the well-known American companies. Instead, you decided to come to Mainz. Why? In many ways, it would have been easier for me to stay in the USA, especially as I had to start all over once before, 30 years ago, when I moved with my husband and daughter from Hungary to the USA. I must admit, however, that I accepted the offer from BioNTech without even preparing myself for the move to Mainz – and I really didn't know much about the location.

What gave you such a strong motivation? The job description was an exact match with my own vision of how I wanted to advance my work, with a focus on applications and, it grants me a lot of flexibility. You see, the hopes and expectations that were once placed in classic genetic engineering rest today on mRNA therapy. It is safer and less expensive for patients because they build the necessary proteins themselves. Being able to make a contribution to helping people who suffer from cancer or a genetic defect is incredibly rewarding. That is what we have worked on so

BioNTech was founded in 2008
and its research headquarters is based in Mainz

hard for so long. Now we are able to apply our research results not only to serious diseases, but also to treating wounds and injured joints. We have achieved a great deal in a very short time at BioNTech and have already begun the preclinical studies. The framework conditions in Mainz are just ideal for this purpose.

Are you referring to the Science Alliance? Well, yes, that is a big part of it: the infrastructure and networks here are extremely helpful. We enjoy a close cooperation, as a member of the Ci3 leading edge cluster, with various universities and institutes like TRON, and it also helps to have the manufacturers represented – overall, it is really a great idea. It is a very conducive atmosphere for innovation and related applications.

Aside from your professional life: What was your first impression of Mainz? I can remember how much I enjoyed seeing all these people out there strolling along the Rhine River with their children or elderly relatives, or riding along on their bikes. In the beginning, I was a little uncomfortable seeing little six-year olds walking to school all alone, until I realized: It is OK. They are safe. I love the fact that I can go for a jog at night – although, I might run faster if it was only a bit more dangerous. Of course, I think it is great that the Frankfurt airport is so close. It makes it so easy to visit my family and friends.

You probably have a lot of visitors too. Do they also like it here? Yes, especially because people are so friendly and welcoming. A colleague of mine, Dr. Muramatsu, with whom I did research for many years in the States came and decided to stay! He moved from Japan to the States 15 years ago. It is nice that we can now continue our work together here in Mainz. He had not expected to find a Kendō group here – and now, the group is delighted to have a real native of Japan practicing this kind of martial art with them.

BioNTech is a leader
in the development
of personalized immuno-
therapies against cancer
and other diseases

WHAT AREAS PROMISE HIGH POTENTIAL IN RHINELAND-PALATINATE – AND WHY?

Rhineland-Palatinate focuses on high potential economic sectors and areas of innovation. Our goal is to be a global leader in existing as well as in future markets. Therefore we carefully monitor new and existing potentials and how they are developing in Rhineland-Palatinate.

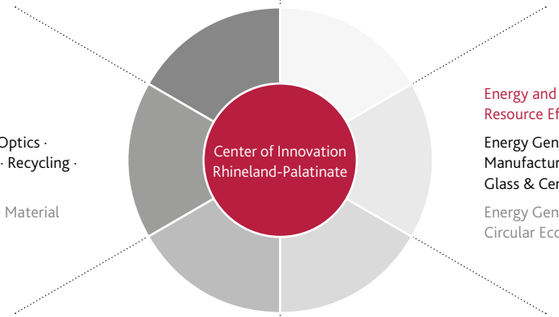
Our innovation strategy answers two key questions: "How can we best meet the challenges of global megatrends?" and "How are the major markets developing?"

Therefore, the following considerations factor into our response:

- Locational advantages and special industrial competence together with regional research and economics
- Specific application markets and their expected developments
- Areas especially relevant to global social challenges, like mobility, healthcare, and climate protection
- Competence and potential in Rhineland-Palatinate regarding key technologies and cross technologies
- Existing clusters and network structures.

We identified six areas we believe have particularly high potential:

AREA OF POTENTIAL	SECTORS	APPLICATION MARKETS
Microsystems, Sensor Technologies, Automation	Chemicals · Equipment Manufacturing · Vehicle Manufacturing · Process Measuring and Control Technologies	Magnetic Microsystems · Smart Factory/Industrie 4.0 · Photonics
Life Sciences, Health Economy	Health Economy · Chemicals · Pharmaceuticals · Medical Technologies · Glass & Ceramics · Optics	Personalized, Translational Medicine · System Solutions for the Health Economy
Materials and Surfaces	Chemicals · Glass & Ceramics · Optics · Vehicle Manufacturing · Metals · Recycling · Plastics · Medical Technologies	(Hybrid-) Materials · Composite Material Systems and Nanotechnology
Energy and Environmental Technologies, Resource Efficiency	Energy Generation · Chemicals · Equipment Manufacturing · Vehicle Manufacturing · Glass & Ceramics · Optics · Electronics	Energy Generation · Energy Storage Technologies · Circular Economy · Energy Efficiency
Information and Communication, Software Systems	ICT/Software · IT-Users	Intelligent Software Systems & Emergent Software
Automobile and Commercial Vehicle Industry	Vehicle Manufacturing · Glass & Ceramics · Optics · Electrical Engineering · Metals · Plastics	Digital Commercial Vehicle Technologies · Energy Efficiency · Alternative Materials



WHY THE SIX AREAS PROVIDE GREAT OPPORTUNITIES …

Each of our six high potential areas represents a cross section of industries and technologies. This stimulates innovation in many sectors simultaneously – and creates promising diversification in these and other new sectors.

… in the life sciences and the health economy

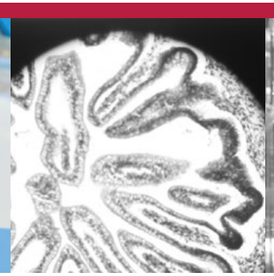
Significance: The technologies of the life sciences and the health economy represent over proportionate growth compared to the economy as a whole, also in terms of jobs. Additionally, key social challenges are being addressed in the health and security issues of medical data infrastructures.

Sectors (selected):
> Health economy
> Chemicals
> Pharmaceuticals
> Medical technologies
> Glass & Ceramics
> Optics

Application markets (selected):
> Medical technologies
> Personalized medicine
> Telemedicine
> Ambient assisted living
> Diagnosis and therapy
> Drug research and development
> Bioinformatics and analysis

Clusters and network structures: Particularly noteworthy is the high profile Cluster for Individualized ImmuneIntervention (Ci3): This cluster combines outstanding expertise in the Rhine-Main region in the areas of drugs, therapeutic approaches and diagnostics and promotes new medical strategies for the treatment of serious illnesses such as cancer, autoimmunity deficiencies and infectious diseases. Other important initiatives in the health economy contribute to the development of system solutions, for example the diabetes cluster or the Adapthera network for rheumatoid arthritis.

Within the framework of the Ci3 “Showcase” format, partners in the leading edge cluster invite you into their companies and research institutes



Researching medicine, biotechnology, and pharmaceutical sciences at Kaiserslautern University of Applied Sciences

Chemical engineering at Kaiserslautern University of Applied Sciences, Pirmasens Campus

… in energy, environmental technologies, and resource efficiency

Significance: These sectors are experiencing exceptionally dynamic growth in Rhineland-Palatinate. Each is focused on solutions to the social challenges of climate change, energy supply, mobility, and data security. Environmental technologies are of increasing importance worldwide in terms of ecologic sustainability and economic competitiveness and represents a significant contribution to the economic strength of Rhineland-Palatinate.

Sectors (selected):
> Energy generation
> Chemicals
> Equipment manufacturing
> Vehicle manufacturing
> Glass & Ceramics
> Optics
> Electronics

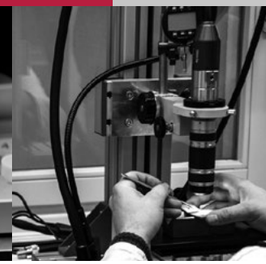
Application markets (selected):
> Solar energy
> Energy storage
> Industrialization of energy storage devices
> Virtual power plants
> Water purification and waste water treatment
> Energy efficiency from industrial and commercial properties as well as industrial manufacturing processes
> High-tech recycling (such as in the recovery of rare metals, especially, from electronic waste)
> Pre-treatment and processing of biomass

Clusters and network structures: Viable cooperative value adding structures are being built. In particular, the aim of the StoREgio Cluster for “The use of intelligent energy storage systems” is to provide integrated system solutions for the use of energy storage. The competence network Smart Grids addresses the same issue – its focus is on distributed intelligent power supply controls. The Ecoliance Rhineland-Palatinate is an environmental technology network with members from the business and scientific communities.

View from the inside of the underground heat collector for the external air supply at the Environmental Campus Birkenfeld

Environmental Campus Birkenfeld:
Media Computer Science students combine subjects from applied computer science with modern communications media.

Autosampler for thermo-gravimetric mass spectrometry with ceramic crucibles



In German startup rankings,
Rhineland-Palatinate takes

2nd place!

That is significant!
Statistically, it means that of every 100 people of working age, almost two of them will establish their own company!

»THE SIMPLE APPROACH«

PROF. DR. CHRISTIANE ZIEGLER

Head of the Physics Department at Kaiserslautern University of Technology, Prof. Ziegler is also the scientific director of IFOS (Institute for Surfaces and Thin Film Analysis), co-founder of Nano S, and Ambassador for Nanotechnology, Deutsches Museum. She was previously employed from 1999 to 2006, as co-director of the Germany's Nanotechnology Center of Excellence, CC-NanoChem and CC-NanoBioNet (formerly, CC-NanoBioTech).

Prof. Ziegler, nearly everyone today has heard something about nanotechnology – You were dealing with the subject long before people started talking about it … That's right! Nanophysics has fascinated me ever since completing my doctoral dissertation in 1991, when I was taking measurements with a scanning tunneling microscope (STM) and I saw atoms for the first time. At the nano level, objects often behave totally different than what classical physics predicts. We are increasingly able to use these properties: Nanotechnology is one of the key technologies of the 21st century.

Is your research at TU Kaiserslautern aimed at the possibilities of some specific use? Our research work is highly application oriented – in many fields, from IT to medicine. A number of spinoff companies from the university illustrate the broad range of possible uses: from everyday objects like the golf balls with improved construction and nano coatings to deliver exceptional flight characteristics that I helped to develop, to companies that develop laser and camera technologies. That's not even mentioning the many IT startups!

The labs of Rhineland-Palatinate universities are developing new ideas for applications from cutting edge research such as the laser system shown in this photonics lab.

