

Small State – Big Research

Saarland's Research and Innovation Competencies
in the Framework of International Cooperation



Scientific
excellence
for Europe



• Government
of the State

SAARLAND



Moving Onto New Horizons

Foreword of the Minister-President

Saarland can rely on remarkable competencies when it comes to France and Europe. This is all the more true in the field of science. In this regard, the EU Framework Programme for Research and Innovation “Horizon 2020” bears great opportunities and opens up new prospects for its stakeholders in science and industry.

As driving forces at the core of the economic development, innovation and research have always enjoyed a special status.

In the sphere of research activities, Saarland’s long history of cross-border cooperation between universities, research institutes and enterprises has an important role to play in seizing development opportunities. As Saarland grows into new structures and networks, we want to further promote these features and develop them in the realm of science as well as that of economy. That’s why we deem it important to participate in EU programmes in order to raise additional funds which are conducive to the science sector and to the corporate landscape of Saarland.

In this light, the federal government of the state is backing an important initiative entitled “Route 2020”, within

Annegret
Kramp-Karrenbauer



which enterprises and research institutes of Saarland are provided with significant support in their plans to integrate EU projects in the fields of science and innovation.

Information and communication technologies, personalized medicine, energy and environmental technologies, Industry 4.0 and contagious diseases; these are five current topics in the area of research and innovation in which Saarland can build upon outstanding local competencies and a sustainable network of European partners, as the present brochure will impressively illustrate.

I hope this brochure may be treated as an invitation for you to help bring about the launching of new cooperation projects with Saarland-based partners in the framework of “Horizon 2020”!

A handwritten signature in blue ink, reading 'AK-K'.

Annegret Kramp-Karrenbauer
Minister-President of Saarland

Small State – Big Research

Seven Years of Research Funding: a Track Record

Saarland's participation in the 7th EU Research Framework Programme (FP7) has been exceptionally successful. From 2007 to 2013, the Saarland University, research institutes and Saarland-based enterprises have managed to raise funds worth approximately 75 million euros, which represents a substantial increase compared to previous years.

Situated at the heart of Europe, Saarland is a well positioned hub for research and innovation with excellent networks while EU research programs are playing an ever growing role in promoting innovation.

In a nationwide comparison, Saarland took the lead in terms of enterprises involved in research projects during FP7. Furthermore, when it comes to funds allocated per researcher, Saarland ranks second.

Saarland's participation in FP7 has been exceptionally successful.



In FP7, Saarland focused on pioneering technology sectors such as energy and environmental technologies, information and communication technologies and life sciences.

On a percentage basis, the share of information and communication technologies (ICT) and life sciences in Saarland was the largest among all other federal states. This topical focus triggered synergetic effects for projects which combined health and IT, particularly in the area of personalized medicine, systems biology and systems medicine.

These facts and figures can be taken as an evidence for the excellent prerequisites Saarland offers as an innovation hub. This successful development has to be sustained within “Horizon 2020”. With “Route 2020”, the ground-work has already been laid to enable such a development.

A comparison: Participation by thematic area within FP7*

	Saarland	Germany	European Union
ICT	34	23	18
Health	26	15	16
SME share	39	14	15

*Figures in percent
(Source: Corda data base)

Facts & Figures

- Saarland: 154 projects worth a total volume of €75 million, involving 176 participants
- Fundraising of the Saarland University increased by 135%
- Top ranking in terms of funds allocated to researchers
- 140 new jobs created in EU funded projects
- Highest number of participating enterprises nationwide
- Saarland-based SMEs have a high potential for innovation



Keeping Private Matters Private

How Safe is the Internet of Tomorrow?

Whether we are using online banking, checking stock prices with our smart phone or whether we are storing data in the cloud – the internet has already become ubiquitous in our work environment and in our everyday lives. While the comprehensive integration of ICT into all spheres of life has its advantages, it also bears high risks, as it is almost impossible to keep control over personal data, once it has been put online. In this context, frequent news about data misuse, data theft or industrial espionage clearly shows the risks incurred.

