THE RESEARCH UNIVERSITY IN THE HELMHOLTZ ASSOCIATION

Annual Report 2015 of Karlsruhe Institute of Technology

KIT – The Research University in the Helmholtz Association

Mission

We create and impart knowledge for the society and the environment.

From fundamental research to applications, we excel in a broad range of disciplines, i.e. in natural sciences, engineering sciences, economics, and the humanities and social sciences.

We make significant contributions to the global challenges of mankind in the fields of energy, mobility, and information.

Being a big science institution, we take part in international competition and hold a leading position in Europe.

We offer research-based study programs to prepare our students for responsible positions in society, industry, and science.

Our innovation efforts build a bridge between important scientific findings and their application for the benefit of society, economic prosperity, and the preservation of our natural basis of life.

Our working together and our management culture are characterized by respect, cooperation, confidence, and subsidiarity. An inspiring work environment as well as cultural diversity characterize and enrich the life and work at KIT.

Employees 2015

Total	9 315
Teaching and research	5 859
Professors	355
Foreign scientists and researchers	999
Infrastructure and services	3 456
Trainees	471

Students

Winter semester 2015/2016	25 196

Budget 2015 in Million Euros

* (provisional figures as of May 13, 2016)

Total	860.8
Federal funds	254.7
State funds	248.1
Third-party funds	358.0

2015 was a special, exciting, and in many respects course-setting year for Karlsruhe Institute of Technology (KIT). Indeed, 2015 was a year that demanded a great deal of strength and energy of all of us. But our efforts have been altogether crowned with success, and joy and enthusiasm have been prevalent throughout.

By adopting the KIT 2025 Umbrella Strategy, we have mapped out the objectives within the areas of research, teaching, innovation, young researchers, governance, and central administration and technical infrastructure. With political support, with our collaborative partners in science and industry, and with the great commitment of our staff, we thus consistently pursue our role of pioneer in the German science system. "The Research University in the Helmholtz Association" follows a clear-cut mission and is an innovation driver that stands for excellent research and superior teaching. Combining the potentials of a university and of a national large-scale research center, KIT is on its way to leveraging enormous synergies in the best possible way.

In this report, we look back and present to you selected exciting results and trendsetting developments of the year 2015. These include, among others, the successful acquisition of two new collaborative research centers, the approval of two proposals within the Program for More Quality in Teaching, the foundation of the KIT Campus Transfer GmbH, and the opening of the Demonstration and Innovation Center for Industry 4.0 of the KIT China Branch. Of course, we also want to inform you about life at KIT, including the ceremony marking the 20th anniversary of the Helmholtz Association, refugee commitment throughout KIT, and KIT's commitment to good work.

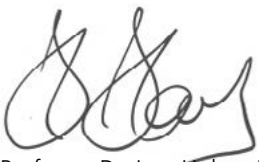
Numerous awards and the entrusting of honorable functions show that, with the help of its outstanding students, professors, and staff in research and administration, KIT is optimally prepared for a successful future.

On behalf of the Presidential Committee of KIT, I express my sincere thanks to our political partners, our partners in research and industry, the KIT Supervisory Board, and the members of KIT for their trusting, intense, and successful cooperation.

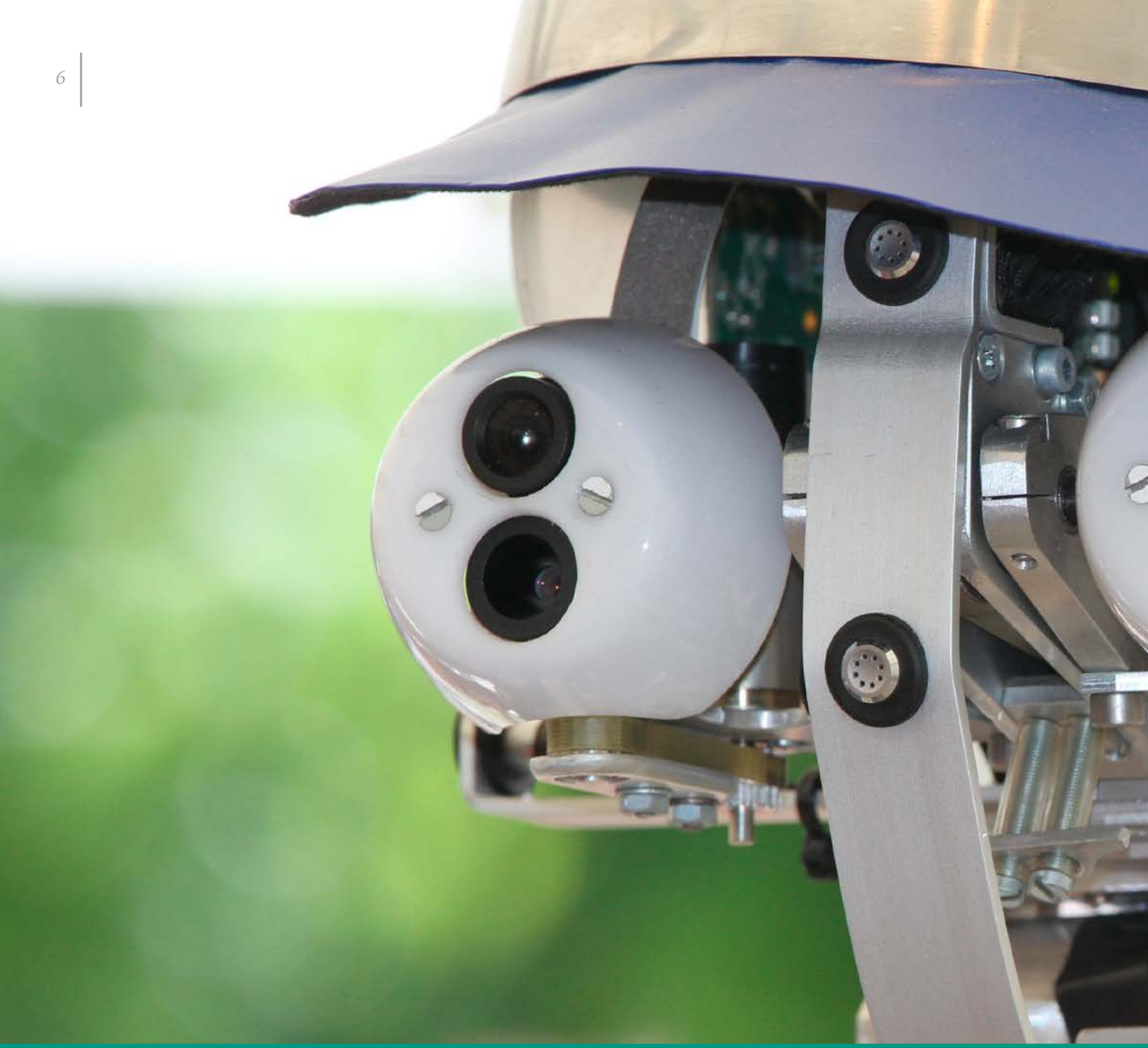
I cordially invite you to take your time to read this annual report and to get informed about the highlights of the year 2015.

Enjoy reading.

Yours,

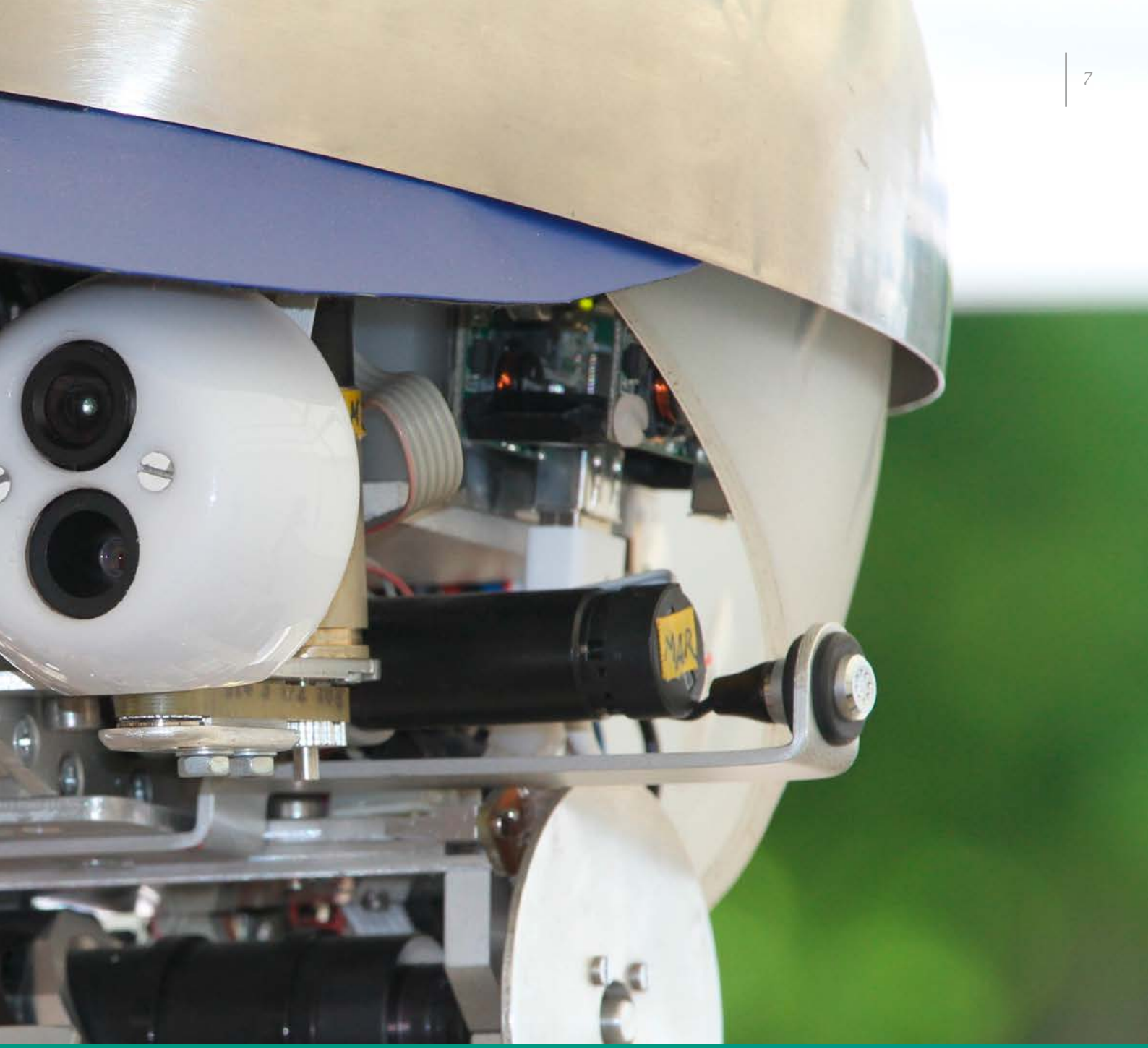


Professor Dr.-Ing. Holger Hanselka
President of KIT



A RETROSPECTIVE VIEW OF KIT

2015 was a course-setting year for KIT. Adopting the KIT 2025 Umbrella Strategy, the Presidential Committee mapped out the major areas of action where KIT wants to develop and improve. Under the auspices of the President of KIT, these areas of action were worked out in detail by the Presidential Committee within a twelve-month strategy process and were concretized in meetings with the Heads of Divisions. In a thorough top-down/bottom-up approach, the relevant issues were discussed and assessed top-down by a sounding board and bottom-up during division workshops. The whole process was closely accompanied by external advisors. The KIT Senate and Supervisory Board have been intensely involved in the Umbrella Strategy and have been actively supporting the strategy process.



KIT positions itself as "The Research University in the Helmholtz Association." Combining the potential of a university and of a national large-scale research center, it is an innovation driver that stands for excellent research and superior higher education.