You said that nano objects often behave quite differently than expected – are you ever surprised by anything else? Absolutely! For example, I was positively surprised at how my ideas were so well received here in Rhineland-Palatinate. I was able to introduce a new degree program in biophysics within just two years. The program ensures that young scientists will have an outstanding education in this interdisciplinary field, which is closely related to nano science. And, in the context of technology startups involving professors, I saw how stones in our path and even larger obstacles were most expediently eliminated in a very natural and matter of course manner.

What do you think is the reason for this natural cooperative support? In Rhineland-Palatinate, the principle of the simplicity applies. If, for example, I want to speak with someone from a government ministry about pursuing a new idea, the process moves quickly and is completely unproblematic. There is a great openness, even for the unusual, and throughout the process there is a pleasantly relaxed mood.

You give the impression that you are very comfortable here … There is a saying about Kaiserslautern: "If you can find it, you'll find that you like it." I especially like the framework conditions for research and the way people treat each other. And, there are other things: I can get everywhere on foot or by bike. The forest is only a short distance away for walking my dog and for me – the broad expanse of nature is the perfect balance for my work with the tiniest objects that humans can manufacture.

As the state's only technical university, many of the degree programs at the University of Kaiserslautern offer a combination of the natural sciences and the engineering disciplines

… in the automobile and commercial vehicle industry

Significance: The development of sustainable mobility systems is of major economic and environmental importance worldwide. Next to the chemical industry, the automobile and commercial vehicle industry is Rhineland-Palatinate's most important sector by revenue. The responses to address issues in mobility, climate change, energy use, and communication are being developed in this area.

Sectors (selected):
> Vehicle manufacturing
> Glass & Ceramics
> Optics
> Electrical engineering
> Metals
> Plastics

Application markets (selected):
> Energy efficiency in automobile and commercial vehicle industry
> Vehicle reliability and safety
> Alternative drives
> Alternative materials
> Forming systems
> Intelligent and functionally networked vehicles

Clusters and network structures: In addition to a collaborative effort on specific technical and technological issues and exploring new fields of technology, the clusters and networks cooperate in the areas of location marketing and the development of export markets. For instance, the Center for Commercial Vehicle Technology, Fraunhofer's DNT Innovation Cluster (Digital Commercial Vehicle Technology), and the Commercial Vehicle Cluster Southwest (CVC) have all come together to form the joint Commercial Vehicle Alliance (CVA) network. The Rhineland-Palatinate Vehicle Initiative, founded in 2013, further intensifies the networking and exchange of key industry topics.

From Rhineland-Palatinate to the world: Trucks such as the Mercedes-Benz truck shown here being loaded with goods leave Wörth for delivery to about 150 countries.

Cluster and network structures facilitate exchange and cooperation.

… in information and communication, software systems

Significance: The sectors in this high potential area are among the key drivers of innovation: in Germany, the majority of the innovation in this area is happening in the automotive, medical technology, and logistics sectors. This is where various social challenges like communication, mobility, security, energy, and healthcare are being addressed. In addition to the substantial research expertise in Rhineland-Palatinate, there are also many, very innovative medium sized enterprises (known as the *German Mittelstand)*.

Sectors (selected):
> Information and Communication Technologies
> Software
> Numerous ICT application areas

Application markets (selected):
> Enterprise software
> Ambient intelligence
> IT safety and security technologies
> Digital models for the automotive industry/ Energy grid management

Clusters and network structures: Rhineland-Palatinate is an important partner in Europe's largest leading edge cluster for the digital enterprise, the "Software-Cluster". The primary focus of this cluster is on enterprise software, specifically, on forming individual software solutions from multiple vendors into a single software product.

IESE / Concept Car – open research and training platform for embedded systems

Detail view of server

Network cables (fiber optic)

… in the areas of materials and surfaces

Significance: The research and development activities ongoing at companies and institutes are a driving force for industrial product development in various sectors. Rhineland-Palatinate is home to many sectors with significant strength and relevancy to a wide range of applications with most opportunities in mobility, energy, and healthcare.

Sectors (selected):
> Chemicals
> Glass & Ceramics
> Optics
> Vehicle manufacturing
> Metals
> Recycling
> Plastics
> Medical technologies

Application markets (selected):
> Composite materials
> Functional surface applications
> Material composite systems and substitution
> Joining technologies
> Material processing and coating in connection with shaping capabilities
> Filter systems
> Refractory systems
> Technical ceramics

Clusters and network structures: The "Innovation Network for Metal-Ceramic-Plastic" (IMKK) and its member research institutes, TIME (Technology Institute for Metals & Engineering) and Research Institute for Inorganic Materials – Glass/Ceramics (FGK), supplies networking of the regional innovation potential and the sector-related expertise and R&D capabilities of the SMEs. This benefits, for example, the market-ready development of hybrid materials made of metals, ceramics, and plastics. The Competence Network for Plastic Technology (Kom-K-Tec) situated in the southwest part of the state brings together producers and processors, tool makers, engineering service providers, and the research and development community.

FGK Research Institute: Development of optical and luminescent ceramics for high performance LEDs (www.fgk-keramik.de)

Ceramic structure model, 3-D ceramic printing (www.bauer-technologies.eu)

Plastic-coated electronic components (www.dr-boy.de)

Rolling mill drive pulley, metal-ceramic composite (www.tekowe-gmbh.de)

Did you know, …

the export rate is

56 %

in Rhineland-Palatinate?
Local companies think global and have international experience.

»THE CONCENTRATION OF SOFTWARE COMPETENCE«

DR. THOMAS ENGEL

Since 2014, manager of Technology Innovation Strategy, Dr. Engel was formerly the head of the Intelligent Solutions Group at the John Deere European Technology Innovation Center. The Center develops technological solutions that are of value to the customer and is responsible for all development in the areas of Information & Communication Technology and E-Mobility for John Deere. After earning his Ph. D., Dr. Engel taught and performed research as a Junior Professor in the application of electronics and software to support sustainable agriculture. As a product manager at Claas, he introduced the first practical products for precision farming. He joined John Deere in 2000.

Dr. Engel, Deere & Company has multiple locations in Germany. Why was Kaiserslautern chosen in 2010 as the site for the European Technology Innovation Center? We chose Kaiserslautern for a number of reasons. Of course, the proximity to our Mannheim and Zweibrücken locations played a role. The decisive factor, however, was the Science Alliance Kaiserslautern. In particular, what convinced us was the concentration of software competence – with the Technical University, Fraunhofer Institutes, Max Planck Institute and the German Research Center for Artificial Intelligence. Another large influence was the existence of the local leading edge cluster that brings together research and industry in the field of commercial vehicle design.

The possibility for strategic alliances made the difference? Yes, in the area of Information and Communication Technologies and software systems, we perform scientific research on future oriented

Driver's compartment control panel with apps for precision farming.

technologies in collaboration with local partners, for example, in the areas of automation and digitization. We are also closely involved in the integration of the automobile and commercial vehicle sectors.

Could you give an example of the cooperation in the software industry? Automation and driver assistance software is increasingly complex and important for agricultural equipment, which is why we seek to benefit from the local expertise and optimize our systems software architectures. Furthermore, in the leading edge cluster we are developing new methods to make the user interface more intuitive. Especially in agriculture, because there are many and often quickly changing conditions and factors, we want them to be able to adapt to the situation and context.

You are working closely with the Commercial Vehicle Cluster. How do you manage to deal with direct competitors? The commercial vehicle cluster is an association of many companies that all face similar kinds of problems as John Deere. There are many areas where we can all learn and mutually benefit from one another. Since no direct competitor of John Deere is involved, the cooperation presents no problems for us from the competitive engineering and antitrust perspectives. The platform provides an open, fair, and trusted exchange for the benefit of all partners.

John Deere
European Technology
Innovation Center
in Kaiserslautern

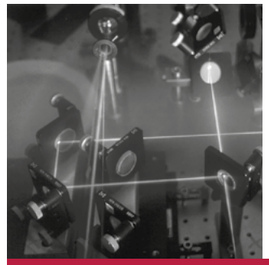
… and, in microsystems, sensor technologies and automation

Significance: Social challenges in the areas of communications, security, energy, and healthcare characterize the focus of this high potential area. Rhineland-Palatinate is host to several highly renowned research institutes, a fact made possible by the early investments by the state in a central R&D infrastructure for the many manufacturers and users based in the state.

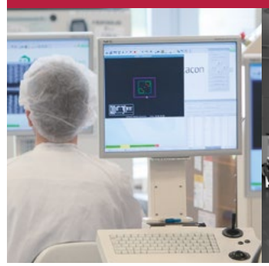
Sectors (selected):
- Chemicals
- Equipment manufacturing
- Vehicle manufacturing
- Process measuring and control technologies

Application markets (selected):
- Automotive
- Medical technologies
- Optical systems
- Information and communication technologies
- All areas of application in which magnetic sensors play a key role
- Laser components
- Laser material processing
- Measuring systems
- Embedded systems
- Industrial IT (digital automated production, or *Industrie 4.0)*

Clusters and network structures: The network partners in the Germany-wide innovation platform INNOMAG (Innovation Platform for Magnetic Microsystems) in Mainz represent the entire added value chain of magnetic microsystems: from sensors to components to various applications in other fields like automotive, life sciences, and energy. The Smart Factory technology initiative is Europe's first multivendor demonstration and research platform for innovative industrial production systems *(Industrie 4.0)*.

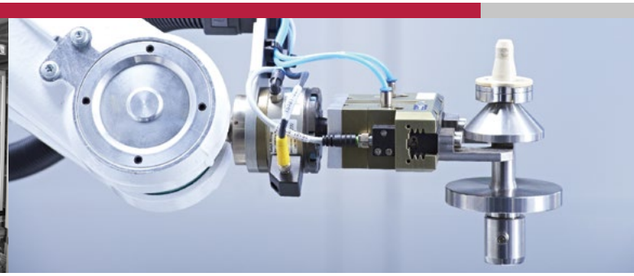


Laser operations with ultrashort laser pulses developed for use in manufacturing systems.



iC-Haus manufactures integrated circuits and microsystems for, among other things, magnetic sensors.

World's first manufacturer independent Industrie 4.0 plant at the SmartFactory KL Living Lab



Plant automation technology for components and systems for the medical technologies sector

HAVE WE AWAKENED YOUR INTEREST IN RHINELAND-PALATINATE?