For this reason, IT security and privacy protection both play an important role in the realm of research and development. This also applies to internationally renowned institutes located in Saarland, carrying out cutting-edge research which has earned recognition on a global scale. Within the centre of excellence CISPA, cooperation between the German Research Centre for Artificial Intelligence (DKFI), two Max-Planck Institutes (MPI for Computer Science and MPI for Software Systems) and the Saarland University have lead to a common research agenda.

In a digital world, privacy is not as safeguarded, as many would like it to believe.





“Safeguarding our digital privacy in the 21st century, requires a paradigm shift.”

Prof. Dr Michael Backes
Saarland University

Involving the Saarland University and the two Max-Planck Institutes, “Privacy, Accountability, Compliance, and Trust in Tomorrow’s Internet (imPACT)” is a research project aiming at protecting data privacy.

Exploring the foundations for privacy protection in tomorrow’s internet, Michael Backes, Peter Druschel, Rupak Majumdar and Gerhard Weikum are steering this top-class project which has been awarded the ERC Synergy Grant, the most highly endowed research prize of the European Research Council.

However, Saarland’s leading role in the field of informatics is not limited to IT-security only. The cluster of excellence “Multimodal Computing and Interaction (MMCI)” is conducting cutting-edge research in the field of text, voice and visual data processing. Since 2007, this cluster is being promoted in the framework of the Excellence Initiative of the German Federal and State Governments.

For further information

impact-erc.eu
cispa.saarland
mmci.uni-saarland.de



Healing Patients Instead of Curing Diseases

Individualized Treatments Through Personalized Medicine

Many have experienced it personally: while a treatment is helpful for some, the very same treatment does not work out for others and can have side effects or even worse, might lead to a further deterioration. While for a long time it was assumed identical disease patterns can also be treated identically, today it is commonly acknowledged that individual treatments tailored to the needs of each patient are far more likely to be successful. From this perspective, connecting research activities and clinical medicine is crucial in linking the knowledge and data gathered in these two areas.

By international comparison, the density of research institutes in the sphere of medical sciences and IT is exceptionally high in Saarland. These favorable conditions have led to the development of Saarland's huge importance with regard to personalized medicine. In a cross-disciplinary approach, experts in the fields of clinical research and informatics are working together. Already today, there are countless studies, findings, analyses and therapies dealing with different diseases spread around the world.

Personalized medicine helps identify the best possible treatment for each patient.



“In the future, a cross-disciplinary approach to co-operation as well as an intelligent IT infrastructure will bring about lasting changes in the fields of medicine, improving prognosis and treatments.”

Prof. Dr Norbert Graf
Saarland University



To enable the best possible use of patients' data, it has to be intelligently integrated into a network. In participating in the EU project “p-medicine”, Professor Norbert Graf from the Homburg/Saar University Hospital is paving the way for such progress in personalized medicine. This project led to a broad cooperation, involving IT specialists, clinicians, biologists, ethicists, legal practitioners and data privacy experts from all over the world. Essentially, the aim is to develop an IT infrastructure allowing the processing and analysis of enormous amounts of data stemming from a myriad of different sources. Thus, doctors will have quicker access to a pool of information enabling them to make quicker diagnoses and to establish individual, effective, therapeutic approaches with fewer side effects. Also, within the project, particular attention is drawn to the protection of data pertaining to patients.

In order to reduce the bureaucratic burden related to clinical trials and to allow greater numbers of participants, professor Norbert Graf has founded the “Study, Trial and Research Center (STaRC)”.

For further information

p-medicine.eu
eu-starc.eu



Taking a Deep Breath

Clean Air for Our Children

Air pollution puts our health at risk. Taking a deep breath without falling ill is a basic right each citizen has and which can even be invoked before court. In its commitment for cleaner air, the European Union has tightened directives and thresholds.