The profile of KIT as a scientific-technical research institution is characterized by its fields of study and major areas of research, which are aligned to the long-term challenges facing society. Profile enhancement in energy, mobility, and information as the fields addressing the needs of today's society is based on interdisciplinary cooperation, with knowledge-oriented fundamental research and applied research inspiring each other. A quality-controlled incentive system is intended to strengthen the development of areas that will enhance the profile over a wide scope of disciplines. This includes the support of fundamental research that may become important to these topics in the future.

A separate chapter (The KIT 2025 Strategy Process, p. 54) is dedicated to the KIT 2025 Umbrella Strategy because of its importance to the entire institution. This chapter describes in detail the areas for action of research, teaching, innovation, young researchers, governance, and central administration and technical infrastructure.

The work at KIT in 2015 was determined by diverse concerns. Our research strength was reflected by the approval of two new collaborative research centers by the German Research Foundation (Deutsche Forschungsgemeinschaft – DFG). In the Collaborative Research Center 1173 "Wave Phenomena: Analysis and Numerics," mathematicians from the fields of analysis and numerics collaborate to understand, simulate, and control the propagation of waves. It is the first collaborative research center in mathematics coordinated by KIT. In November 2015, the DFG also approved the chemical Collaborative Research Center 1176 "Molekulare Strukturierung weicher Materie" (molecular structuring of soft matter) to be operated under the aegis of KIT. This collaborative research center intends to develop new synthesis methods for long-chained molecules to be manufactured and characterized with so far unprecedented precision and to thus enable leaps in innovation for several classes of materials. Funding of this collaborative research center started on January 1, 2016.

The further increase in the number of students at KIT and the granting of the State Teaching Award to two professors of KIT are testimonials to the excellent higher education at KIT. For their innovative concept, which bridges the gap between technology, biology, and philosophy and between science and application of science in everyday life, biology Professor Dr. Peter Nick and philosophy Professor Dr. Mathias Gutmann were granted the 2015 State Teaching Award.

The awarding of the Deutscher Gründerpreis (German Startup Prize) in the category of "Startup" reflects the significance of our innovations. Presenting a self-inflatable life buoy that can rescue the lives of drowning persons, RESTUBE, a startup of KIT graduates, convinced the jury of the Deutscher Gründerpreis and won the first place in the "Startup" category. Nanoscribe, which is another KIT spinoff, was among the finalists in the category of "Shooting Star" with a 3D printer for the micrometer scale.

The recent influx of refugees into Europe met with a wave of solidarity and helpfulness among the staff of KIT. Two of Baden-Württemberg's initial reception centers are found on the premises of KIT, i.e., one on KIT Campus East since October 2014 and one in the former canteen on KIT Campus North since September 2015. Both staff members and students of KIT show an enormous volun-

Professor Dr. Thomas Hirth,
newly appointed Vice President for Innovation and International Affairs.

Professor Dr. Oliver Kraft,
newly appointed Vice President for Research.

KIT's Heads of Divisions: Dr. Karl-Friedrich Ziegahn, Division IV – Natural and Built Environment, Professor h. c. Dr. Joachim Knebel, Division III – Mechanical and Electrical Engineering, Professor Dr. Doris Wedlich, Division I – Biology, Chemistry, and Process Engineering, Professor Dr. Johannes Blümer, Division V – Physics and Mathematics, and Professor Dr. Michael Decker, Division II – Informatics, Economics, and Society (from left to right).

tary commitment by making or coordinating donations, helping out in tearooms or in child care or teaching German.

In June, the scientific, scientific-technical, and academic staff were for the first time invited to directly elect the KIT Convention. The KIT Convention is composed of ninety members. It is intended to supply information, shape opinions, and provide advice to the decision-making bodies. The appointment of a convention and its duties and responsibilities are laid down in the KIT Act.

As of January 1, 2016, the Presidential Committee of KIT has consisted of six members. In July 2015, the KIT Senate by a large majority approved the appointments of Professor Dr. Oliver Kraft as the new Vice President for Research and of Professor Dr. Thomas Hirth as the new Vice President for Innovation and International Affairs, thus confirming the unanimous votes of the Supervisory Board. Oliver Kraft succeeds Professor Dr.-Ing. Detlef Löhe who retired on December 31, 2015. The position of Vice President for Innovation and International Affairs was filled for the first time.

Two personnel changes took place on the second management level: The Heads of Division II – Informatics, Economics, and Society and Division V – Physics and Mathematics retired on September 30, 2015. From the very beginning, Professor Dr. Wilfried Juling and Professor Dr. Volker Saile had made essential contributions to establishing and shaping KIT. While the successor chosen for Division II is Professor Dr. Michael Decker, Division V is now headed by Professor Dr. Johannes Blümer. Professor h.c. Dr. Joachim Knebel continues as Head of Division III – Mechanical and Electrical Engineering. He had been heading this division since 2014 and was reelected for an office term of five years.

OUTSIDE VIEWS

KIT improved again in 2015 in national and international rankings and was able to reaffirm its position among the top universities. In the renowned Times Higher Education Ranking 2015, KIT improved by 27 places and is now ranked in position 138 worldwide. These good results are due to improvements in research, citation rates, and third-party funds from industry.

In the globally acknowledged QS World University Ranking, KIT improved by 30 places. It is now ranked in position 93 and, hence, among the 100 best universities worldwide. In four subjects – mechanical engineering, materials sciences, chemical engineering, and physics – KIT is in the top 50 of the world. This ranking is based on the criteria of academic reputation, reputation among employers, citation in scientific papers, and Hirsch index, which is an indicator of the research achievements of scientists. KIT, moreover, advanced into the Reuters TOP 100 ranking of the most innovative universities worldwide.

The ranking of the Center for University Development (Centrum für Hochschulentwicklung – CHE) assesses more than 300 universities and universities of applied sciences in the German-speaking countries and every year evaluates one third of the disciplines. Apart from criteria relating to studies, teaching, equipment, and research, the ranking is based on judgments of students regarding the conditions of studies at their university. In the spectrum of subjects evaluated in 2015, KIT was successful in the programs of mathematics, informatics, and sports. In particular the bachelor's and master's programs in mathematics were rated very positively by the students.

A study by Michael Hartmann, Professor of Elite and Organizational Sociology at TU Darmstadt, evaluated the education biographies of 529 board members of the 100 biggest German companies. 24 of these top managers studied at the KIT or its precursory institution, Universität Karlsruhe. KIT thus assumes a clear top position in this ranking.

KIT is member of the Helmholtz Association, which in 2015 celebrated its 20th anniversary. The ceremony held on June 24, 2015 in Berlin was attended by Federal Chancellor Dr. Angela Merkel and all Federal Ministers of Research since 1995.

President of the Helmholtz Association Professor Dr. Jürgen Mlynek, who in accordance with the statutes resigned after two terms of office, was succeeded by President Professor Dr. Otmar D. Wiestler. During a two-day inaugural visit in July, Professor Wiestler, among others, went to see the solar power storage park, the Energy Lab 2.0, and the bioliq® pilot plant. In addition, he met young researchers taking part in Helmholtz programs.

The good relations between KIT and the State of Baden-Württemberg were highlighted by a visit of Minister-President Winfried Kretschmann. Together with Minister of Science, Research, and the Arts Theresia

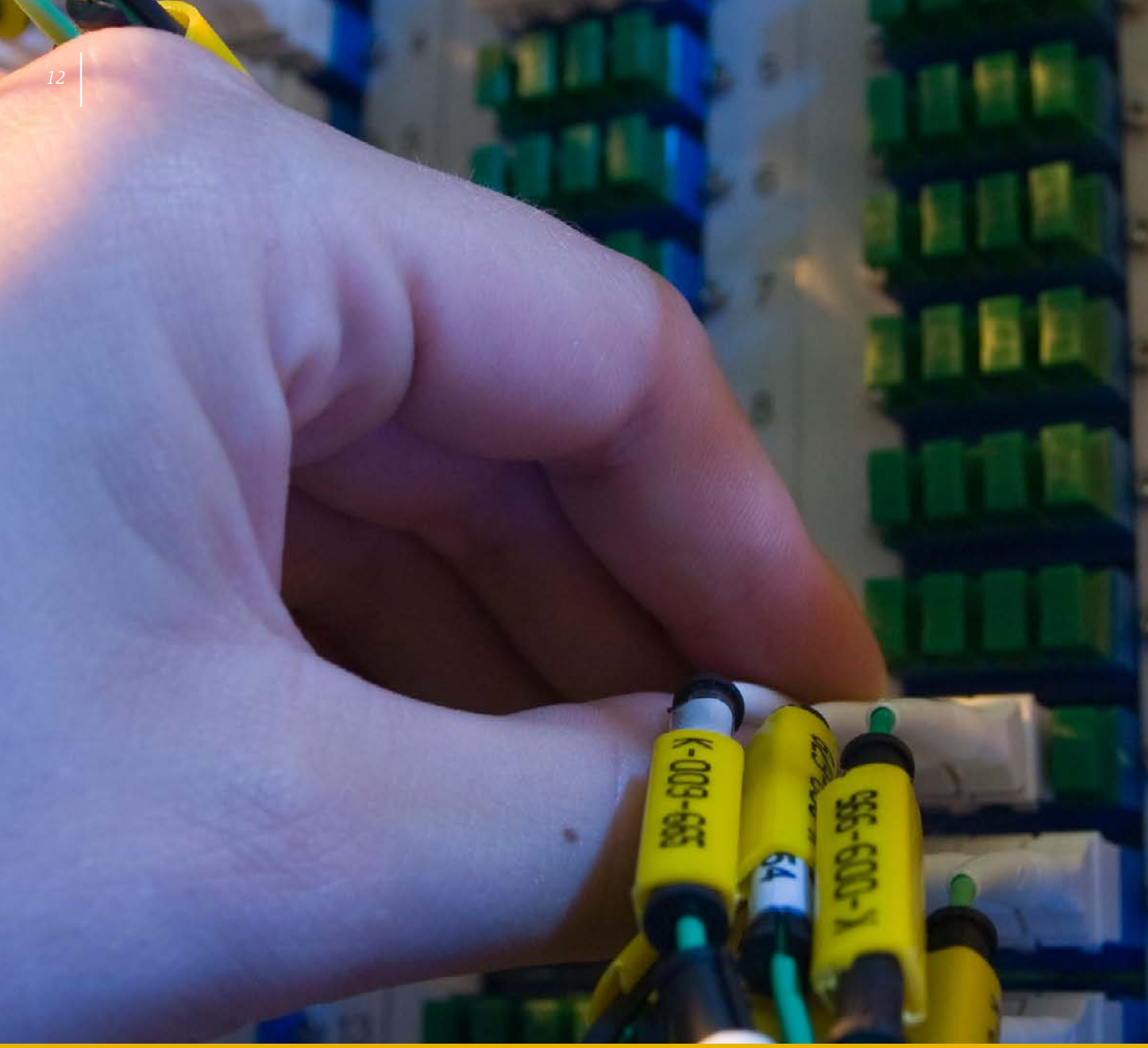
The new Helmholtz President Professor Dr. Otmar D. Wiestler (center) and KIT President Professor Dr.-Ing. Holger Hanselka visited the bioliq® pilot plant that was presented by bioliq® project manager Professor Dr. Nicolaus Dahmen (left).

On their visit to KIT on July 1, 2015, Minister-President Winfried Kretschmann and Minister of Science Theresia Bauer were accompanied by Members of the Baden-Württemberg Parliament, Mayor of Karlsruhe Dr. Frank Mentrup (left) as well as by Member of the KIT Supervisory Board Undersecretary Simone Schwanitz and the President of KIT Professor Dr.-Ing. Holger Hanselka (both on the right).

Bauer, he learned about the subjects of energy, mobility, information technologies, medical engineering, and genetics. The two politicians, in addition, visited KIT's central institution for promotion of young researchers, the Karlsruhe House of Young Scientists (KHYS), as well as the Young Investigator Network (YIN), a young-researchers network unique in Germany.