Today, Rhineland-Palatinate is an exceptionally innovative and very popular location – this is evident from the facts and figures presented in this brochure …

Really exciting, however, are the developments coming in the next few years: Our state innovation strategy guarantees that the maximum number of market participants will benefit from new discoveries and applications. New impulses for growth are continuously being created.

Always a priority for our actions is the support to small and medium size enterprises: They represent a substantial contribution to the economic vitality of Rhineland-Palatinate. We continue to promote various networking structures for businesses and research institutes through the use of well-coordinated tools and professional services.

Would you like to be a part of our success story? Get in touch with us now!

Do you have the impression Rhineland-Palatinate is the place where you can realize your vision? Do you believe your product or your company would be a good addition to one of the networks or clusters? Are you active in one of the sectors included among our high potential areas? Do you want to set up high-tech operations in Rhineland-Palatinate? Contact us for more detailed information – learn more about the diverse funding options from the state's own Investment and Economic Development Bank of Rheinland-Pfalz (ISB).

BUSINESS PARTNER

Ministry of Economic Affairs, Transport, Agriculture and Viniculture (MWVLW)
Department of Innovation

Stiftsstraße 9
D – 55116 Mainz

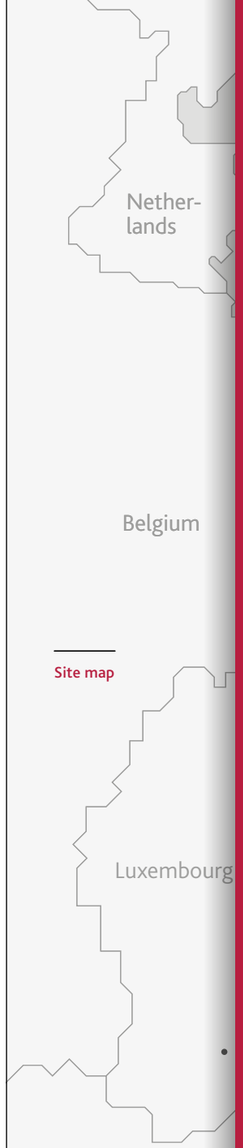
Telefon +49 6131 16-5686
innovation@mwvlw.rlp.de
www.mwvlw.rlp.de

BUSINESS PARTNER

Investment and Economic Development Bank of Rheinland-Pfalz (ISB)
Department of Corporate Communication, Investment Promotion, Foreign Trade Support

Holzhofstraße 4
D – 55116 Mainz

Telefon +49 6131 6172-1202
isb-marketing@isb.rlp.de
www.isb.rlp.de



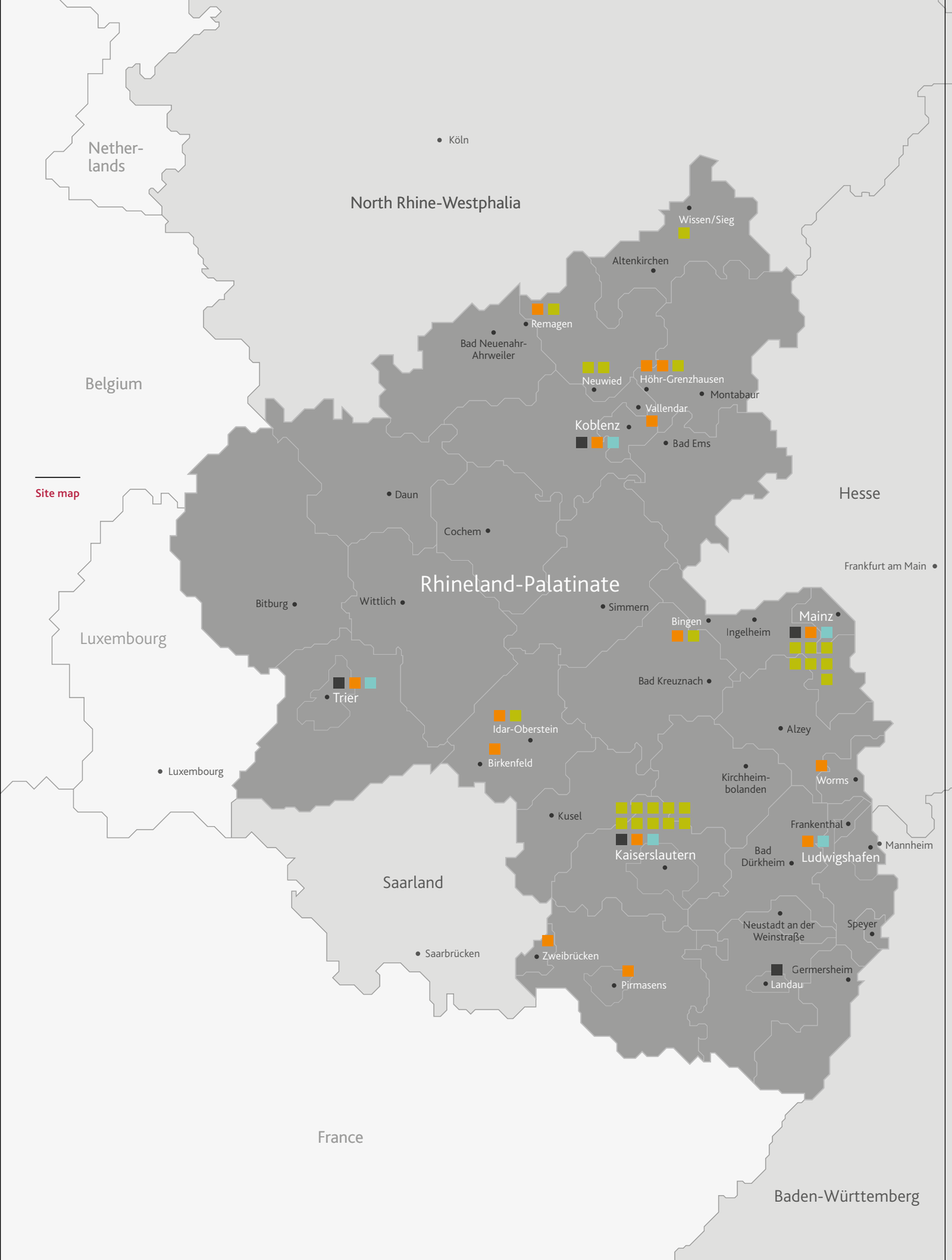
Site map

More details and information about Rhineland-Palatinate are provided online at:
www.rlp.de
Learn more about our innovation strategy at:
www.mwvlw.rlp.de/innovation

Information of interest to investors is summarized and provided at: www.isb.rlp.de
More about tourism in the Rhineland-Palatinate is available at: www.gastlandschaften.de

EDITORIAL NOTES

Published by	Ministry of Economic Affairs, Transport, Agriculture and Viniculture (MWVLW) State of Rhineland-Palatinate in cooperation with the Investment and Economic Development Bank of Rhineland-Palatinate (ISB)
Layout	Hilger & Boie Design
Edited by	Sabine Eigenbrod in collaboration with MWVLW and ISB
Circulation	3,500 copies
Date	July 2016



Universities

Johannes Gutenberg University Mainz | University of Kaiserslautern | University of Koblenz-Landau | Trier University

Other Institutions for Higher Learning & Applied Sciences

University of Applied Sciences Mainz | University of Applied Sciences Worms | University of Applied Sciences Ludwigshafen | Koblenz University of Applied Sciences – RheinAhr Campus Remagen, WesterWald Campus Höhr-Grenzhausen | Institute for Ceramic and Glass Arts (IKKG), Höhr-Grenzhausen | Kaiserslautern University of Applied Sciences – Campus Pirmasens, Campus Zweibrücken | Trier University of Applied Sciences – Environmental Campus Birkenfeld, Campus Idar-Oberstein | Bingen University of Applied Sciences | WHU Vallendar – Otto Beisheim School of Management

Non-University Research Institutes

Institutes of the Max Planck Society:
Max Planck Graduate Center, Mainz | Max Planck Institute for Chemistry, Mainz | Max Planck Institute for Polymer Research (MPI-P), Mainz | Max Planck Institute for Software Systems, Kaiserslautern

Fraunhofer-Gesellschaft
Department of Material Characterization and Testing – Fraunhofer Institute for Physical Measurement Techniques IPM, Kaiserslautern | Application Center for Multimodal and Airborne Sensors AMLS – Fraunhofer Institute for High Frequency Physics and Radar Techniques FHR, Remagen | Fraunhofer ICT-IMM, Mainz | Fraunhofer Institute for Experimental Software Engineering IESE, Kaiserslautern | Fraunhofer Institute for Industrial Mathematics ITWM, Kaiserslautern

Helmholtz Association of German Research Centers
Helmholtz Institute Mainz

Research Institutes with federal state participation
Research Institute for Inorganic Materials – Glass/Ceramics (FGK), Höhr-Grenzhausen | Research Institute for Mineral and Metallic Materials – Gemstones and Precious Metals – (FEE), Idar-Oberstein | Institute for Surface and Thin Film Analysis (IFOS), Kaiserslautern | Institute for Composite Materials (IVW), Kaiserslautern | Technological Institute for Functional Polymer Materials and Surfaces (TIFKO), Neuwied | Technology Institute for Metals & Engineering (TIME), Wissen/Sieg

Other Research Institutes
German Research Center for Artificial Intelligence (DFKI), Kaiserslautern | EI-QFM – European Institute for Quality Management in Actuarial Methods and Products, Kaiserslautern | Institute of Biotechnology and Drug Research (IBWF), Kaiserslautern | Institute for Molecular Biology, Mainz | ITB Institute for Innovation, Transfer and Consulting, Bingen | Material Inspection and Testing Center Neuwied – Research Institute for Volcanic Building Materials plc | Photonics Center Kaiserslautern | TRON – Translational Oncology at the University Medical Center of the Johannes Gutenberg University, Mainz

Innovation and Technology Centers with federal state participation

Business + Innovation Center Kaiserslautern – BIC | Technology Center Koblenz – TZK | Technology Center Ludwigshafen – TZL| Technology Center Mainz – TZM | Technology Center Trier – TZT