In Saarland, numerous research groups and enterprises are offering innovative solutions to energy and environmental issues, as is the case for the Institute for Future Energy System IZES. The Saarland University is also undertaking research in the development and utilization of alternative energy and in tackling air pollution. These efforts are not limited to outdoor pollution only, as the use of printers and computers can contaminate indoor air as well.

The EU project “SENSIndoor” clearly shows that environmental protection starts in one’s own home. Chairing the Laboratory for Measurement of the Saarland University, Professor Schütze and an international team of experts

Micro and nano sensor systems are at the base of customized ventilation and allow for a healthier indoor climate while driving down energy consumption.





“In today’s world physical sensors are everywhere. The next milestone will be the development of chemical sensors for environmental, medical, industrial and everyday use.”

Prof. Dr Andreas Schütze
Saarland University

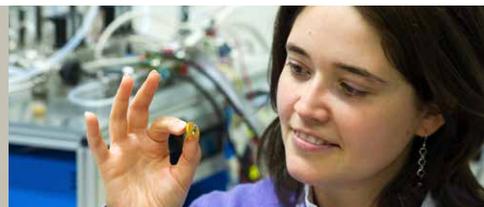
focus their research on customized ventilation for indoor environments, using gas detectors and sensor systems. The Saarland-based Technology Company 3S has undoubtedly contributed to the success of this project by developing the hardware for these systems.

Many are not aware of the fact, that furniture, carpets or cleaning products emit odourless pollutants which are harmful to one’s health. Fresh air reduces these risks. However, at some point, open windows drive up energy costs and thus contributes to increasing CO₂ emissions.

The set goal of “SENSIndoor” project partners is to reduce energy consumption and health risks with a cost-effective, intelligent ventilation system. Gas detectors monitor airborne pollutants; using measurement data and additional information on how and when indoor spaces are used, the system adapts the supply of fresh automatically. Hence high-quality indoor air is guaranteed and impacts on the environment are significantly lowered.

For further information

sensindoor.eu
3s-ing.de



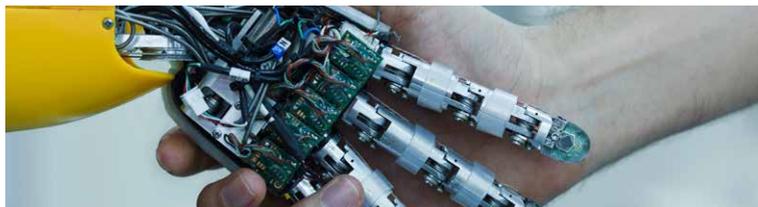
The Smart Factory: Industry 4.0

Innovative Technology in Automation and Robotics

We are about to witness a revolution in industry and in our everyday lives. The eras of mechanization and mass production were followed by the era of digitalization. Today, we are on the eve of the fourth industrial revolution: The computerization of production processes. Smart Homes or Autonomous Driving shows that the Internet of Things has become reality. The aim of Industry 4.0 is to intelligently computerize factories. In such a network, machines, humans and products are able to communicate with each other, are kept up to date on production processes and adapt accordingly – at best, in a resource saving manner.

As many industries are located in Saarland, intelligent solutions pertaining to automation and manufacturing processes are of central importance to the region. In this field, Saarland-based enterprises and distinguished research institutes such as the German Research Centre for Artificial Intelligence and the Leibniz Institute for New Materials work hand in hand. This close interlinking between research and industry can be observed when taking a look at clusters such as “automotive.saarland”. This

The Internet of Things allows a cooperative approach to decision taking between humans and machines.





“The cross-disciplinary research approach serves as an interface between computer sciences, engineering and ergonomics, providing Saarland with all necessary conditions to sustain its success in the topical field of Industry 4.0.”

Prof. Dr Ing. Rainer Müller
ZeMA Center for Mechatronics
and Automation

cluster can be described as a communication hub and trendsetter in the realm of the automotive sector.