Intelligent machines, components, and processes are the future of production. Through Industry 4.0, the Federal Government wants to prepare the industry for the related challenges. China, too, tries to increasingly digitize its industry, pursuing the strategy of "Made in China 2025" based on the German model. To prepare companies that want to manufacture in the People's Republic of China for the country-specific requirements of Industry 4.0, the KIT China Branch opened a Demonstration and Innovation Center in Suzhou. The KIT China Branch is a platform for Sino-German joint research projects.

The Presidential Committee of KIT as of 2015: Professor Dr. Alexander Wanner, Dr. Elke Luise Barnstedt, Professor Dr.-Ing. Detlef Löhe, Dr. Ulrich Breuer, Professor Dr.-Ing. Holger Hanselka (from left to right).



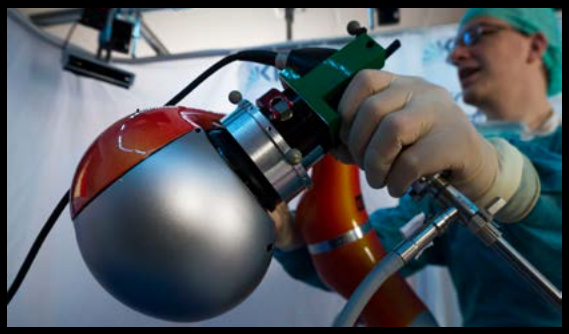
RESEARCH

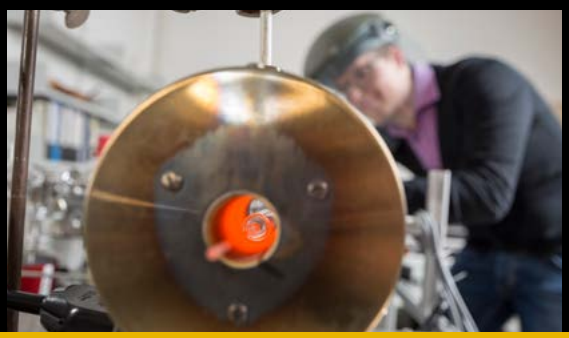
KIT creates and imparts knowledge for the society and the environment, from fundamental research to applications in a broad range of disciplines, i.e. natural sciences, engineering sciences, economics, and the humanities and social sciences. In doing so, KIT addresses present and future challenges facing our society.

KIT's policies for recruiting scientists or supporting research are guided by the wish to guarantee the highest quality of research. KIT participates in scientific competition, with the success being measured by benchmarks and science-adequate evaluation methods. Its vast scope

of competencies and resources makes KIT predestined for taking a leading role in research for the society's demands for energy, mobility, and information.

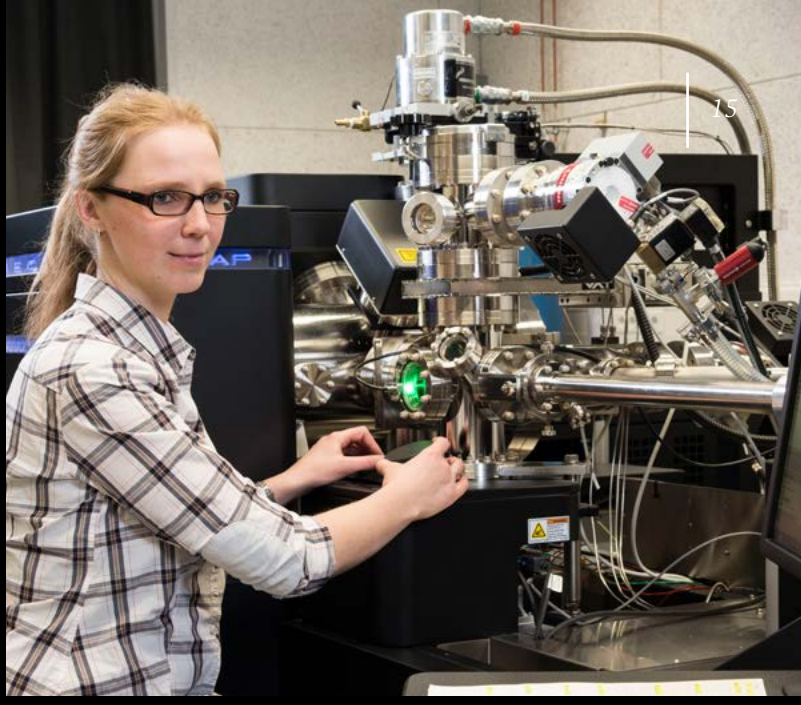
Many research and development activities are embedded in the superordinate program structure of the Helmholtz Association. In the third phase of program-oriented funding (PoF), KIT is involved in 13 research programs of the four Helmholtz research fields of Energy, Matter, Key Technologies, and Earth and Environment. In 2015, the third funding period (PoF III) started in the former three research areas after their successful evaluation. In the Earth and Environment research field, PoF III started one year earlier. Moreover, KIT operates two large-scale research facilities for external users, the Karlsruhe Nano Micro Facility (KNMF) and the Grid Computing Centre Karlsruhe (GridKa). KNMF is a unique high-tech platform in Germany to structure and characterize functional materials on the micro- and nanoscales. GridKa is one of eleven tier-1 computing and data centers worldwide that are to supply computing and storage capacities for the LHC (Large Hadron Collider) experiment at the European Research Center CERN, Geneva.






ELECTRIC MOTOR
VEHICLE


KIT



IMPROVED BATTERIES

INCREASED ENERGY DENSITY OF LITHIUM STORAGE MATERIAL

The lithium-ion battery currently is the most widespread battery technology; no other rechargeable energy storage system can keep up. It is indispensable for devices, such as laptops, mobile phones, or cameras. Current research is aimed at enhancing lithium storage densities in order to increase the amount of energy stored in a battery. Moreover, lithium storage should be quick to ensure energy supply for devices with high power consumption. To this end, scientists of KIT are working to obtain a thorough understanding of electrochemical processes in detail and to develop new battery components.

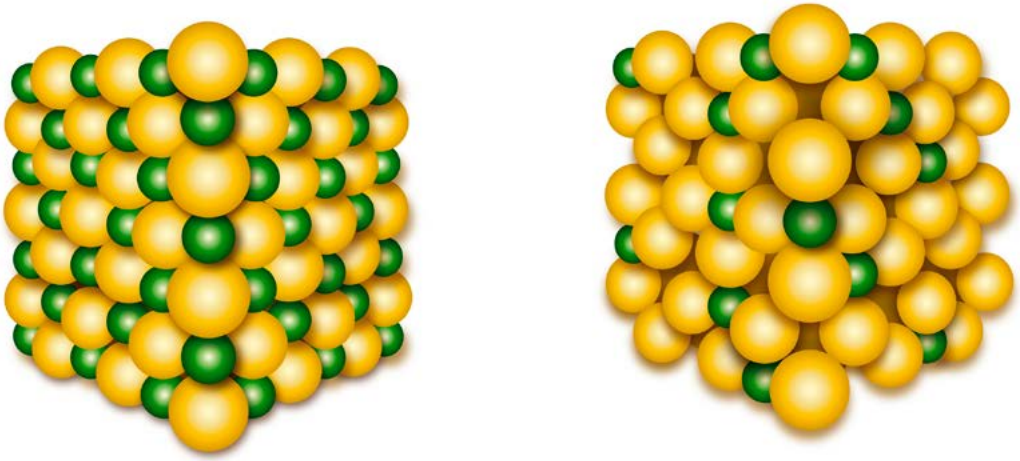
The materials used so far are based on intercalation storage of lithium in small cavities in the crystal, called interstitials. This host structure usually consists of metal oxides. The method works well, but the storage densities reached are limited, as lithium cannot be packed very densely in the structure. In addition, intercalation storage of more than one lithium ion per formula unit is impossible in general, as the structure then is no longer stable and collapses. It would therefore be desirable to increase the packing density of lithium in the stable structure and to exceed the upper limits reached so far.

Enhanced Storage Capacity

An interdisciplinary team of researchers of the Helmholtz Institute Ulm around Professor Dr. Maximilian Fichtner and Dr. Ruiyong Chen has now presented a new storage principle and a novel material on this basis, which allows for the reversible storage of up to 1.8 lithium ions per formula unit. As a result, storage capacity is nearly doubled. Apart from lithium, the new material also contains vanadium, oxygen, and fluorine (Li_2VO_2F).

"The high stability of the structure at a high defect mobility, associated with a very small volume change of three percent only – this is what makes the new system unusual. Moreover, the storage principle appears to be transferable to other compositions. Using other compounds of similar structure, we presently measure even higher energy densities than for the vanadium-based

Test cells with the new cathode material are assembled in a glovebox.



New storage material with lithium (left) and without lithium (right).

system," head of the research team Maximilian Fichtner reports.

Surprisingly, lithium ions are highly mobile in this structure and can be incorporated into the lattice and removed again easily. Vanadium takes up two charges or releases them again, while the lattice as a whole remains stable – a novelty in such storage materials. Contrary to the materials used so far, the new system no longer stores lithium at the interstitials, but directly at the lattice sites of a cubic closely packed structure. As a result, packing densities are increased significantly.

Helmholtz Institute Ulm for Electrochemical Energy Storage

The Helmholtz Institute Ulm for Electrochemical Energy Storage (HIU) was founded in January 2011 by KIT as a member of the Helmholtz Association. The Institute acts as a strategic link to Ulm University in the area of electrochemical energy storage. KIT and the Helmholtz Association established the HIU in cooperation with Ulm University. The German Aerospace Center (DLR) and the Center for Solar Energy and Hydrogen Research Baden-Württemberg (ZSW) are involved in the HIU as associated partners.

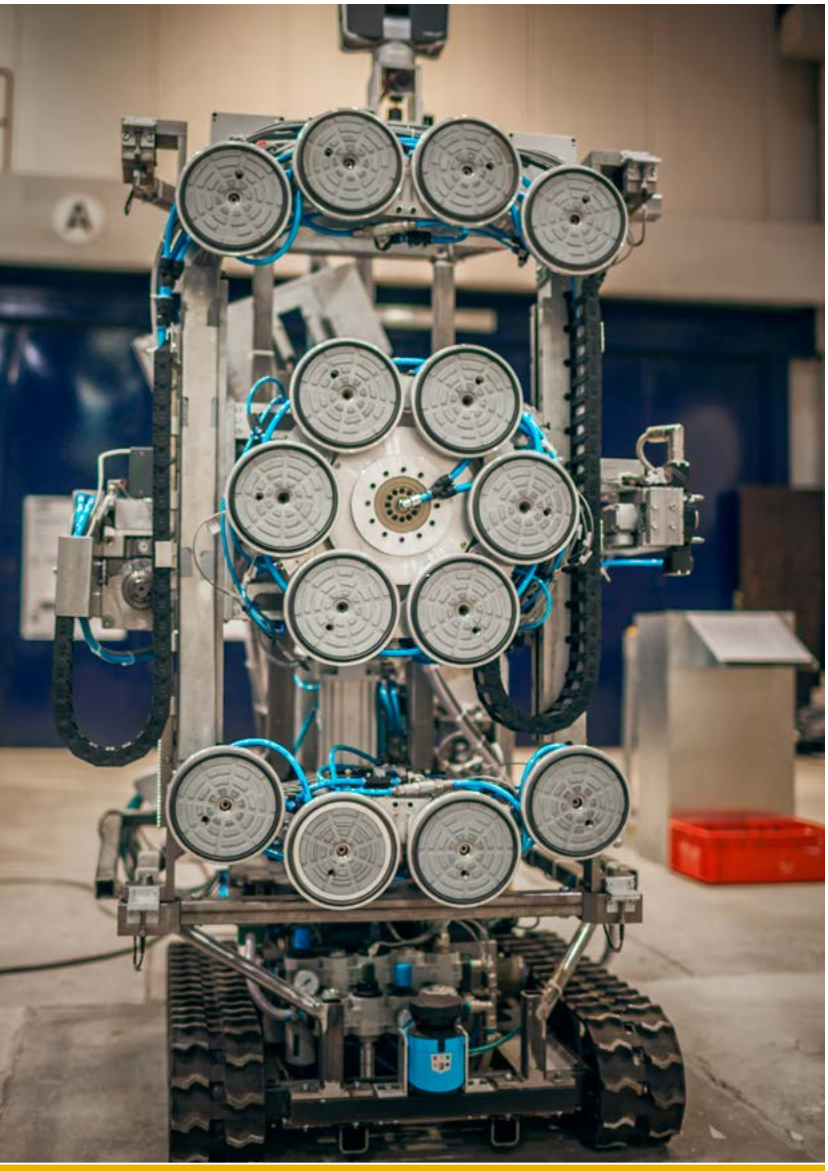
The HIU studies and develops electrochemical battery concepts of the next and next but one generations. It pools the competencies of the four partner organizations for fundamental and close-to-application research. Hence, it essentially contributes to securing the future in our society's highly relevant field of energy supply from renewable sources.