Photo credits

Ci3 / Andrea Enderlein | BOMAG GmbH | Commercial Vehicle Cluster – Nutzfahrzeug GmbH | Daimler AG | Dr. Rolf Slatter | Dr. Thomas Engel | Ecoliance Rheinland-Pfalz e. V. | Fachhochschule Bingen | Fluitronics GmbH | Forschungsinstitut für Anorganische Werkstoffe – Glas/Keramik-GmbH | Fraunhofer IESE | Fraunhofer ITWM | Georg Banek, www.artepictura.de | Hochschule Kaiserslautern | Hochschule Koblenz | Hochschule Mainz (Lisa Bader, Francesca Müller) | Hochschule Mainz (Sophia Bischoping, Laura Pausinger) | Hochschule Mainz (Stephanie Brenken, Viola Kreßmann) | Hochschule Mainz (Tina Strack, Luisa Gierhardt) | IMKK e. V. | Ingo Bartussek – Fotolia.com | Innomag e. V. | ISB – Werner Feldmann | John Deere | Karlsruher Institut für Technologie (KIT) | Landesbetrieb Daten und Information Rheinland-Pfalz | NASA/JPL-Caltech | Peter Pulkowski / Universitätsmedizin Mainz | Sensitec | Technologie-Initiative SmartFactory KL e. V. | Technologie-Institut für Metall & Engineering GmbH (TIME) | Thomas Brenner | Thomas Koziel, TU Kaiserslautern | Thomas Zilch | TRON / Mathias Kohl | TU Kaiserslautern | TU Kaiserslautern / Landesforschungszentrum OPTIMAS | Umwelt-Campus Birkenfeld | Universität Koblenz-Landau | Universität Trier | Volvo Construction Equipment Germany GmbH

ISB | Investment and Economic Development Bank of Rheinland-Pfalz

RheinlandPfalz
MINISTRY OF ECONOMIC AFFAIRS, TRANSPORT, AGRICULTURE AND VINICULTURE

Holzhofstraße 4
D – 55116 Mainz

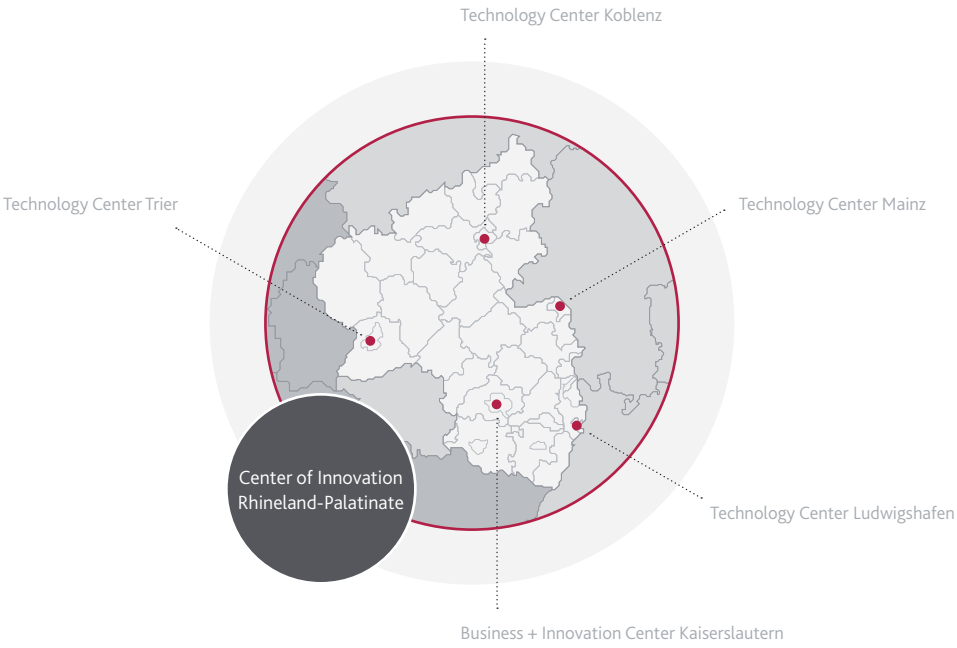
isb-marketing@isb.rlp.de
www.isb.rlp.de
www.standortfinder.rlp.de

Stiftsstraße 9
D – 55116 Mainz

innovation@mwvlw.rlp.de
www.mwvlw.rlp.de/innovation

ISB | Investment and Economic Development Bank of Rheinland-Pfalz

RheinlandPfalz



INNOVATION AND TECHNOLOGY CENTERS IN THE STATE OF RHINELAND-PALATINATE, GERMANY

Rhineland-Palatinate operates innovation and technology centers in the five largest cities of the state. For more than 25 years, these centers have been helping innovative, young technology companies to get established. Startups and spinoffs can find the appropriate consulting services, modern office space, laboratories, and conference areas here to smooth their market entry and facilitate their future development.

In the last two decades, approximately 600 new companies have been founded, some of which are becoming major market participants in Germany, Europe, and worldwide. Currently, 85 young companies are operating from these centers where they occupy about 10,000 square meters.

ISB | Investment and Economic Development Bank of Rheinland-Pfalz



CONTACT

BUSINESS + INNOVATION CENTER KAISERSLAUTERN
Trippstadter Straße 110, 67663 Kaiserslautern
Phone: +49 631 68039-0
kontakt@bic-kl.de
www.bic-kl.de

TECHNOLOGY CENTER KOBLENZ
Universitätsstraße 3, 56070 Koblenz
Phone: +49 261 8854-0
info@tzk.de
www.tzk.de

TECHNOLOGY CENTER LUDWIGSHAFEN
Donnersbergweg 1, 67059 Ludwigshafen
Phone: +49 621 5953-0
kontakt@tz-lu.de
www.tz-lu.de

TECHNOLOGY CENTER MAINZ
Erthalstraße 1, 55116 Mainz
Phone: +49 6131 906 41 10
info@tzmz.de
www.tzmz.de

BIOTECHNICUM OF THE TECHNOLOGY CENTER MAINZ
Erthalstraße 1, 55116 Mainz
Phone: +49 6131 906 41 10
info@tzmz.de
www.tzmz.de

TECHNOLOGY CENTER TRIER
Max-Planck-Str. 6, 54296 Trier
Phone: +49 651 81009-700
kontakt@tz-trier.de
www.tz-trier.de

INNOVATION AND TECHNOLOGY CENTERS IN RHINELAND-PALATINATE

Located close to the University of Kaiserslautern, the BUSINESS + INNOVATION CENTER organizes top quality business meetings and scientific conferences in addition to its resident mix of innovative startups and other high-tech institutions. The Business + Innovation Center reflects the diverse priorities of the Technical University including IT, automation, and mechanical engineering.

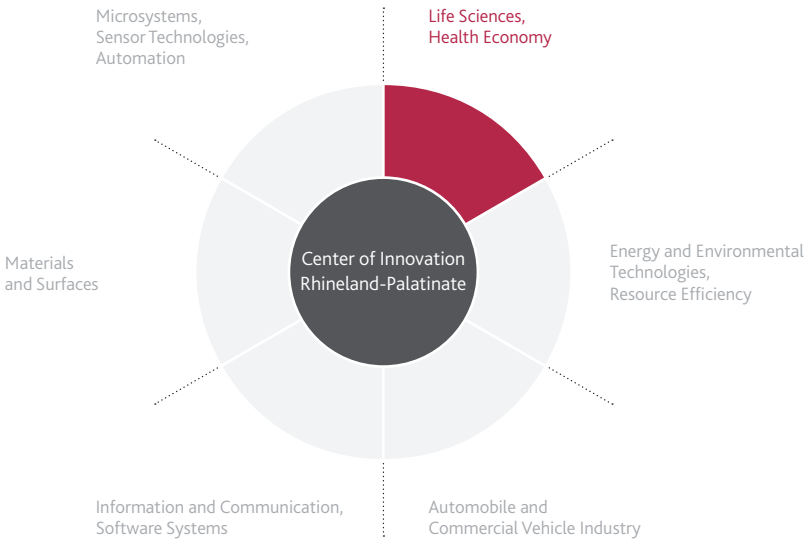
The TECHNOLOGY CENTER KOBLENZ in northern Rhineland-Palatinate focuses on the field of IT services. The Center enjoys a long term cooperation with the University of Koblenz-Landau and has made a name for itself in the development of concepts to support spinoffs and startups in Germany.

In addition to its emphasis on IT, the TECHNOLOGY CENTER LUDWIGSHAFEN provides special support for chemical-related startups. This is taking place in a joint project with the world's largest chemicals group BASF SE, also based in Ludwigshafen.

In the European economic center of Rhine-Main, the TECHNOLOGY CENTER MAINZ is located in the state capital of Rhineland-Palatinate and focuses on biotechnology and the health economy. In addition to the traditional incubator infrastructure, the BIOTECHNICUM provides state of the art lab space to spinoffs and startups.

The TECHNOLOGY CENTER TRIER is well-positioned for international operations thanks to its proximity to Belgium, Luxembourg and France.

Published as of 2015
Credits: .shock, contrastwerkstatt, everythingpossible – Fotolia.com



ADAPTHERA, THE RHEUMATISM NETWORK

- Supports a high number of patients suffering from rheumatoid arthritis throughout the entire course of their disease in a trans-sectoral care-network for individualized therapy that relies on the close cooperation of all partners for the treatment of rheumatic diseases in Rhineland-Palatinate.

- Conducts active research in cooperation with university and industry partners from the fields of medical care, diagnostics, and therapy in order to develop new models for individual, risk-adapted treatments for rheumatic diseases

- Builds a database including a serum- and tissue-bank to create a unique platform for innovative, future-oriented research projects

Overview of high-potential areas where the cluster belongs to



CONTACT

Prof. Dr. Andreas Schwarting
Medical Director
ACURA Kliniken Rheinland-Pfalz AG
Kaiser-Wilhelm-Straße 9–11 | 55543 Bad Kreuznach | Germany
Telefon: +49 671 93-22 30 | E-Mail: andreas.schwarting@kh-acura-kliniken.com

PARTNERS

A number of partners work closely together in the context of ADAPTHERA. Rheumatologic practices, the ACURA clinics, and the the Association of Statutory Health Insurance Physicians (Kassenärtzliche Vereinigung) provide comprehensive and continuous treatment of patients. General practitioners and the support group Rheuma-Liga play an integral part in the early diagnosis and counseling of new patients with rheumatoid arthritis.

The University Medical Department in Mainz and AIRA's Aesku Institute in Wendelsheim conduct research on new testing methods and treatments. A number of big players from the pharmaceutical industry are active cooperation partners of the network.