In the framework of the EU project “FourByThree”, the Center for Mechatronics and Automation ZeMA cooperates with the local industrial company Woll Maschinenbau and other international partners, designing and building robotic solutions. In view of Industry 4.0, the cooperative approach between humans and robots has already become reality with regard to production processes and assembly lines. Enabling robotic solutions to collaborate safely and efficiently with human operators is at the core of this development. However, current conventional industrial robots do not fulfil some necessary safety standards. Therefore, “FourByThree”, focuses on designing robotic solutions which can safely operate with humans in small spaces and which at the same time are easy to program and to operate.

The high number of enterprises participating in EU research and innovation projects substantiates Saarland’s openness and capacity to remain innovative in the future.

For further information

fourbythree.eu
zema.de

Effective and safe
HUMAN-ROBOT
collaboration



Borders Cannot Stop Diseases

Dealing with Global Problems on a Local Level

As our global mobility has steadily increased, physical borders have almost disappeared. In consequence, contagious diseases which were restricted to a local area 20 years ago can spread into global dimensions today. The risk of contagion is heightened. For those who already have a weakened immune system, a co-infection with further pathogens can be lethal.

Worldwide, AIDS and tuberculosis are among the deadliest contagious diseases. Only a few know that in the end, many patients suffering from AIDS die of tuberculosis. Up to a third of the world population carries the TB pathogen, which in most cases is kept at bay by the immune system. However, if a co-infection occurs with the HIV pathogen triggering AIDS, survival chances sink dramatically.

In Europe as well, patients are suffering such diseases – currently, resistant germs are on the rise.

Promoting cooperation between regional, national and international partners in the field of infection research.



“The efforts made in and achievements gained from international initiatives have been sustainably anchored in the region thanks to the financial backing we were provided by the state.”

Prof. Dr Martina Sester
Saarland University



Additionally to the funds of the 7th EU Framework Programme and in order to promote further clinical trials, Saarland-based researchers in the field of contagious diseases are supported financially by both, the European and Developing Countries Clinical Trials Partnership (EDCTP) and the Bill & Melinda Gates Foundation.

Under coordination of Professor Martina Sester from the Homburg/Saar University Hospital, the EU project “EUCCO-Net” connects experts in the fields of virology (AIDS) and bacteriology (TB) from all over the world. The aim is twofold: improving conventional treatments and diagnostic methods and setting an agenda for future research activities.

The local initiative “AITS (AIDS/TB Saar)” supports those efforts to link this European network to Saarland-based research facilities.

For further information

euco-net.eu
aits-project.eu



Setting Sights on New Horizons

Research in Saarland for Europe

Today, the treasures of the Saarland region are no longer to be found deep under the ground but in people's intelligence. By actively intervening the state government has adapted to these shifts. The policies implemented were mainly geared towards promoting research and innovation as driving forces for growth and competitiveness. In the last years, Saarland has systematically developed a landscape of high-performing and versatile universities and research facilities.

This development can be illustrated with the emergence of innovation clusters or with long-term policies in the fields of innovation and technology, which have been laid out by the federal state government and which have certainly contributed to turning the state into an attractive business location driven by innovation and research. This is why Saarland holds dear to these specific assets and intends to further integrate them into the European research and innovation landscape.

Many interested people attended the kick-off event of "Route2020" initiative organized at the Saarland University campus.





Join us!

Saarland has been promoting an important regional initiative, by supporting “Route 2020” and charting the course for a successful participation of Saarland-based universities, research institutes and enterprises in the new EU Framework Programme for Research and Innovation, “Horizon 2020”.

In order to provide information and give advice on the many opportunities there are to participate in “Horizon 2020”, numerous events are organized and specific workshops are offered to interested researchers and entrepreneurs in the framework of this initiative.

In the following pages you will find further details on “Horizon 2020” as well as on the regional service partners of the “Route 2020” initiative, supporting you with advice and assistance.