The Helmholtz Institute Ulm was established in 2011. The new research building accommodating state-of-the-art laboratory equipment was opened in 2014.

POOLED EXPERTISE FOR SAFE DECOMMISSIONING OF NUCLEAR FACILITIES
COMPETENCE CENTER FOR DECOMMISSIONING ESTABLISHED AT KIT

Safe decommissioning of nuclear facilities is one element of the transformation of the energy system in Germany, the so-called energiewende. It is associated with big challenges for science, technology, and industry. To maintain existing specialized know-how relating to the decommissioning of nuclear facilities and to deepen this knowledge in an application-specific manner, KIT has established the Competence Center for Decommissioning.

Not only in Germany, but also on the European level and worldwide, the demand for competencies relating to the safe decommissioning of nuclear facilities is expected to grow in the future. This will also include the safe disposal of radioactive wastes that have been produced. According to the European Commission, about one third of the currently operating 145 nuclear power plants will be shut down by 2025. Hence, young scientists and engineers have to be trained for executing this work in the medium and long term.



MANOLA carrier system (MANOLA = Manipulator-controlled Surface Removal by Laser Technology) for laser decontamination and release measurement of surfaces.

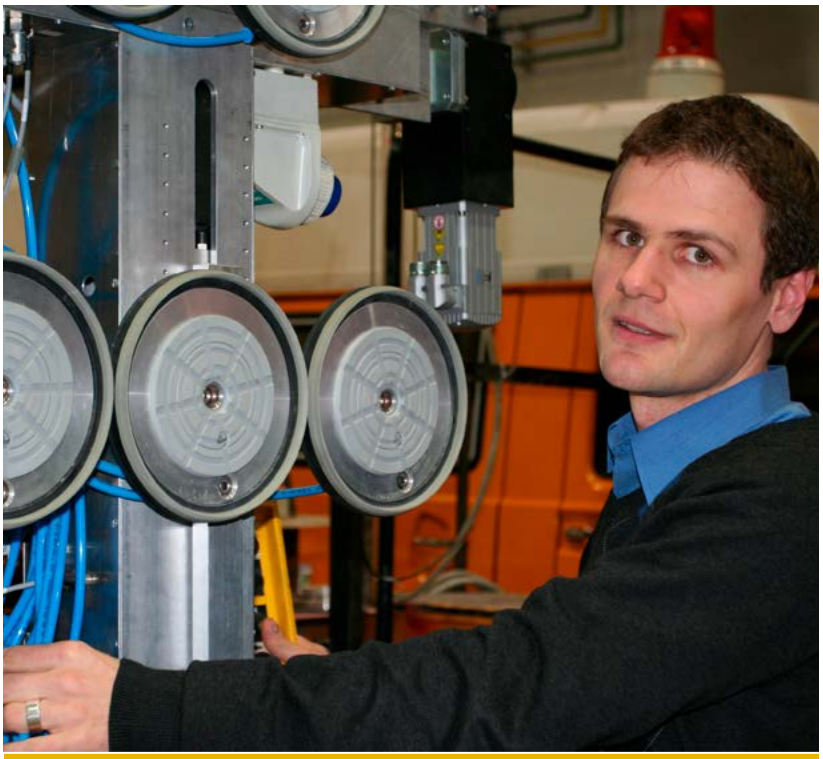
Efficient, Comprehensive, and Holistic

The Competence Center for Decommissioning is part of the Nuclear Waste Management, Safety, and Radiation Research Helmholtz Programme (NUSAFE). Twelve leading scientists of KIT and their teams have organized within this Center. Decommissioning of nuclear facilities covers various topics, including innovative dismantling technologies, radiological characterization of contaminated plant components, decontamination and conditioning technologies, protection of the staff, population, and the environment against radiation exposure, management of complex processes, analysis of political and societal framework conditions, as well as strategies for the appropriate participation and informing of the public.

"The KIT Competence Center for Decommissioning can rely on comprehensive expertise and high-performing infrastructure facilities," Dr. Walter Tromm, spokesperson of the KIT NUSAFE Programme and of the Nuclear Energy and Safety Topic of the KIT Energy Center, says. "Hence, it offers ideal conditions for sustainable qualification and training of young engineers." Professor Dr. Sascha Gentes of the KIT Institute for Technology and Management in Construction will set up the new competence center: "The competence center is planned to scientifically and technically develop and make available standardized solutions and methods for decommissioning."

Special and Unique

An optimal decontamination strategy requires detailed knowledge of the type of radionuclides, their distributions in components, and their chemical binding states. Investigation and comprehensive characterization of real



Professor Dr. Sascha Gentes presents the robot that autonomously decontaminates surfaces of nuclear facilities.

radioactive samples are indispensable. KIT's Institute for Nuclear Waste Disposal is equipped with special infrastructure facilities required for this purpose.

The research portfolio of the Competence Center for Decommissioning will be further extended and complemented in a stepwise manner in order to allow for a holistic research approach. Apart from technical and engineering aspects, natural sciences as well as sociopolitical, legal, medical, and ecological issues will be considered. As early as in 2008, the professorship for decommissioning of conventional and nuclear facilities was established at KIT, the only one of this kind in Germany. In addition, the AREVA Nuclear Professional School of KIT offers a training program on decommissioning.

All nuclear plants in Baden-Württemberg are located within a radius of about 60 kilometers of KIT, including Philippsburg 1 and 2, Neckarwestheim 1 and 2, and Obrigheim. Of these, only Philippsburg 2 and Neckarwestheim 2 are still in operation.

The Competence Center for Decommissioning is part of the "Decommissioning of Nuclear Facilities" cluster launched in February 2016. The cluster bundles the competencies of five partners from three countries and strengthens qualification and training of skilled workers. Founding members are Karlsruhe Institute of Technology, the Karlsruhe branch of the Baden-Württemberg Cooperative State University, the University of Stuttgart with its Institute of Nuclear Technology and Energy Systems and its Materials Testing Institute, the Paul Scherrer Institute in Switzerland, and the Institute for Transuranium Elements (Karlsruhe) as well as the Institute for Reference Materials and Measurements (Belgium) of the Joint Research Center of the European Commission.

MAKING THE RIGHT TURN

ASSISTED STEERING SYSTEM FOR ELECTRIC VEHICLES

In conventional vehicles, the internal combustion engine not only accelerates the car, but also supplies energy to on-board assistance systems. One is the assisted steering system, which reduces the strain on the driver at the wheel. In electric vehicles, this energy comes from the battery and reduces the range as a result.

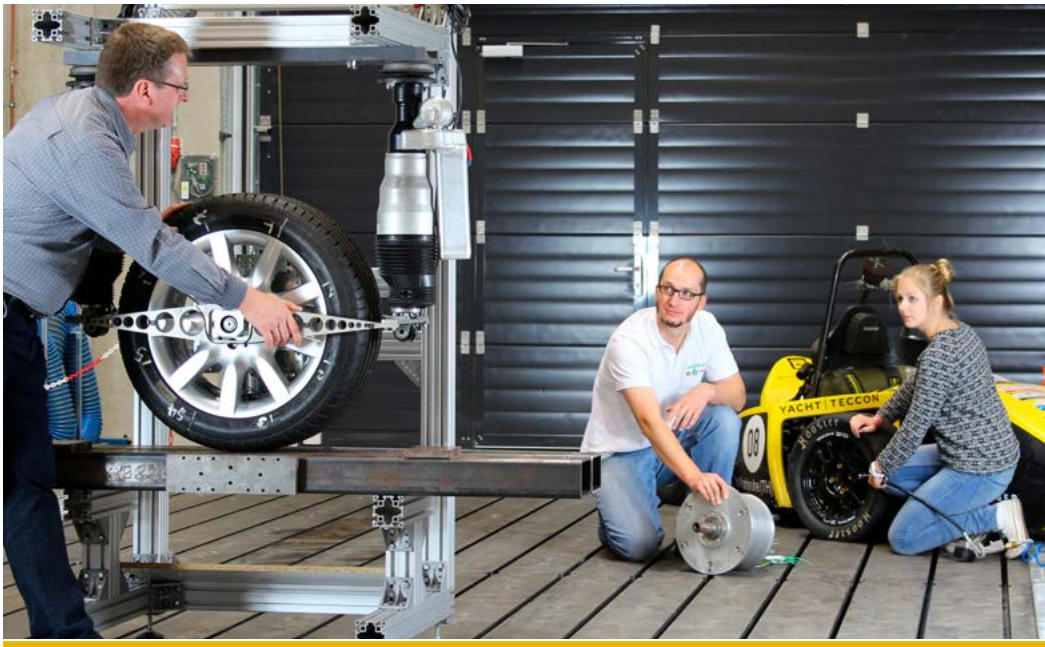
The project "Intelligent Assisted Steering System with Optimum Energy Efficiency for Electric Vehicles (e^2-Lenk)" funded by the Federal Ministry of Education and Research focuses on a new assisted steering concept. In this project, Karlsruhe Institute of Technology cooperates with the Schaeffler Group.

"The new assisted steering system would require less system components in an electric vehicle. This would mean savings in terms of weight and energy," explain project managers Dr. Marcel Mayer, Schaeffler, and Dr. Michael Frey, KIT. "This would mean that an electric car would be cheaper and have a greater range." Use of materials and production steps can be reduced because of the potential optimization of the design and weight.

Wheels Driven Individually

The basic idea of the e^2-Lenk project is simple: The wheels in an electric car will be driven individually by electric motors in contrast to a car with an internal combustion engine, where all the wheels are provided with equal force. If the wheels on the left side transmit more drive torque to the road than those on the right side, this will result in acceleration of the vehicle to the right without the need to turn the front wheels or apply additional energy for steering. Tracked vehicles or quadrocopters steer using the same principle. "Steering assistance can be provided while driving by means of an intelligent control system and suitable wheel suspension," says Schaeffler engineer Mayer, manager of the Automatic Driving Working Group. Under the collaborative research program SHARE at KIT (Schaeffler Hub for Automotive Research in E-Mobility at Karlsruhe Institute of Technology), he conducts research at KIT. "Only steering when stationary remains a challenge with conventional designs."

New drive and steering concepts for electric cars are tested with a scale model demonstrator.



Electric cars can be provided with steering assistance by means of an intelligent control system and suitable wheel suspension.

"The assisted steering system is part of the drive train with our approach," explains Frey, who conducts research at KIT's Institute of Vehicle System Technology. Steering the front wheels is performed without using additional energy. "We also want to significantly enhance the quality of driving. Customer benefit, comfort, safety, and reliability go hand in hand here."