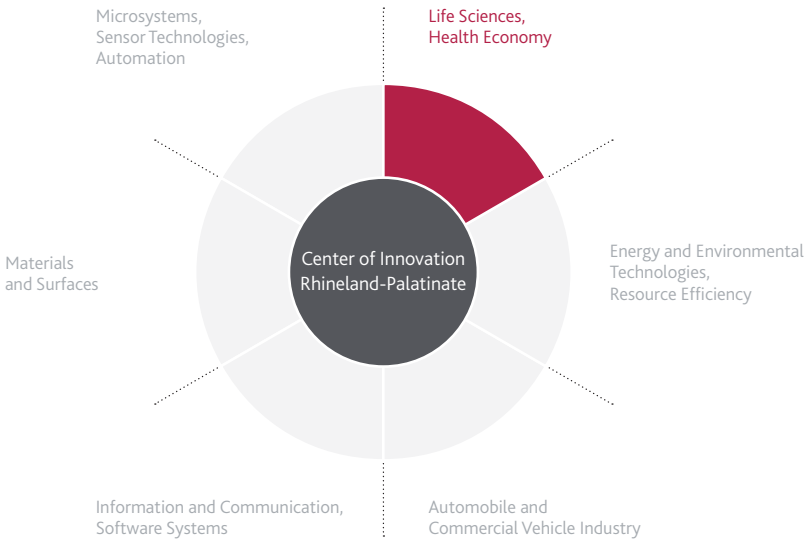
The department for Bioinformatics at the University of Mainz and the renowned Institut für Medizinische Biometrie, Epidemiologie und Informatik (IMBEI) support the development of the ADAPTHERA RheumaRegister, the network's database, serum- and tissue-bank.

APPLICATIONS / MARKETS

With its growing RheumaRegister and professional network management, ADAPTHERA provides ideal conditions for cooperative R&D projects for the field of rheumatoid arthritis and related diseases (evaluation of current therapy strategies, target search, development of new individualized diagnostic and therapeutic options, care research).

ADAPTHERA is looking for R&D partners from the field of industrial research that are interested in taking on an active role in the development of the ADAPTHERA care-network and RheumaRegister with individual cooperative research projects. Projects from the medical and care-oriented research perspectives are also welcome!

Published as of 2015
Credits: Syda Productions, decade3d, abidika – Fotolia.com



CLUSTER FOR INDIVIDUALIZED IMMUNEINTERVENTION (CI3)

The rise of cancer, autoimmune and infectious diseases requires new medical intervention approaches and is increasingly challenging health care systems, worldwide. By utilizing the immune system, individualized immune intervention promises answers to these challenges, by providing novel, more effective, well-tolerated and economically better sustainable treatments.

Located in Europe's leading biopharmaceutical hub, Germany's Rhine-Main region, Ci3 provides the integrative element across the whole biopharmaceutical innovation and value chain and connects more than 100 partners from industry, academia and government to advance truly novel individualized immune intervention approaches.

Overview of high-potential areas where the cluster belongs to



CONTACT

Dr. Andrea Schilz

Managing Director

Cluster for Individualized ImmuneIntervention (Ci3)

Kupferbergterrasse 17–19 | 55116 Mainz | Germany

Phone: +49 6131 5 0193 22 | Fax: +49 6131 5 0193 23

E-Mail: mail@ci-3.de | Website: www.ci-3.de

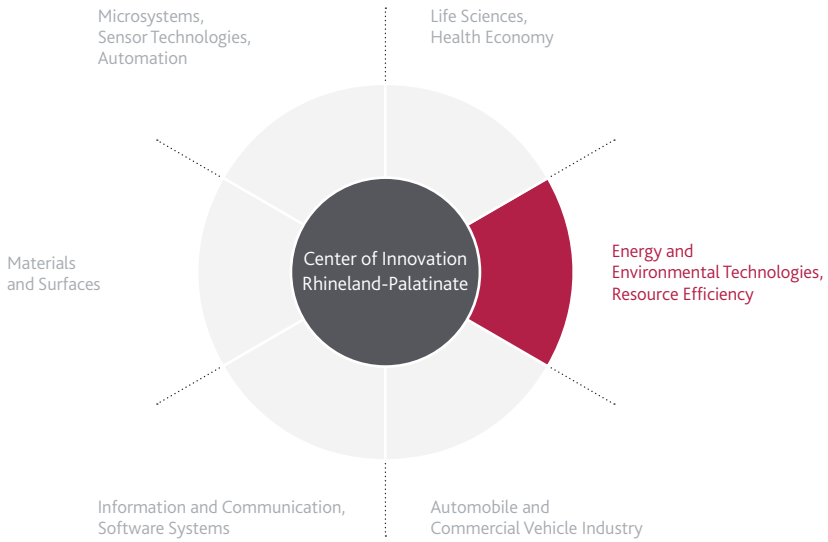
PARTNERS

The majority of immunotherapies are developed in collaborations between academic institutions, SMEs and large pharmaceutical companies. The Ci3 cluster integrates the expertise of these diverse players to further advance individualized immune therapies & diagnostics to reach an international leading position. As a winner of Germany's leading edge cluster competition in 2012, the German Federal Ministry of Education and Research (BMBF) is funding 70 R&D projects of Ci3's partners with up to Euro 40 million, to develop breakthrough immune intervention therapies, diagnostics and platform technologies. This vital innovative element of effective collaboration of different partners in product-oriented project networks forms an essential part of the Ci3-strategy.

APPLICATIONS / MARKETS

With its market focus on stratified and individualized immune intervention, in cancer, autoimmune diseases and infections, Ci3 is positioned in the fasted-growing biopharmaceutical segment, with a yearly two digit worldwide growth in sales and more than 50 billion in worldwide revenue. The strong position of the cluster is based on the technology competence of its partners, which is demonstrated by the clusters leading position with regard to European biopharmaceutical patents. Key technology disciplines are the development of immune diagnostics and therapeutics, biopharmaceutical manufacturing, bioinformatics and pharma economics.

Published as of 2015
Credits: iStock.com/Lisa Gagne, Ci3



ECOLIANCE RHINELAND PALATINATE

Ecoliance is a coalition of key-players in the environmental technology sector of Rhineland-Palatinate and serves as a central contact for its members with a view to potential cooperation projects. The network supports its members in finding the right partners for the successful implementation of comprehensive, application-oriented solutions. Ecoliance also enables its members to participate in pilot projects for markets of the future. Working together, especially small and medium-sized companies can land larger orders, ensure their future development, and thus encourage growth and employment in the state of Rhineland-Palatinate.

Overview of high-potential areas where the cluster belongs to

ISB | Investment and Economic Development Bank of Rheinland-Pfalz

ECOLIANCE RHEINLAND-PFALZ



CONTACT

Dr. Jürgen Gerber

Managing Director

Ecoliance Rheinland-Pfalz e.V. c/o IMG Innovations-Management GmbH

Trippstadter Straße 110 | 67663 Kaiserslautern | Germany

Telephone: +49 631 316 68-10 | Fax: +49 631 316 68-99

E-Mail: gerber@ecoliance.de | Website: www.ecoliance-rlp.de

PARTNERS

Members:

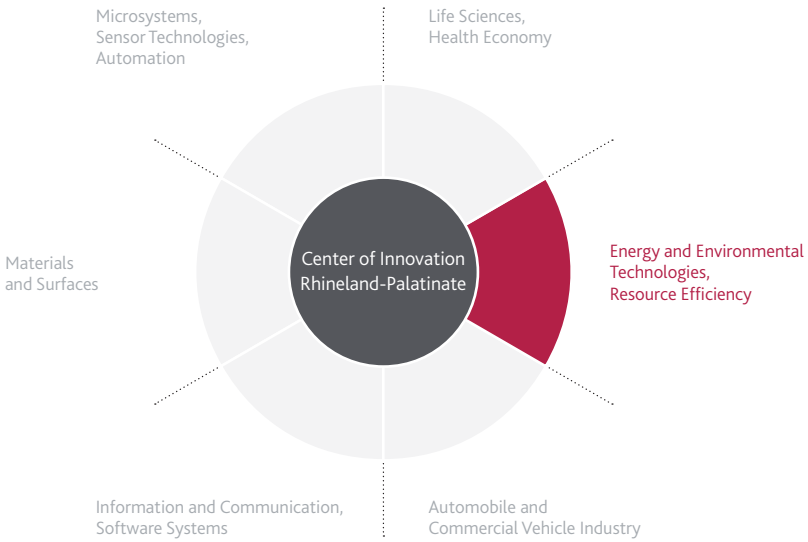
AIM – Angewandte Innovative Materialien GmbH, Baumgärtner & Walz GmbH, Baumgärtner GmbH, BITControl GmbH, Björnsen Beratende Ingenieure GmbH, Coulomb Water Technology GmbH, Damm Solar GmbH, DEEnO Energie AG, deutsche Passivhaus transfer GmbH & Co. KG, Dieter Oppenhäuser (Energie Effizienz Contracting GmbH), Dimitri Wolinski, Energieagentur Region Trier GmbH, EnviroFALK GmbH, EVM AG Energieversorgung Mittelrhein AG, EWM AG, EWR-Netz GmbH, Fachverband Sanitär-, Heizungs- und Klimatechnik Rheinland-Pfalz (Assoc. for Sanitary, Heating, and Air-Conditioning), Faritec GmbH & Co. KG, Günther Schmelzer GmbH, H2BZ Wasserstoff-Brennstoffzellen Kooperationsnetzwerk Rheinland-Pfalz (Cooperation Network for Hydrogen Fuel Cells), Trier University of Applied Sciences, Hofgut Planz, ibF ingenieurbüro Friedrich, IBV Ingenieure GmbH, IHK-Arbeitsgemeinschaft RLP IHK Pfalz, IMA Sanierungszentren GmbH & Co. KG, Ingenieurbüro für Elektrotechnik Plischke UG, Ingenieurbüro H. Berg & Partner GmbH, Ingenieurgesellschaft Dr. Siekmann + Partner mbH, Ingenieurkammer Rheinland-Pfalz (Chamber of Engineers), Institut für Bauverfahrens- und Umwelttechnik (Institute of Construction Processes and Environmental Engineering), Jumel + Kraft Kunststofftechnik GmbH, KBA-FT Engineering GmbH, Kocks Consult GmbH, KSB AG, Kübler GmbH, LWT GmbH Luftwanstechnik, Metropolstrom-NW GmbH, METSÄ TISSUE GMBH, Pallmann Maschinenfabrik GmbH & Co. KG, Peschla + Rochmes GmbH, Pyreg GmbH, Rhenocoll-Werk e. K., Simona AG, Süd-Müll GmbH & Co. KG, Technical University of Kaiserslautern, Thomas Friedrich Financial Relations Consulting, TOMRA Sorting GmbH, Trierer Hafengesellschaft mbH, University of Koblenz-Landau, Ethical Energies Business Group, Vecoplan AG, Viessmann Deutschland GmbH, VOGEL CleanEnergy GmbH, wat Wasser- und Abfalltechnik Ingenieurgesellschaft mbH, Wirtschaftsbetrieb Mainz AöR, Zahnen Technik GmbH

APPLICATION MARKETS / TECHNOLOGIES

Decentralized energy systems, building services engineering, energy efficiency, process water technology, water supply and wastewater treatment, circular economy, material flow management, recycling, plant engineering, mechanical engineering, industrial supply and disposal.