For further information

route2020-saar.de



The EU Framework Programme “Horizon 2020”

Promoting and Supporting with a Wide Array of Effective Measures

“Horizon 2020”

Horizon 2020 is the Framework Programme for Research and Innovation of the European Union. The total budget amounts to 77 billion euros spread over 7 years (2014-2020). With the implementation of “Horizon 2020”, the process of transforming breakthrough findings into marketable innovations and services shall be accelerated, thus contributing to the strength of Europe’s economy and to its competitiveness in the world.

Streamlined participation schemes

The fusion of formerly separate instruments to promote research and innovation has allowed “Horizon 2020” to become a comprehensive program complemented by streamlined participation schemes which has improved accessibility. Moreover, compared to previous programs, implementation is faster and the participants can navigate easily through the process. For universities, research institutes and enterprises, the program offers a wide range of attractive funding opportunities across a multitude of topics and research fields.

Structure

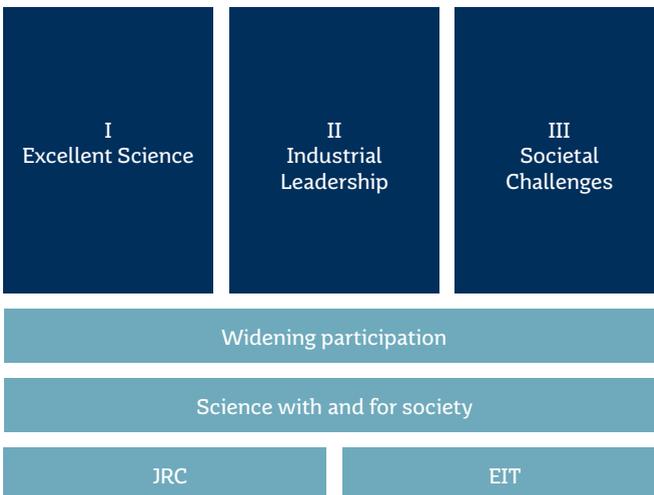
“Horizon 2020” is built upon three main pillars:

- Excellent science
- Industrial leadership
- Societal challenges

In addition to promoting excellent science and strengthening networks enhancing the mobility of researchers, measures aimed at supporting research and innovation in joint projects are brought into focus.

Usually, participants in a transnational consortium have different institutional backgrounds in the field of science and economy (mainly universities, research facilities, enterprises). Together, they develop innovative technologies, processes, products and services.

Also, “Horizon 2020” has elaborated measures tailored specifically to the needs of Small and Medium Enterprises (SME). With this new instrument, SMEs will be individually supported throughout the whole innovation chain, from feasibility analysis to research and demonstration through to market introduction.



Applying to “Horizon 2020”: A Quick Guide

Practical instruction on how to submit
your proposal

How can I submit my proposal and where do I find calls?

Project proposals have to be submitted in the course of an open tendering procedure. Every year, “Horizon 2020” offers at least one call for each topic. While the primary coordinator is responsible for submitting the proposal, the preparation of such proposal requires commitment of the whole consortium.

The Participant Portal provides an overview of all calls for tender and topics and offers a wealth of further practical instructions relating to the submission of proposals.

How much time should I schedule for a project proposal?

Drafting a convincing proposal can be quite time-consuming and demands some amount of preparation. Therefore, it is recommended to begin with this task prior to the opening of the tendering procedure. Planning ahead is possible, as work programs within “Horizon 2020” stretch over a two-year period.

Each topic has a deadline for proposals. Depending on which topic, the submission procedure either consists of one or two stages. For one stage topics, the full proposal is submitted by the set deadline. For two-stage topics, an outline proposal is first submitted and evaluated. If the proposal passes stage one, the full proposal can be submitted by a newly set deadline.

How do I set up a convincing consortium?

For a project proposal to be successful, it is crucial to establish a convincing consortium. Beyond the assessment of their skills and expertise, the partners should have complementary competencies. Also, a well performing consortium is characterized by an efficient and transparent collaboration. Coordination in the period prior to the submission of proposal is the first challenge partners have to face up to. If cooperation problems are already arising at this stage (for instance: deadlines not being respected, contributions being insufficient), the make-up of the consortium should be reconsidered.