As part of the project, functional demonstrators are being built, with which the concepts can be validated and optimized in experiments. It is also planned to implement the system in the Formula Student racing car built by the KA-RaceIng university group with the participation of students.

SHARE at KIT Collaborative Research Program

In late 2012, Schaeffler and KIT launched a long-term collaborative research program based on the "Company on Campus" model. One of its objectives is the joint development of solutions for future mobility. Direct presence of the industry partner on the campus in Karlsruhe ensures early consideration of research issues in the context of industrial use. The name SHARE at KIT (Schaeffler Hub for Automotive Research in E-Mobility at Karlsruhe Institute of Technology) reflects the function of the project management office as a hub that acts as the link between Schaeffler and KIT. e^2-Lenk is the first publicly subsidized joint project under the SHARE at KIT collaborative research program.

The Schaeffler Group and KIT also are partners in the Electric Mobility South-West Leading-edge Cluster (ESW), which connects over 80 stakeholders from science and industry in the region Karlsruhe – Mannheim – Stuttgart – Ulm. The strategy of the ESW cluster is to achieve intensive regional collaboration in the field of electric mobility by new forms of cooperation and new approaches. As a result, knowledge is developed, consolidated, and ultimately advantages are achieved in international competition.

25 YEARS TAB AND 20 YEARS ITAS
AT THE INTERFACE OF TECHNOLOGY AND SOCIETY

How can citizens participate in the transformation of the energy system or make their district more sustainable together with researchers? Which governance methods create transparency and understanding while searching for a nuclear repository? What may future cooperation of robots and humans be like in tomorrow's factory? Is energy production from algae sustainable over the complete lifecycle of the facilities used? And what makes offers for online participation in parliamentary work attractive? These and many other questions are studied by the Institute for Technology Assessment (ITAS) of KIT in interdisciplinary teams consisting of philosophers, engineers, sociologists, economists, and natural scientists.

In 1995, ITAS was established at the then Karlsruhe Research Center. The founding of KIT turned out to be highly beneficial for ITAS and has inspired its work to date. ITAS can accompany technical innovations in early conception and development stages, examples being the bioliq® plant for the production of second-generation biofuels from straw and residual wood or development of a cement production process with low CO_2 emissions within the Celitement project. In addition, the institute is involved in teaching on Campus South. Since the institute moved to its new office in the Karlsruhe city center in 2012, citizens have been given the opportunity to become more involved in the research activities of ITAS.

Employees of the Office of Technology Assessment with the German Parliament (TAB) that was established in 1990 to advise members, groups, and parties of the German Bundestag.

Since ITAS has moved to the Karlsruhe city center in 2012, citizens have been given the opportunity to become more involved in research activities.

25 Years Technology Assessment with the German Parliament

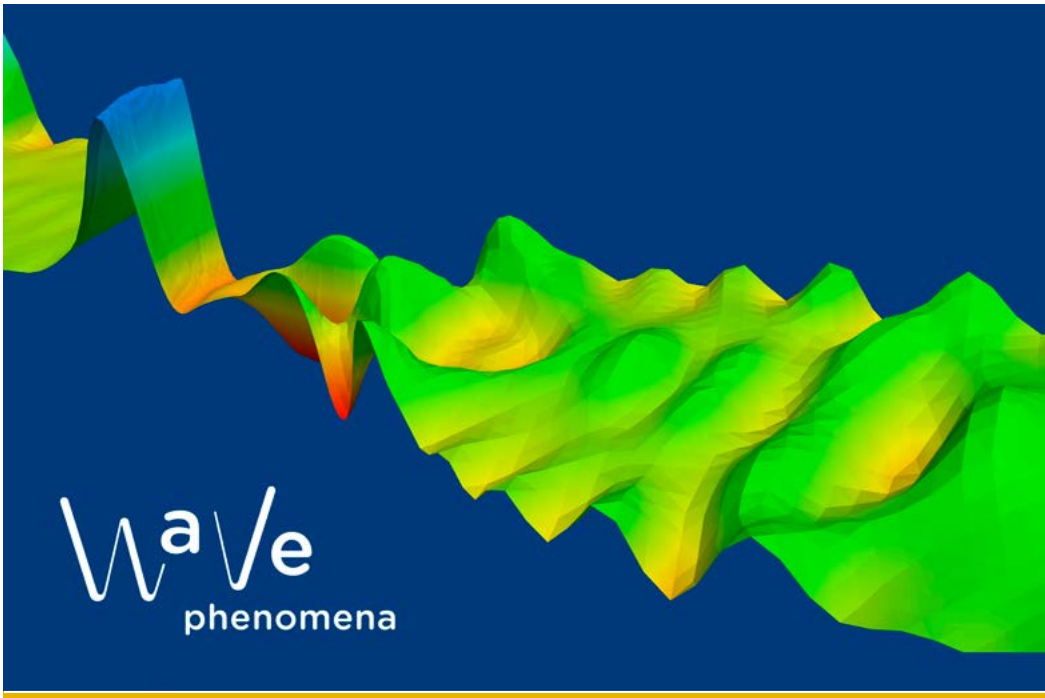
The scope of topics covered by the Office of Technology Assessment with the German Parliament (TAB) also is very wide. Since its establishment in 1990, the office has been run by KIT. To date, TAB has submitted to the German Bundestag about 200 reports on the impacts on society of scientific-technical developments. The analyses are made by TAB on behalf of the committees and parliamentary groups. Then, they are discussed there and in the plenum of the German Bundestag, thus supporting the members of parliament in their political work. TAB provides members of parliament with independent, objective, and highly substantiated scientific expertise. Transparent and understandable communication of complex matters characterizes the work results of TAB and has led to its success.

FASCINATING WAVES

NEW COLLABORATIVE RESEARCH CENTER IN MATHEMATICS

Waves are everywhere. They can be experienced directly in a boat on the water, are audible as sound waves, visible as light waves. They can be bound to matter or propagate in the form of electromagnetic waves at the speed of light.

Mathematicians find a lot more in waves: They are enthusiastic about the variety and beauty of the mathematical equations associated with waves. Wave propagation is described by differential equations raising a multitude of fascinating problems involving different mathematical disciplines.



Understanding, simulating, and controlling the propagation of waves is the objective of the new collaborative research center "Wave Phenomena: Analysis and Numerics".

This is the point of departure of the "Wave Phenomena: Analysis and Numerics" collaborative research center funded by the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation). Here, mathematicians in the areas of analysis and numerics cooperate to analytically understand, numerically simulate, and eventually manipulate the propagation of waves under close-to-reality conditions. Research will concentrate on characteristic wave phenomena: Occurrence of standing or traveling waves or wave fronts, oscillations and resonances, dispersion, wave guidance, reflection, refraction, and scattering of waves.

The approach also includes applications. Consequently, scientists from optics and photonics, geophysics, and biomedical engineering are involved in the collaborative research center.

The collaborative research center also focuses on electromagnetic waves known as visible light, i.e. ultraviolet, X-, or gamma radiation in the shorter-wave range and infrared, microwave, or radio radiation in the longer-wave range. Maxwell's equations published by English physicist James Clerk Maxwell in 1864 describe the behavior of electric and magnetic fields and, hence, the propagation of electromagnetic waves.

In May 2015, DFG decided to approve the collaborative research center at KIT. It is the first collaborative research center coordinated by KIT's mathematicians and started in July 2015. KIT now receives more than 2 million euros for it annually. After four years, a follow-up proposal will have to be submitted. The maximum funding period is twelve years. Presently, about 80 scientists are involved in the collaborative research center.

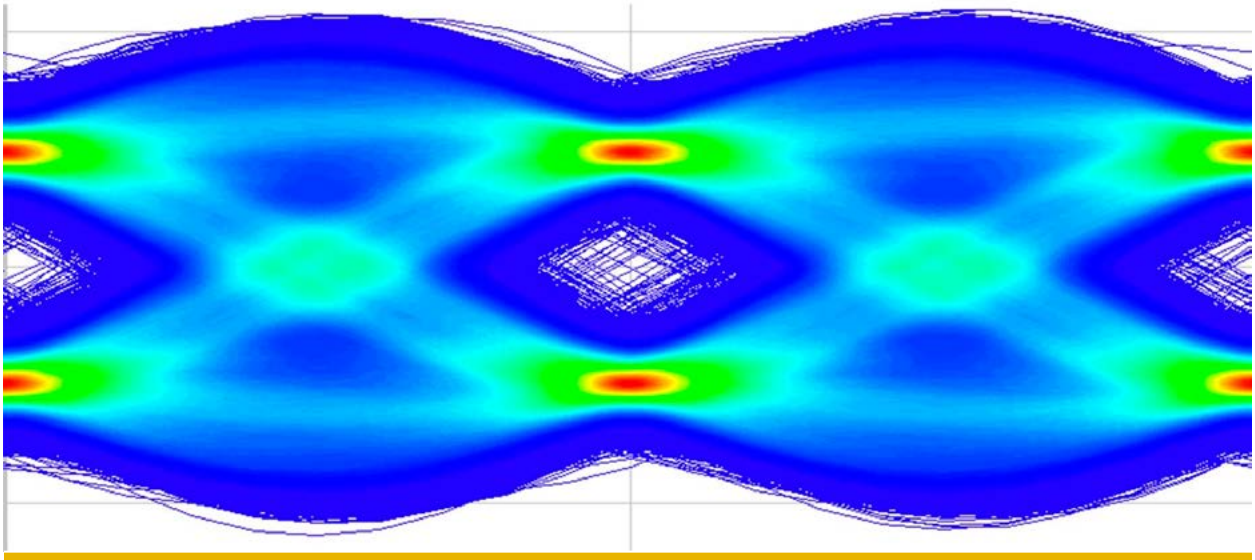
SMALL, QUICK, AND ENERGY-EFFICIENT
MICROMETER-SIZE COMPONENT FOR OPTICAL DATA TRANSMISSION

Compact optical transmission units are of great interest for faster and more energy-efficient data exchange between electronic chips. Special modulators are required for them to convert electrical signals into optical signals. Scientists of KIT's Institute of Microstructure Technology and ETH Zurich developed a plasmonic modulator, the Mach-Zehnder modulator (MZM), under the EU project NAVOLCHI (Nano-scale Disruptive Silicon Plasmonic Platform for Chip-to-chip Interconnection). The modulator is 100 times smaller than a conventional modulator and only about 12.5 µm long, which corresponds to one tenth of the thickness of a hair. It can convert digital signals into optical signals at a rate of up to 108 gigabits per second.

The new MZM consists of two arms, each of which contains one electro-optical modulator. Each modulator is composed of a metal-insulator-metal waveguide with a gap of approximately 80 nanometers in width that is filled with an electro-optical polymer. The side walls are made of gold and act as electrodes. The voltage applied to the electrodes is modulated in line with the digital data. The electro-optical polymer changes its index of refraction as a function of voltage. The waveguide and the silicon coupler guide the two fractions of a split light beam to the gaps or away from them.

In the gaps, the light beams from the waveguides excite special electromagnetic waves, so-called surface plasmons. The voltage applied to the polymer modulates the surface waves. Modulation is different in both gaps, but coherent, as the same voltage is applied with different polarities. After passing the gap, the surface waves enter the output waveguides as modulated light beams. Then, they are superimposed. The result is a light beam in which digital information is encoded.

About ten percent of the electricity in Germany are consumed by information and communication technologies, such as computers and smartphones of individuals, but also by servers of big computing centers. As data traffic grows exponentially, new approaches are necessary to increasing the data rate and, at the same time, reducing power consumption. Plasmonic components could make a decisive contribution.