Published as of 2015

Credits: Ecoliance Rheinland-Pfalz e.V.



STOREGIO
ENERGY STORAGE SYSTEMS

StoREgio brings companies across the entire value chain together with academic partners to develop solutions that provide flexibility to energy systems based on renewable energy resources.

In specific application projects we handle technical issues and, in particular, new business models and their economic efficiency. The experience gained flows back into the innovation process to be used to improve products and services and develop new ones.

In addition, we analyze issues such as regulatory frameworks, user acceptance or safety and security, which are essential for successful applications and systems.

Overview of high-potential areas where the cluster belongs to

ISB | Investment and Economic Development Bank of Rheinland-Pfalz

StoREgio



CONTACT

Dr. Peter Eckerle

Managing Director

StoREgio Energiespeichersysteme e. V.

Donnersbergweg 1 | 67059 Ludwigshafen | Germany

Telephone: +49 621 59 28 09-31 | Fax: +49 621 59 28 09-38

E-Mail: peter.eckerle@storegio.com | Website: www.storegio.com

PARTNERS

ABB AG, ads-tec GmbH, BASF SE, Deutsche Telekom AG, Fraunhofer IESE, Fraunhofer ISE, Fraunhofer ITWM, HEAG Südhessische Energie AG (HSE), Darmstadt University of Applied Sciences, KIT – Karlsruhe Institute of Technology, Metropolregion Rhein-Neckar GmbH (MRN), MVV Energie AG, Panasonic R & D Center Germany GmbH, Pfalzwerke AG, Siemens AG, Smart Grids-Plattform Baden-Württemberg e. V., Solar Cluster Baden-Württemberg e. V., Solibra GmbH, Stadtwerke Heidelberg GmbH, Stadtwerke Speyer GmbH, TWL Technische Werke Ludwigshafen AG, WIRSOL GmbH, Younicos AG

APPLICATIONS / MARKETS

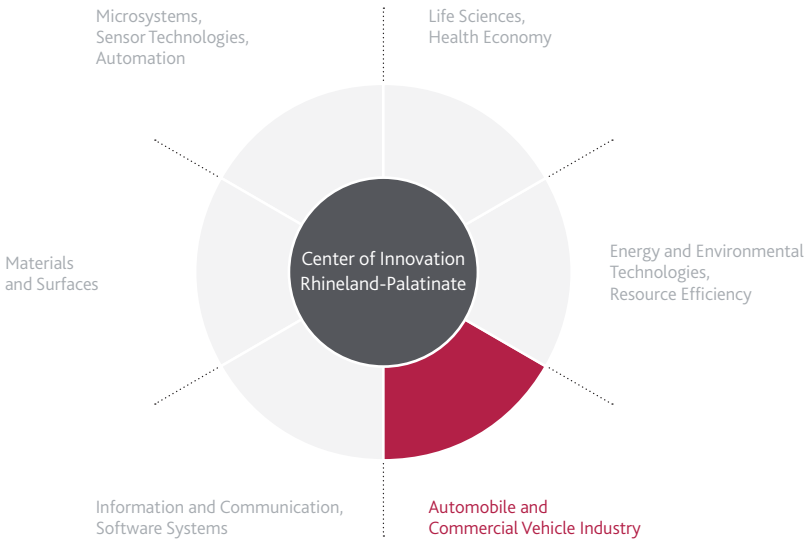
StoREgio primarily deals with different types of stationary energy storage systems (electro-chemical, thermal, chemical, mechanical). Industrial load management is also factored in as a process related to storage. With their different characteristic profiles, these options flexibly address various fields of application and may be used in combination. StoREgio defines an energy storage system as a combination of specific storage technologies and the necessary information and communication systems to ensure safe and reliable integration and operation in smart grids. This starts with forecasting systems for load and generation profiles and extends to measurement and control systems and finally accounting systems.

Energy storage systems can be used in a wide variety of applications. These differ greatly from one another in terms of the starage system´s power and energy requirements. Other crucial factors for practical application include service life, reaction speed, peak power and potential hazards. All of these factors together determine the economic efficiency – and thus the willingness of potential users to invest in such systems.

In addition to classic applications such as grid stabilizationservices (balancing power, black start ability), back-up systems, peak shaving or deferral of grid extension, StoREgio also examines innovative energy services for private and commercial end customers, in which storage systems play a major role. Increasing decentralization of energy generation and the transformation of consumers into producers of energy mean that the sale of energy as the basis of most suppliers' business models is increasingly being replaced by services which create an added value for customers. The IT upgrading of the power grid will make a major contribution to this as well.

Published as of 2015

Credits: Smileus, artjazz, Gina Sanders – Fotolia.com



COMMERCIAL VEHICLE CLUSTER

The Center for Commercial Vehicle Technology, the Fraunhofer's DNT Innovation Cluster (Digital Commercial Vehicle Technology), and the Commercial Vehicle Cluster Southwest (CVC) are working together successfully in the Commercial Vehicle Alliance (CVA).

The collaboration between industry and science includes pre-development projects, cooperation in technical matters, the Commercial Vehicle Technology School, the implementation of the Commercial Vehicle Technology Symposium and joint public relations work.

The goal of all participants is the expansion and marketing of R&D expertise as well as educational qualification potential in the commercial vehicle industry segment of the State of Rhineland-Palatinate.

Overview of high-potential areas where the cluster belongs to

ISB | Investment and Economic Development Bank of Rheinland-Pfalz

CVC Südwest



CONTACT

Dr. Martin Thul

Managing Director

Commercial Vehicle Cluster – Nutzfahrzeug GmbH

Europaallee 3 – 5 | 67657 Kaiserslautern | Germany

Telephone: +49 631 41 48 625-0 | Fax: +49 631 41 48 625-9

E-Mail: martin.thul@cvc-suedwest.com | Website: www.cvc-suedwest.com

PARTNERS

Europe: Flanders' DRIVE (BE), FIER Automotive (NL), GOODYEAR DUNLOP TIRES OPERATIONS S.A. (LU), Societé SAFRA (FR) **Germany:** Daimler AG, John Deere, the German Association of the Automotive Industry (Verband der Automobilindustrie e.V. VDA), the German Engineering Association (Verband Deutscher Maschinen- und Anlagenbau e.V. VDMA), Evobus GmbH, Schmitz Cargobull AG, DAF Trucks Deutschland GmbH, MAN SE, Scania Deutschland GmbH, Volvo Construction Equipment Germany GmbH, Grammer AG, Robert Bosch GmbH, Continental AG, Liebherr-International Deutschland GmbH, Terex Cranes Germany GmbH, Johnson Controls Components GmbH & Co. KG, Wirtgen GmbH, euro engineering AG, DBK David+Baader GmbH, Robert Seuffer GmbH & Co. KG, Faun Umwelttechnik GmbH & Co. KG, Schaeffler AG, Knorr-Bremse AG, MBtech Group GmbH & Co. KGaA, Progress Rail Inspection & Information Systems GmbH, ITK Engineering AG, LöSi GmbH, Braun Maschinenbau GmbH, Ero Gerätebau GmbH, Werner GmbH Forst- und Industrietechnik

APPLICATIONS / MARKETS

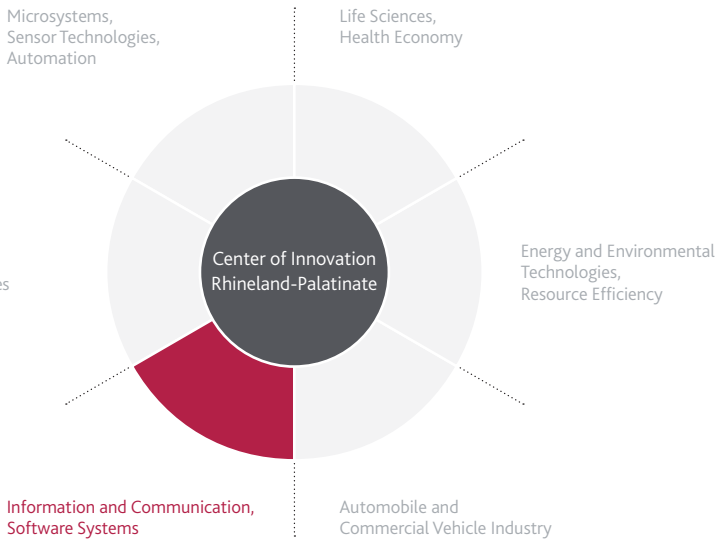
Commercial vehicle industry and suppliers

RESEARCH FIELDS | Innovative, networked vehicles: Intelligent solutions for networked vehicles; Secure cooperation and navigation of automated commercial vehicles for low-speed operation; Automation of processes, autonomous functions; Electrical/electronic architectures in the vehicle; Development of electronic control units | **Energy and CO_2 efficiency:** Electrification of ancillary units/working hydraulics; VMC – Virtual Measurement Campaign to collect data for load and use of vehicles – resource-efficient production | **Person-vehicle system:** Driver assistance systems; Integration of mobile end devices; Interactive person-vehicle-environment simulation; Human machine interfaces (HMI) | **Added value services:** Additive manufacturing in commercial vehicle production; Variant management, parameterization; Innovation management; Preventative maintenance; Cable and hose simulation; Software test, cognitive science; Development of a new structurally extended tire model; Usability studies, utilization and error analysis in the interactive simulation; Onboard monitoring

FEATURES | Servo-hydraulic test benches for stability/oscillating comfort studies; System test bench for hydraulic power generation systems; "RODOS" simulator for construction, agricultural and mobile work machines

Published as of 2015

Credits: Daimler AG, John Deere, Volvo Construction Equipment Germany GmbH



SOFTWARE-CLUSTER

The Software-Cluster in southwest Germany is Europe's Silicon Valley for enterprise software. In the region around Kaiserslautern, Darmstadt, Karlsruhe, Saarbrücken, and Walldorf, more than 130,000 people are employed in over 11,000 software companies. The region's university computer science departments and research institutions regularly earn top positions in international rankings. Since 2010, the Software-Cluster has been recognized as a Cluster of Excellence by the German government. Its goals include promotion of research and development, technology transfer and startup support, branding and international visibility of the cluster, as well as the creation of new educational and training programs.