What should I keep in mind when it comes to form and content of the project proposal?

The following points should be considered:

- The content of the projects has to be in line with the topic description in the call. Core contents have to be clearly defined and their relevance to innovation emphasized. It might be helpful to elaborate a detailed work schedule which precisely describes the different tasks the partners are in charge of and which also illustrates how these partners interact.
- Expected outcomes of the project have to be demonstrated in concrete terms (for instance, products, processes, services, patents, prototypes, methods, scientific data, publications, etc.)
- Project proposals shall be written in English. The special features of the project shall be highlighted in the introductory part. Also, a meaningful project name (acronym, title) is of importance.

For further information
h2o2ouk.org

Service partners of “Route 2020”

European Research and Project Office – Eurice



“We are committed to ensuring that the projects are fitting your ideas and that your projects bring about the right ideas.”

Jörg Scherer
Eurice GmbH

The European Research and Project Office GmbH – Eurice provides support to researchers and entrepreneurs, enabling them to successfully participate in European programmes promoting research and innovation. From the very first project idea to strategic planning and proposal preparation, through to the successful realization of a project and the final exploitation of results, we offer our assistance throughout the cycle of the project.

Founded in the year 2000, Eurice is headquartered in Saarbrücken and Berlin and is one of the largest consulting firms in the realm of scientific projects and regularly features at the top of rankings in that field. To this date, the Eurice team has participated in over 250 EU programmes for research and technology cooperation in all key areas with our team of experts. In sum, the research and innovation projects (“Horizon 2020” among others) in which Eurice has been involved through planning and assistance account for more than 600 million euros.

Eurice provides innovative solutions and dove-tailed services for researchers and entrepreneurs and assists them along the project life cycle with competencies in project, communication and innovation management.

Furthermore, Eurice’s consulting services also include coaching and training programmes, with more than 3000 participants per year. Additionally, Eurice is not only a partner of the Enterprise Europe Network (EEN), but is also coordinating training programmes for the “European IPR Helpdesk” (www.iprhelpdesk.eu), an EU initiative for a better protection of Intellectual Property (IP) and exploitation of research results.

For further information

eurice.eu

The Saarland's University Office for Knowledge and Technology Transfer (KWT)

For cooperation projects between private companies and the University of Saarland, KWT is the first point of contact since 1985. Tasks related to economic activities led KWT to found the Saarland's University Knowledge and Technology Transfer company (WuT GmbH) in 2002. After successfully applying for it at the Federal Ministry of Education and Research, a Patent Marketing Agency (PVA) has been integrated into WuT's activities.

Departments which are operating in different fields such as business cooperation, business creation as well as the patent marketing agency and the agency organizing events and conferences are working together closely. Hence, new technologies which can be marketed are identified and are provided with legal protection if necessary. As a result of these coordinated efforts business can be created.

In 2013, the Saarland University has been designated as an EXIST-entrepreneur university, a title granted by the Federal Ministry of Education and Research. The involvement of KWT and WuT in the "Entrepreneurial Campus Saar" aims at supporting the business creation process of university enterprises and non-university research institutes. Additionally to well-equipped office and laboratory spaces, start-ups are provided a professional infrastructure comprising a central office as well as training and meeting rooms.

As an emphasis is put on innovation-related activities, EU research programs in the framework of "Horizon 2020" require a focal point on the usability of research results obtained. KWT and WuT offer their expertise throughout the EU project: Drawing up strategies regarding the issue of usability when applying for EU, IP-Management and seeking partners for cooperation or exploitation in the industry sector.



"We ensure visions become reality. For a stronger Saarland."

Axel Koch
KWT

For further information

kwt-uni-saarland.de

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[@saarland_de](https://twitter.com/saarland_de)

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