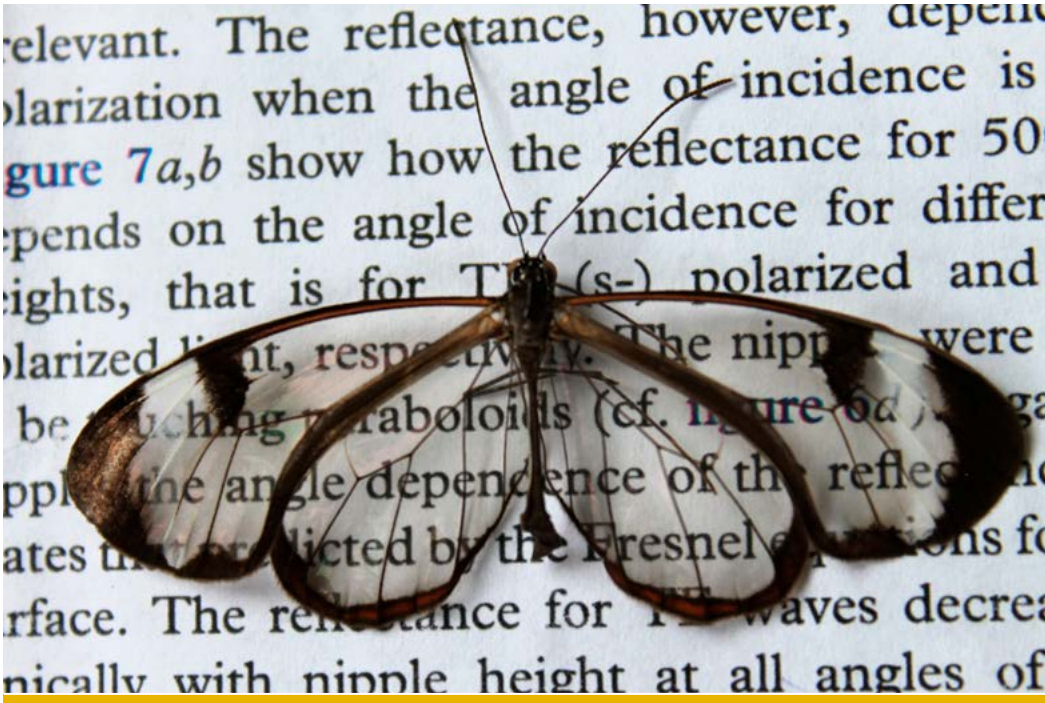


Eye diagrams are used by scientists to check the quality of electro-optical modulators.

THE GLASSWING BUTTERFLY AND LIGHT

LOW-REFLECTION DISPLAYS MODELED ON NATURE

Smartphones suffer from a defect that is all too well-known: Sun is reflected by the display and hardly anything can be seen. In contrast to this, the glasswing butterfly hardly reflects any light in spite of its transparent wings. As a result, it is difficult for predatory birds to track the butterfly during flight. Researchers of the team of Dr. Hendrik Hölscher of KIT's Institute of Microstructure Technology have found the reason for this extremely low reflection of the butterfly wings.



Contrary to other transparent surfaces, the wings of the glasswing butterfly do not reflect any light.

Transparent materials, such as glass, always reflect part of the incident light. Some animals with transparent surfaces succeed in keeping the reflections very small, but only when the view angle is vertical to the surface. The wings of the glasswing butterfly, however, also have a very low reflection when looking onto them at oblique angles. Depending on the view angle, specular reflection varies between two and five percent of the incident light. For comparison: As a function of the view angle, a flat glass plane reflects between eight and 100 percent of the light.

Chaotic Nanostructures – Fascinating Applications

For research into this so far unstudied phenomenon, KIT scientists examined the butterfly wings by scanning electron microscopy. They found that irregular nanostructures on the surface of the transparent wings cause the low reflection. According to earlier studies, regular pillar-shaped nanostructures are responsible for low reflection by other animals. On the butterfly wings, the nanopillars were found to be arranged irregularly and to have random heights. The typical height of the pillars varies between 400 and 600 nanometers and the distance between the pillars ranges between 100 and 140 nanometers. This corresponds to about one thousandth of the thickness of a human hair.

In theoretical experiments, the researchers mathematically modeled this irregularity of the nanopillars in height and arrangement and found that the calculated reflected amount of light exactly corresponds to the amount observed at variable view angles. In this way, they proved that the low reflection at variable view angles is caused by this irregularity of the nanopillars.

These findings open up a range of applications wherever low-reflection surfaces are needed, such as lenses or displays of mobile phones. First application tests are in the conception phase at the moment. Prototype experiments have already shown that this type of surface coating also has a water-repellent and self-cleaning effect.

LIGHTWEIGHT CONSTRUCTION WITHOUT ANY COMPLICATED MATHEMATICS

RECESSES WITHOUT WEAKENING CONSTRUCTION

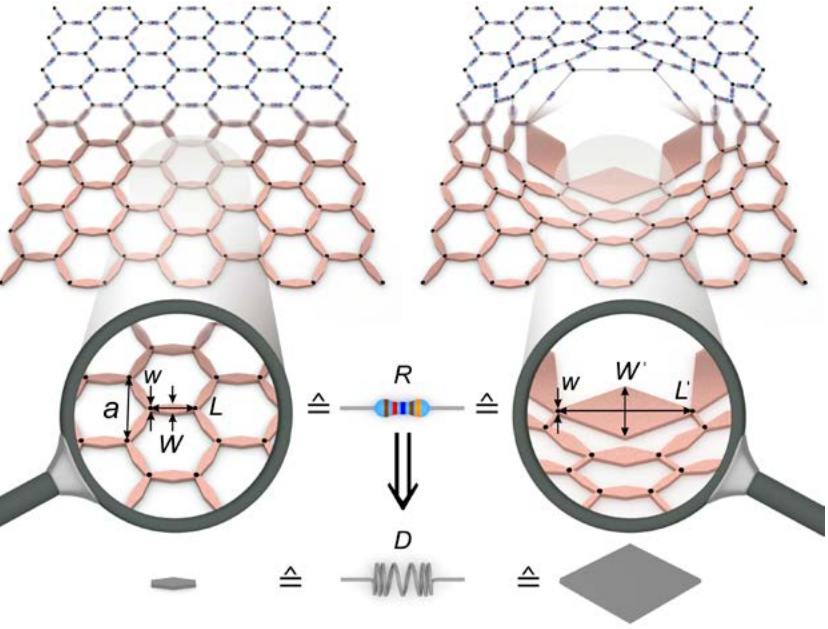
A honeycomb is a stable structure, but a hole in a wall reduces its stability. How can stability of a honeycomb structure with a hole be enhanced for it to withstand external forces? Such stable types of known structures might be useful in architecture or when developing new construction materials. So far, however, the mathematical expenditure required for this purpose has been very high. Now, researchers of the Institute of Applied Physics have found a new principle that considerably facilitates the mathematical approach and produces promising results with simple means.

The concept of "coordinate transformation" may sound complex, but such mathematical transformations are rather helpful: A mesh of connected points is drawn onto a rubber skin. Coordinate transformation is simulated by extending and distorting this rubber surface. When the assumed mesh can be mapped onto a material distribution, a rather universal design approach results. It can be used to direct mechanical forces acting on the material along the tracks desired.

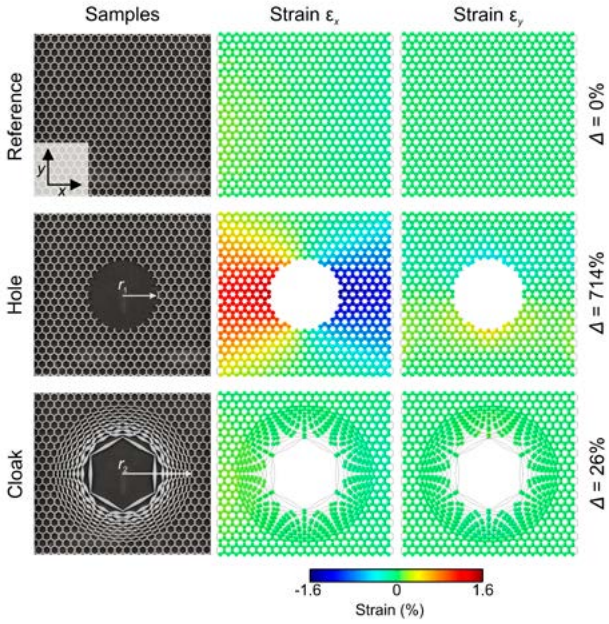
For light, such transformations are based on the mathematics of transformation optics. So far, however, it has been impossible to transfer this principle to real materials and components in mechanics. Mathematics dictated requirements that could not be met by the material.

To overcome these difficulties, researchers of KIT found a new, simpler method. In a thought experiment they replaced the material with a network of electrical resistors. The wire connections between the resistors can be of variable lengths, while their value remains the same. Electric conductivity of the network remains unchanged even when the network is deformed. In mechanics, small springs are used instead of resistors.

The researchers tested their method in a model experiment with a printed polymer material. A stable hexagonal honeycomb structure was provided with a hole. Due to its reduced stability, the distorting forces first caused an error of more than 700 percent. After application of the newly developed transformation, the error amounted to 26 percent only.



In a regular honeycomb structure, a hole is compensated by a distortion.

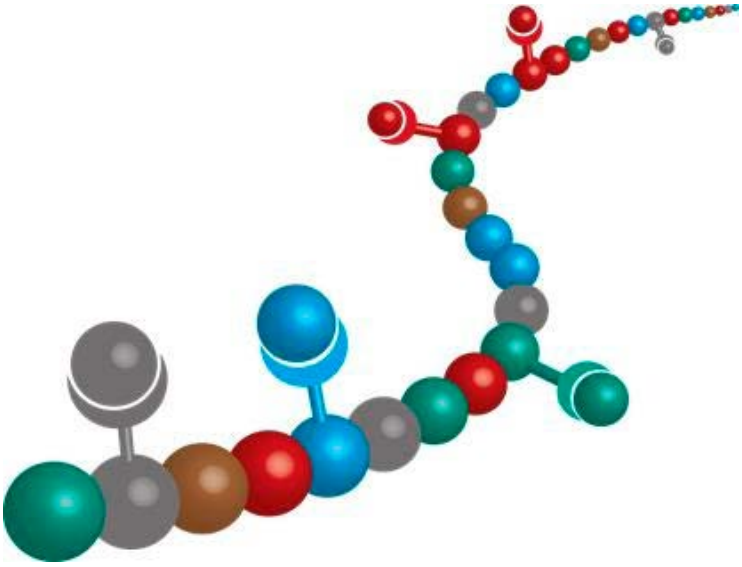


Analysis of mechanical properties of a spherical hole in a hexagonal structure.

CUSTOMIZED MACROMOLECULES

NEW COLLABORATIVE RESEARCH CENTER IN CHEMISTRY

In 2015, not only the mathematicians , but also the chemists of Karlsruhe Institute of Technology acquired a collaborative research center funded by the German Research Foundation (DFG). Collaborative research center 1176 "Molekulare Strukturierung weicher Materie" (molecular structuring of soft matter) focuses on synthesis processes to precisely manufacture long-chained molecules, so-called macromolecules. Molecules form chains, planes, or three-dimensional structures using specific chemical reactions. Macroscopic properties of the material are determined by which molecules combine in which order. This determines whether the object formed is transparent or opaque, hard or soft, compact or loosely packed.



The new collaborative research center focuses on customized macromolecules with defined functions.

Structured and Diverse

"We want to influence specific material properties," says Professor Dr. Christopher Barner-Kowollik of the Institute for Chemical Technology and Polymer Chemistry, Spokesperson of the new collaborative research center 1176. "For this, we have to define at which point of the chain which molecule is located."

Individual small molecules, so-called monomers, are the basic building blocks of macromolecules. In the course of the chemical reaction, these molecules are linked to polymer chains, planes, or three-dimensional structures. Many polymers can be found in everyday life: All types of "plastics" are polymers. The number of possible polymer compositions is nearly endless: If twenty different molecules were to form a chain with one hundred places, the possible arrangements would outnumber the atoms in the universe.