Overview of high-potential areas where the cluster belongs to

ISB | Investment and Economic Development Bank of Rheinland-Pfalz

Software-Cluster

CONTACT

Thomas Jeswein

Managing Director

Software Technologie Initiative e.V.

Fraunhofer Institute for Experimental Software Engineering IESE

Fraunhofer-Platz 1 | 67663 Kaiserslautern | Germany

Telephone: +49 631 6800-2106 | Fax: +49 631 6800-9-2106

E-Mail: thomas.jeswein@iese.fraunhofer.de | Website: www.iese.fraunhofer.de

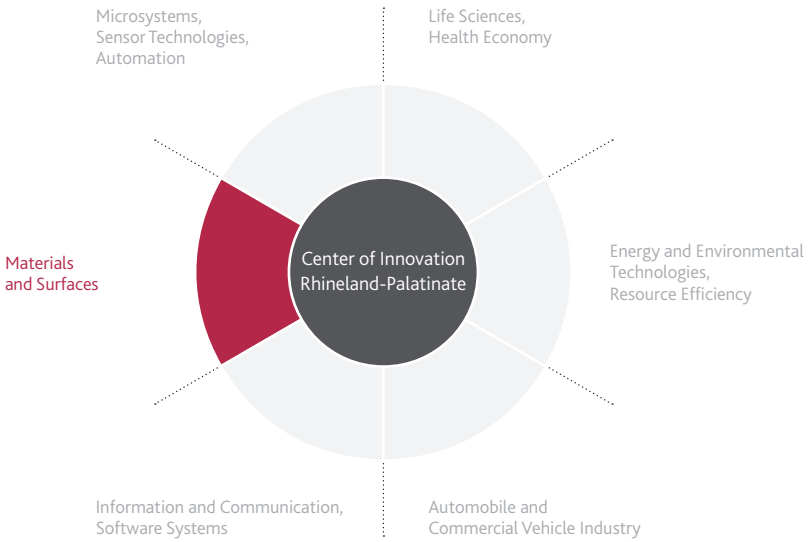
PARTNERS

More than 250 companies are partners in the Software-Cluster. These include the large German producers of enterprise software (SAP SE, Software AG), leading small and medium-sized enterprises (proALPHA Software GmbH, CAS Software AG, SEEBURGER AG), as well as numerous innovative small and medium-sized enterprises and start-ups. Also included are the computer science departments of the universities in Kaiserslautern, Saarbrücken, Darmstadt, and Karlsruhe, as well as the research institute startups Fraunhofer IESE, ITWM (Kaiserslautern), SIT, IGD (Darmstadt), FZI (Karlsruhe), and the German Research Center for Artificial Intelligence (Saarbrücken, Kaiserslautern).

APPLICATIONS / MARKETS

The Software-Cluster is developing the enterprise software of the future, for all sectors of industry, worldwide. This so-called emergent software will help to completely transform companies into digital companies in which the driving motor for product and process innovation is the Information and Communication Technology. This new kind of software will dynamically adapt to the requirements of the market and the business environment (adaptivity), support complex enterprise networks (agility), and enable innovative services in the future Internet. The central prerequisite for both the Internet of Services and Things and for moving processes to the Cloud is to ensure a consistently high level of security, data protection, and service quality. IT security is therefore one of the most important research and development topics in the Software-Cluster.

Published as of 2015
Credits: red150770 – Fotolia.com, iStock.com/Mikko Lemola/shutter_m



METAL-CERAMIC-PLASTIC INNOVATION NETWORK

The Metal-Ceramic-Plastic Innovation Network (IMKK) provides companies in northern Rhineland-Palatinate that have a primary focus on metals, ceramics, plastics, mineral-based building materials and surface technologies a platform for cooperation and networking, where they can combine their complementary materials expertise and develop innovative materials and manufacturing concepts. As a triple-helix cluster in which business, municipalities/government and research are closely associated, the IMKK supports some 800 regional companies in their pursuit of international competitiveness in constantly changing global markets.

Overview of high-potential areas where the cluster belongs to

ISB | Investment and Economic Development Bank of Rheinland-Pfalz



CONTACT

Metal-Ceramic-Plastic Innovation Network
Rheinstraße 60 a | 56203 Höhr-Grenzhausen | Germany
info@metall-keramik-kunststoff.de
Phone: +49 26 24 94 73-210 | Fax: +49 26 24 94 73-129
Website: www.metall-keramik-kunststoff.de

PARTNERS

Members (R&D institutes, municipalities, associations and companies) and cooperation partners

R&D institutes: Research Institute for Inorganic Materials – Glass/Ceramic (FGK) GmbH, Höhr-Grenzhausen / European Center for Refractories (ECREF) gemeinnützige GmbH, Höhr-Grenzhausen / Education and Research Center for Ceramics (BFZK) e.V. Höhr-Grenzhausen / Material Inspection and Testing Institute Neuwied (MPVA) GmbH, Neuwied / Technology Institute for Functional Plastics and Surfaces (tifko) GmbH, Neuwied / Technology Institute for Metal & Engineering (TIME) GmbH, Wissen / Technology Center for Surface Technology Rheinbreitbach GmbH, Rheinbreitbach

Municipalities: Development of SMEs in the Neuwied District GmbH, Neuwied / Westerwald District Economic Development Agency mbH, Montabaur / Altenkirchen District Economic Development Agency mbH, Altenkirchen / Kannenbäckerstadt Economic Development Agency mbH, Höhr-Grenzhausen / Höhr-Grenzhausen Local Authorities Association, Höhr-Grenzhausen

Associations: Federal Association for Lightweight Concrete e.V., Neuwied / Education and Research Center for Ceramics e.V., Höhr-Grenzhausen

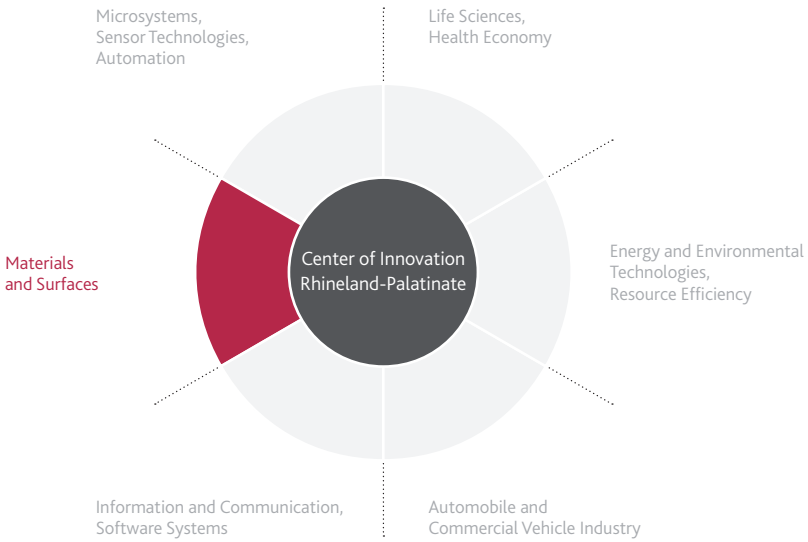
Companies: EWM AG, Mündersbach / Maschinenbau Böhmer GmbH, Steinebach / VWH Vorrichtungs- und Werkzeugbau GmbH, Herschbach / Weberit Werke Dräbing GmbH, Oberlahr / Weber GmbH & Co. KG Kunststofftechnik und Formenbau, Dillenburg / ARALON GmbH, Montabaur / AKMA GmbH, Altenkirchen / Maschinenbau Wüst GmbH, Ötzingen / Lohmann GmbH & Co. KG, Neuwied / GIRLICH Technische Kunststoffe Kunststoffbearbeitung GmbH, Neuwied / Kalenborn International GmbH & Co. KG, Vettelschoss / RHI Urmitz AG & Co. KG, Mülheim-Kärlich / WEW Westerwälder Eisenwerke GmbH, Weitefeld / Germatec GmbH, Ransbach-Baumbach / LKH Kunststoffwerk Heiligenroth GmbH & Co. KG, Heiligenroth / Reuth GmbH, Großmaischeid / Dr. Boy GmbH & Co. KG, Neustadt / Rittal GmbH & Co. KG, Herborn

Partners: University of Koblenz-Landau, Koblenz / Koblenz University of Applied Sciences, Koblenz / University of Siegen, Siegen / Koblenz Chamber of Industry and Commerce, Koblenz / Koblenz Chamber of Crafts, Koblenz

APPLICATIONS / MARKETS

Besides industry-specific expertise in metals, ceramics and plastics, refractory materials and mechanical engineering, the focus of the IMKK member companies and institutes is on initiating and developing innovative hybrid materials and products, and resource-efficient lightweight construction solutions. Cross-industry cooperation and innovative material combinations lead to the development of brand-new material and manufacturing concepts.

Published as of 2015
Credits: IMKK e.V.



KOM-K-TEC – COMPETENCE NETWORK FOR PLASTIC TECHNOLOGY RHINELAND-PALATINATE

Since its establishment in Rhineland-Palatinate in 2010, the Kom-K-Tec competence network has linked the know-how of the plastics processing industry in the state.

Companies and research institutions use the platform to exchange information and form efficient working relationships.
The mid-term goal of its membership is to increase revenues and lower costs through cooperative projects. Additionally, the network provides support to its members in applying for and carrying out publicly funded research projects.

Overview of high-potential areas where the cluster belongs to



CONTACT

Dr.-Ing. Robert Lahr
Networking Officer
Institut für Verbundwerkstoffe GmbH
Erwin-Schroedinger-Str. 58 | 67663 Kaiserslautern | Germany
Phone: +49 631 2017 448
E-Mail: robert.lahr@ivw.uni-kl.de | Website: www.kom-k-tec.de

PARTNERS

More than 40 member companies and over 20 research & development cooperation partners are involved in the Kom-K-Tec network.