Customized synthetic, theoretical, and analytical processes are developed to control chemical precision synthesis and to characterize the structures produced. Highly precise macromolecules can be generated for use in areas ranging from membrane technology to organic photovoltaics.

Specific and Efficient

One line of research covers the development of synthesis processes to perfectly control the sequence of the polymer building blocks. The macromolecules obtained with an exact chain length are used to construct three-dimensional precision networks of functional metal complex-loaded nanoparticles. Precision networks are applied as separation media, whereas metallic nanoparticles are used as catalysts for new, efficient synthesis paths.

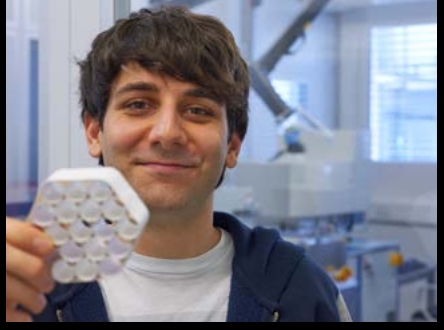
Collaborative research center 1176 attaches particular importance to promoting young scientists through its associated research training group for doctoral students and integration of young investigators groups. In the first of the three possible four-year funding periods, the collaborative research center will be funded with more than EUR 9 million. Via DFG's Mercator Programme, Professor Martina Stenzel of the University of New South Wales, Australia, is involved as well.

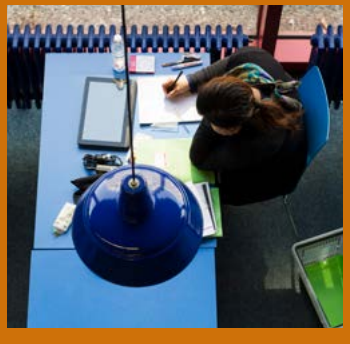
TEACHING

Academic education is one of the three core tasks of KIT, apart from research and innovation. In this respect, KIT's work is guided by the principle of research and academic education being an entity. All scientists of KIT are involved in research-based teaching. The didactic conception of research-based teaching and learning makes research the most important basis of academic education. Vice versa, academic teaching is the basis of KIT's research and innovation. Students are familiarized with entrepreneurial thinking at an early stage of their studies. KIT prepares them in the best possible way for assuming responsible positions in society, industry, and science.

Technology-enhanced learning guarantees flexible, cooperative, and digitally supported research-based learning and teaching during university studies, continuing scientific education, or advanced training of teachers. For this reason, KIT established the ZML – Center for Technology-Enhanced Learning as part of its House of Competence in January 2015. The ZML conceives, develops, executes, and evaluates online education programs and blended-learning courses that combine the advantages of face-to-face teaching with those of e-learning. ZML as a provider of education develops technology-enhanced teaching and learning programs for flexible use by both teachers and students in any context. ZML supports and advises KIT's teaching staff in implementing technology-enhanced approaches in education, such as MOOCs (Massive Open Online Courses). Work of ZML in particular focuses on the topic of energy.

The number of KIT students is growing constantly. In the 2015/2016 winter semester, the number of students totaled 25,196. Of these, 7036 students were females (27.9%). By 2025, the proportion of female students is planned to increase to 40%.





IMPROVING STUDY CONDITIONS AND TEACHING QUALITY
PROGRAM FOR MORE QUALITY IN TEACHING

In the next four years, KIT will receive up to EUR 13 million under the federation's and states' Program for More Quality in Teaching to continue financing of two projects: The Research-based Education Project, under which KIT has introduced new formats to strengthen research-based education, and the MINT-Kolleg Baden-Württemberg that prepares beginning students for study of mathematics, informatics, natural sciences, and engineering and, hence, improves their individual success.

"Continued funding of both projects reflects the success of the measures we implemented in the first funding phase. I am very happy about this confirmation of our work and its further support by the federation and the state under the Program for More Quality in Teaching," says KIT Vice President for Higher Education and Academic Affairs, Professor Dr. Alexander Wanner.

The Research-based Education Plus Project is aimed at improving study conditions and at continuously enhancing teaching quality.

The education approaches developed under the Research-based Education Project are aimed at familiarizing students with research work at an early stage of their studies. Research-based education at KIT represents an optimum basis for successful later employment of graduates in science, industry, and society. The MINT-Kolleg has succeeded in developing measures to counteract known difficulties of students as they start to study mathematics, informatics, natural sciences, and engineering. "Both projects complement each other ideally and contribute decisively to the continuous improvement of teaching and learning conditions as well as of teaching quality at KIT," Alexander Wanner adds.

Research-based education characterizes studies at KIT. The Research-based Education Project encompasses KIT's efforts to develop new research-based education programs.

KIT-Lehre^{Forschung}-PLUS

Among the successful measures implemented in the first funding phase were new courses in the form of projects and internships to provide early insight into research-relevant issues during studies. These concepts that are associated with small groups of participants and high mentoring efforts can now be further developed and integrated into various study programs.

The follow-up project KIT-Lehre^{Forschung}-PLUS (Research-based Education Plus) is not only aimed at improving study conditions, but also at continuously enhancing teaching quality by the further development of all programs. Teachers, students, and service units plan to regularly exchange experience in the "Research-based Education" metaforum. Workshops will be organized by the university didactics unit together with the KIT departments to specifically initiate and reflect further developments of study programs. KIT-Lehre^{Forschung}-PLUS is embed-

ded in KIT's accredited quality assurance scheme for study programs. In this way, sustainable further development of academic education is ensured.

MINT-Kolleg Baden-Württemberg

The MINT-Kolleg Baden-Württemberg was established in 2010 by KIT and Stuttgart University. It is to facilitate the start of university studies by preparing beginning students for studies of mathematics, informatics, natural sciences, and engineering, and improving their individual success during these studies. To this end, the MINT-Kolleg has conceived a differentiated education program. The education concepts developed during the first funding phase proved to increase success of beginning students in the early phases of their studies. In written tests, the pass rate of students who had joined the MINT-Kolleg was found to exceed that of all students participating in the tests.

The second funding period is now aimed at consolidating and further developing measures to meet the increasing demand. Existing courses will be complemented by new, more flexible services for the individual support of students, as both their personal skills and the requirements of the study programs vary considerably. It is planned among others to establish a MINT help desk for the subjects of mathematics and informatics at KIT.

The MINT-Kolleg also receives funding from the Baden-Württemberg Ministry of Science, Research, and the Arts.

The MINT-Kolleg prepares beginning students for studies of mathematics, informatics, natural sciences, and engineering.

BRIDGING THE GAP BETWEEN TECHNOLOGY, BIOLOGY, AND PHILOSOPHY

2015 STATE TEACHING AWARD FOR TWO PROFESSORS OF KIT

Discussing and finding solutions across the borders of disciplines – this is what biologist Peter Nick and philosopher Mathias Gutmann ask their students to do in their interactive courses at KIT. Biology meets ethics: Students are encouraged to actively exchange knowledge across the borders of their realms. For their innovative concept that bridges the gap between technology, biology, and philosophy and between science and its application in everyday life, both scientists were granted the 2015 Teaching Award of the State of Baden-Württemberg.

Peter Nick and Mathias Gutmann, a biologist and a philosopher, jointly developed courses for studies of biology. Their main concern is to encourage students to think and reflect and to communicate about moral aspects of biology and technology, for instance. "The more our world is interconnected, the more important is the skill to understand and to integrate other perspectives. This can be done best by inter- and transdisciplinary dialog," both prize winners say. Above all, they want to make available to the students time for exchange of information, the objective being the joint development of new findings.

Understanding Other Perspectives and Styles of Communication

Both scientists also lecture as a team in the courses "Modellbildung und Ethik in der Biologie" (modeling and ethics in biology) and "Wie evolvieren biologische Theorien" (how do biological theories evolve). Here, students can experience various perspectives and communication styles as well as their "translation" into the other discipline. A short keynote by one of the lecturers is followed by a group discussion. The efforts are aimed at integrating the respective topic into the research routine of biology.

This concept meets with the positive response of students. According to KIT students of chemistry and biosciences, who proposed Peter Nick and Mathias Gutmann for the 2015 State Teaching Award, the lecturers present

Crossing the borders of disciplines: Biologist Professor Dr. Peter Nick and philosopher Professor Dr. Mathias Gutmann developed new courses for studies of biology.

concrete examples in interdisciplinary cooperation and thus succeed in demonstrating that science does not only exist at the laboratory or library, but that knowledge learned is also used in everyday life and may open up new perspectives on ethics and moral aspects.

Moreover, the way of lecturing differs from that of other courses. The frequently existing lecturer/audience style is reduced and discourse as a means of learning and developing is shifted into the focus. Both scientists plan to extend their teaching concept and to open it to other subject areas in the future. The prize money associated with the State Teaching Award will be used for the establishment of an academy for critical interdisciplinarity.

Minister Theresia Bauer with the winners of the 2015 State Teaching Award. Professor Dr. Peter Nick and Professor Dr. Mathias Gutmann can be seen on the right.

Active Interdisciplinary Dialog

"In an increasingly interconnected world full of mutual dependencies, the importance of interdisciplinary dialog in science increases," President of KIT, Professor Dr.-Ing. Holger Hanselka, says. "Everybody knows that solutions to cope with challenges of society mostly also have a social and an ethic dimension. Hence, it is the task of universities to convey sensitivity for the different views during education. In both courses winning the 2015 State Teaching Award, natural sciences and humanities meet to interact."

"Studying is much more than qualification in a certain realm. It means thinking out of the box, acquiring social and communicative skills, and further developing one`s own personality," KIT Vice President, Professor Dr. Alexander Wanner, emphasizes. "The joint courses of Professors Nick and Gutmann bring these aspects together in an ideal manner and encourage students to actively discuss across borders of disciplines."

FUNDING BY THE STATE OF BADEN-WÜRTTEMBERG

KIT INCREASES THE NUMBER OF MASTER'S STUDENTS

Since 2006, the number of student beginners has been increasing all over Germany. This is a result of the growing number of young people acquiring university entrance qualification and the high proportion of them who enroll at universities. In line with the total number of students, the number of places needed for master's students increases as well.

Under the "Master 2016" state program to increase the number of master's students in Baden-Württemberg, KIT has been granted funding to establish another 290 places for master's studies in the 2016/17 winter semester and the following academic year of 2017/18. This decision was made by the Baden-Württemberg Ministry of Science, Research, and the Arts in December 2015.

After KIT had acquired funding for the establishment of 350 additional places for master's students in the first round, KIT again succeeded with its proposals. With an increase rate of 11% for both rounds, KIT is ahead of all other universities and colleges in Baden-Württemberg.

Master's studies have a very high priority at KIT. With the funds granted by the state, KIT now has the opportunity to further develop the master's programs it offers. 55 additional places for master's students will be offered by KIT in Mechanical Engineering and Industrial Engineering and Management, 50 in Mechatronics and Informatics, and 35 in the program of Science – Media – Communication. The number of places for master's students will also be increased in the subjects of Informatics and Vocational Education in Engineering (25 each), Sports Science (15), Geophysics, German Studies, and Water Science and Engineering (10 each).

Within the framework of the first program phase, about 4 100 new places for master's students have been established all over Germany since 2013. In the second round, this number now totals 2 200. Efforts particularly focused on programs of high demand in Mathematics, Informatics, Natural Sciences, and Technology, where nearly half of the additional places will be offered. Other additional places will be offered to master's students of Linguistics and Cultural Sciences as well as Economics and Social Sciences, also at KIT. The additional funds are available for professorships, scientific staff, and other personnel.