The size of the companies ranges from "one-man consultancies" to medium-sized companies with international operations.

In addition to partners in Rhineland-Palatinate, the network now stretches across the state borders to the Saarland, Baden-Wuerttemberg, and Bavaria.

APPLICATIONS / MARKETS

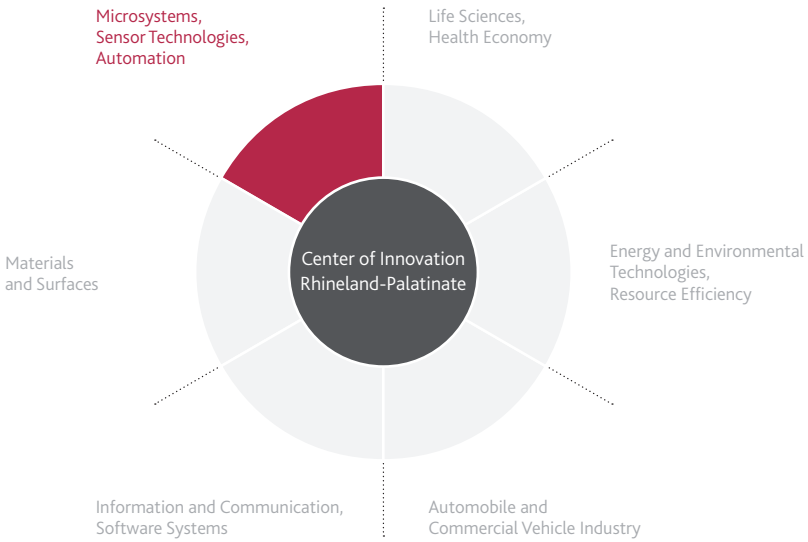
The member companies and cooperation partners have skills in all areas of the plastics processing industry such as component design, materials development, and process manufacturing and testing.

The substitution of existing metal applications with synthetic-based structures is a key area of activity that stretches across the entire industry.

This development, in addition to reducing costs, is a topic in the areas of lightweight construction, improved wear behavior, resistance to environmental influences, and functional integration.

The main application markets are vehicle construction, medical technologies, equipment engineering, and sports.

Published as of 2015
Credits: IVW GmbH



INNOVATION PLATFORM FOR MAGNETIC MICROSYSTEMS INNOMAG

INNOMAG combines the interests and potentials of producers, service providers and users in a single Network.

Main objective is to connect research, development and manufacturing technology. By this networking the potentials of magnetic microsystems are clustered and optimally coordinated. Further objectives are:

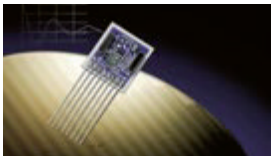
- To merge the interests and competences of industry to establish new products and services using magnetic microsystems
- Realisation of application specific system prototypes
- Organisation of seminars and qualification
- Further development of advanced manufacturing technology
- Fast transfer of research results into product development
- Development of advanced design methods and technologies for system integration

Overview of high-potential areas where the cluster belongs to

ISB | Investment and Economic Development Bank of Rheinland-Pfalz

INNOMAG





CONTACT

Dr. Jürgen Gerber

Networkmanager

Innovation platform for magnetic microsystems INNOMAG e.V.

Trippstadter Straße 110 | 67663 Kaiserslautern | Germany

Phone: +49 6 31 3 16 68-10 | Fax: +49 6 31 3 16 68-99

E-Mail: gerber@innomag.org | Website: www.innomag.org

PARTNERS

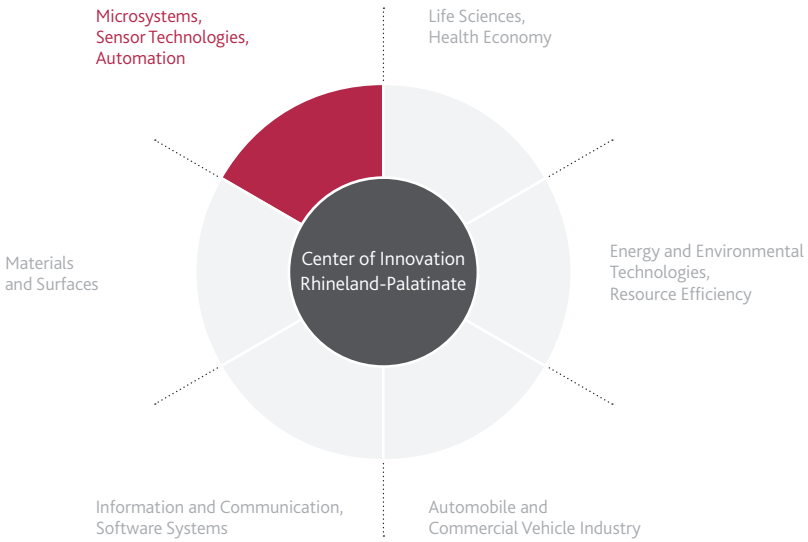
ams AG, Baumer IVO GmbH & Co. KG, Beckhoff Automation GmbH & Co. KG, BOGEN Electronic GmbH, BAM Bundesanstalt für Materialforschung und -prüfung, ELGO ELECTRONIC GmbH & Co. KG, ELSOMA GmbH, Festo AG & Co. KG, First Sensor AG, Fraba AG, Fraunhofer-Institut für Integrierte Schaltungen IIS, GEMAC – Gesellschaft für Mikroelektronikanwendung Chemnitz mbH, Giesecke & Devrient GmbH, Balluff HighResolution GmbH, iC-Haus GmbH, Institut für Oberflächen- und Schichtanalytik GmbH, Leibniz-Institut für Festkörper- und Werkstoffforschung Dresden e.V., IMSTec GmbH, Fraunhofer ICT-IMM, Johannes Gutenberg Universität Mainz, Institut für Mikroproduktionstechnik, Lenord, Bauer & Co. GmbH, Lust Hybrid-Technik GmbH, MACCON GmbH, MAGNOPOL GmbH & Co. KG, Matesy GmbH, MEAS Deutschland GmbH, Merck KGaA, Micro Systems Engineering GmbH, Landesforschungszentrum OPTIMAS, Pepperl+Fuchs Vertrieb Deutschland GmbH, PREMA Semiconductor GmbH, Sensitec GmbH, Technische Universität Kaiserslautern, TR-Electronic GmbH, TRINAMIC Motion Control GmbH & Co. KG, VSE Volumentechnik GmbH

APPLICATIONS / MARKETS

The variety of applications in different branches is impressing and the number of applications is steadily increasing. Hall- and magnetoresistive sensors are becoming omnipresent in the automotive sector, e. g. in wheel- and steering angle sensors for torque measurement or as miniaturized systems with integrated processing as well as traffic engineering, e. g. by using new methods for monitoring of parked cars or moving traffic, and, last but not least, in the non-destructive testing of materials. Medium-sized companies in machine and plant construction are also more and more interested in new solutions with increased precision and robustness. Magnetic sensors can deliver advanced solutions, e. g. in consumer electronics or medical technologies. No matter whether in washing machines, smartphones or cameras or in bio analytics or human diagnostics magnetic sensors (magnetic compass) play a key role in realising new functionalities. Furthermore, magnetic sensors for position and current measurement are essential in the fields of nenewable energy or e-mobility. Whether in wind turbines or photovoltaic converters as well as energy management in electric vehicles – the precise measurement of movement and electrical current plays a decisive role.

Published as of 2015

Credits: NASA/JPL-Caltech, Innomag e. V.



TECHNOLOGY-INITIATIVE SMARTFACTORY KL

SmartFactory KL is a unique, manufacturer-independent technology demonstrator and research platform for testing and developing innovative information and communication technologies (ICT). The application oriented research is performed in realistic industrial production environments together with 38 partners. The aim is to develop ICT applications that advance the vision of Industrie 4.0 and to integrate them into factory automation systems.

Overview of high-potential areas where the cluster belongs to

ISB | Investment and Economic Development Bank of Rheinland-Pfalz

smartFactory KL



CONTACT

Dipl.-Wirtsch.-Ing. Rüdiger Dabelow

Managing Director

Technology-Initiative SmartFactory KL e. V.

Trippstadter Straße 122 | 67663 Kaiserslautern | Germany

Phone: +49 631 2057 5 - 3401 | Fax: +49 631 2057 5 - 3402

E-Mail: dabelow@smartfactory.de | Website: www.smartfactory-kl.de

PARTNERS

Arend Prozessautomation, BASF, BELDEN Electronics, Bosch Rexroth, Cisco Systems, Continental Teves, Deutsche MESSE, German Research Center for Artificial Intelligence DFKI, EPLAN Software & Service, Festo, Flextronics, HARTING, IBM Germany, John Deere Mannheim, Johnson Controls Components, KSB, Lucian Blaga Universität Sibiu, Lund University, MiniTec, Phoenix Contact, Pilz, proALPHA Software, Progress Software, ProMinent Dosiertechnik, SAMA PARTNERS Business Solutions, SAP, Siemens, Softing Industrial Automation, University of Technology and Science Kaiserslautern, TÜV SÜD, Tyco Electronics AMP, U.I. LAPP, Unipo, Universitat Politècnica de València, Weidmüller Interface, WIBU-SYSTEMS, WIPOTEC Weighing Technology, WITTENSTEIN

APPLICATIONS / MARKETS

Since 2005, SmartFactory KL has been working closely with the German Research Center for Artificial Intelligence (DFKI) in Kaiserslautern to develop realistic production solutions for the future. The innovative research and development of industry oriented applications and the SmartFactory demonstrator are a driving force in bringing the concepts of Industrie 4.0 to the fore of public awareness. The initiative makes it possible to realize the Industrie 4.0 vision with its ground-breaking solutions and developments in both automation technology and human-machine interaction (HMI). Taking on the role of pioneer and trailblazer, the 38-member initiative is transferring the knowledge in this area of research to practical applications. Manufacturer-independent efforts and results demonstrate how it is done – from both the user and the supplier perspectives. Numerous demonstration units have helped to visualize the developments. Collaboration on the central theme of standardization is resulting in the discovery of novel methods for implementing the technology. SmartFactory KL, and 16 of its partners have succeeded in building the world's first, manufacturer independent Industrie 4.0 facility. This achievement represents an important step in the transition of the Industrie 4.0 concept to the real industrial production of the future.

Published as of 2015

Credits: Technologie-Initiative SmartFactory KL e. V.