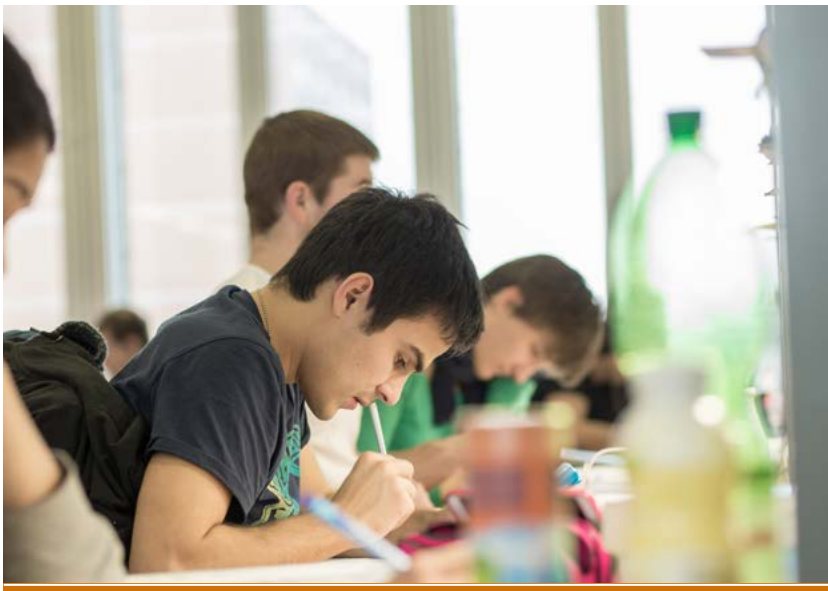
Within the framework of the "Master 2016" Baden-Württemberg State Program to increase the number of places for master's students, KIT will offer another 290 places.

STARTING STUDIES WELL-PREPARED

MINT-KOLLEG STARTS ONLINE PREPARATION COURSE

Vectors, derivations, and integrals, how can they be calculated? Knowing this is not only important at school. Such fundamental knowledge is also required in lectures of mathematics, informatics, natural sciences, and engineering. To facilitate the start of studies for future students, more than 20 German universities have developed two versions of an online preparation course to brush up on knowledge of mathematics, called "VE&MINT" and "OMB+". The "VE&MINT" course version is coordinated by the MINT-Kolleg of Karlsruhe Institute of Technology and Stuttgart University.

"The proportion of mathematics in many mathematics, informatics, natural sciences, and engineering programs taught is very high. For this reason, fundamental knowledge of mathematics is needed particularly in the first phase of studies," says Dr. Claudia Goll, Director of the MINT-Kolleg Baden-Württemberg that was established jointly by KIT and Stuttgart University. She points out that beginning students have very different levels of knowledge in the subjects relevant to the above programs. Consequently, this knowledge has to be brushed up before studies are started. The new Germany-wide and cost-free online preparation course provides prospective students with the opportunity to prepare for mathematics lectures at the university.



Online preparation courses offered by the MINT-Kolleg facilitate the start of studies of mathematics, informatics, natural sciences, and engineering.

Flexible and Modular

As part of a TU9 initiative (TU9 is the alliance of leading technical universities in Germany), the online preparation course is offered in the two versions of "VE&MINT" and "OMB+". While the contents are the same, organization of these courses is different. The "VE&MINT" version is the result of a cooperation with the VEMINT consortium that has been developing mathematical preliminary and preparation courses for more than ten years now. The MINT-Kolleg has conceived most of the online modules and the technology required for "VE&MINT". It also coordinates the course contents and is responsible for quality management. The ten modules mainly cover mathematics for pupils of middle and upper grades of secondary schools, ranging from fractions to integrals. With the help of an entrance test, the knowledge level of the participants is determined. Then, the preparation course suggests the modules that need to be studied in more detail.

Universities can include this preparation course in their offerings for prospective students. "VE&MINT" can be adapted to the universities' learning platforms. "OMB+", a project of several universities under the direction of RWTH Aachen and TU Braunschweig, offers the technical infrastructure and support by online tutors all year round for a fee.

INNOVATION

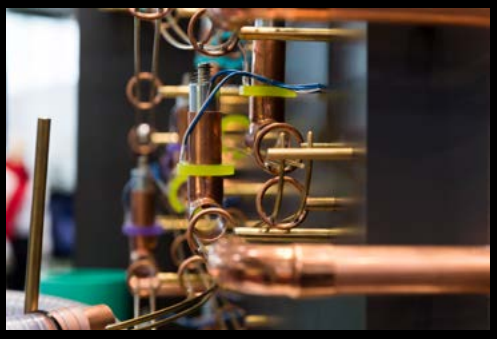
The ability to innovate determines the future existence of our society. For the KIT as a member of the Helmholtz Association, innovation is a very special duty to society and, at the same time, a core activity laid down in law. Innovation is also closely related to research and teaching. In translating ideas and inventions of sustainable benefit to business (technical innovation) and to society (social innovation) and combining them into systemic solutions, innovation contributes to improving the quality of life and to competitiveness. Many KIT innovations provide answers to future challenges confronting society, such as motor fuel produced from straw, superconductors

for electrical transmission, or solar energy stores to relieve the power grid.

KIT's innovative performance is reflected in international rankings. In 2015, the KIT managed to enter the new ranking list of the world's most innovative universities. Among Reuter's top 100 "Most Innovative Universities in the World," the KIT secured rank 100; among German universities, the KIT held sixth place. Since 2013, the KIT also has been among the 22 universities supported by the German Federal Ministry for Economic Affairs and Energy within the "EXIST – Founding Culture – The Founding University" competition.

Innovation as a core duty serves to produce scientific findings useful to society and industry by spinoff companies, licenses, or services offered to industry.

Roughly 40 to 50 percent of the approximately 130 inventions reported annually are covered by patent applications by the KIT, and some 20% are directly transferred to partners in industry. Another factor documenting the innovative performance of the KIT is the high rate of 60% of industrial copyrights used at the KIT. An annual amount of approximately € 2.5 million flows back to the KIT from licenses.

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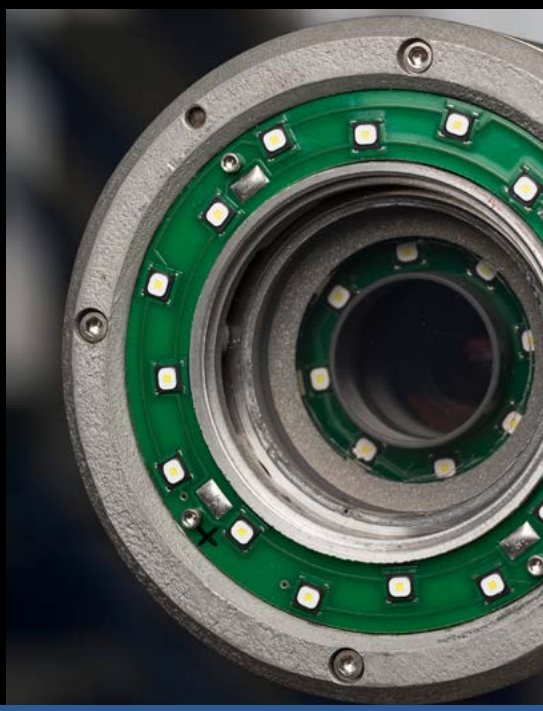










Stickstoff




FLEXIBLE STRUCTURES FOR INNOVATION

KIT CAMPUS TRANSFER GMBH FOUNDED

KIT Campus Transfer GmbH (KCT), founded by the unit supporting innovation at the KIT, by the KIT and KIT Innovation GmbH, marks a new approach to technology transfer that strengthens cooperation of the KIT with industry, in particular with small and medium-sized enterprises. It offers flexible support in the execution of industry projects and spinoffs and, by means of a variety of technology transfer units (TTU), creates a platform for translating existing technological competences into industrial value. Since the foundation of KCT, 19 TTU have been set up for specific projects in machine building, electrical engineering and information technology, chemical engineering and process technology, civil engineering, geosciences and environmental sciences as well as chemistry and life sciences.

"The advantages of KCT include flexible project design, development of new markets, and faster execution," explains Dr. Hanns-Günther Mayer of the KIT Innovation Management Service Unit who, together with Professor Dr. Albert Albers, Head of the KIT Institute of Product Engineering (IPEK), is one of the Managing Directors of KCT GmbH.

Under the roof of KCT, also spinoff projects at the KIT which have completed some first prototypes or products are able to enter the market in an early phase, validate their offerings, and accumulate some initial experience.

KIT President Professor Dr.-Ing. Holger Hanselka (center) with the two Managing Directors of KIT Campus Transfer GmbH, Dr. Hanns-Günther Mayer (left) and Professor Dr. Albert Albers (right).

A MATTER OF SCALING

KIT RUNS CROWDFUNDING PLATFORM OF ITS OWN

Good ideas need the right environment to grow but, on the road to implementation, they also need financial support. This is why public funds are used at the KIT to support promising ideas, technologies and last, but not least, talent. Beginning in March 2015, the KIT embarked on a new platform, KITcrowd, to acquire additional funds and arouse public interest in project ideas by means of a unique network of approx. 20,000 alumni, 10,000 staff members, 25,000 students, and many friends and supporters from a variety of fields.

Projects are presented under www.kitcrowd.de. Private persons and businesses can support them financially and conceptually. If many supporters are found, even small amounts would lead to successful project funding.

One special project supported financially by means of crowdfunding is the development of 3D ultrasonic computerized tomography (3D-USCT) at the KIT Institute for Data Processing and Electronics, which uses innovative technology to detect breast cancer. A 3D ultrasonic tomography examination is not only a more pleasant and less invasive diagnostic technique than radiographic mammography, but also promises to become an effective contribution to modern breast cancer prevention. Cancer of the breast is the most frequent cancer in women – 1,600,000 cases of breast cancer annually occur worldwide. Although the breast is not a vital organ, chances of curing the disease are not as good as they could be. If detected and localized in time, breast cancer can be treated very well. This innovative ultrasonic technique promises to localize breast cancer without compressing the breast, without needing a contrast medium and without exposure to radiation before cancer turns into a risk. The project is being conducted to develop an ultrasonic unit producing high-definition volume images for improved breast cancer diagnosis.

One example of a development aid project financed by crowdfunding is a bakery to be built in Sri Lanka following an initiative of the "Engineers Without Borders" university group at the KIT. Between 1983 and 2009, a terrible civil war raged in the north of Sri Lanka. The consequences of that war have left their mark on families. Estimates say that there are 86,000 Tamil widows in the north and northeast of Sri Lanka alone. The new bakery building is to be a place that will be these women safety and a job during the daytime.

One of the projects successfully acquiring funds on the crowdfunding platform: "Find out earlier what is important – 3D ultrasonic computerized tomography". This is a detail of the prototype.

RESCUING LIVES

RESTUBE WINS GERMAN STARTUP AWARD

The self-inflatable life buoy of RESTUBE, a startup founded by KIT graduates supported largely under the "EXIST" funding program of the German Federal Ministry for Economic Affairs and Energy, impressed the jury of the 2015 German Startup Award. It won first prize in the startup category. The jury felt that this made the company one of the most successful German startups in the past few years.

In a matter of seconds, the RESTUBE life buoy inflates to its full size, constituting a lifesaving rescue system for persons about to drown.

Water sports are very popular, but again and again many people practicing it are drowned. The self-inflatable life buoys of RESTUBE GmbH can save the lives of people about to drown. Christopher Fuhrhop and Marius Kunkis, two students of mechanical engineering at the KIT, developed rescue systems for all kinds of water sports. "The systems use a self-inflatable buoyant structure keeping drowning persons above the water when they pull the trigger," explain the founders. The life buoy can be attached to swimming trunks as a small package not much larger than a smartphone and not disturbing them while swimming or surfing or doing any other activity.

The founders of the RESTUBE KIT startup, Christopher Fuhrhop and Marius Kunkis.

3D Printing in a New Dimension

The finals of the 2015 German Startup Award included Nanoscribe GmbH, another KIT spinoff, in the shooting star category. The 3D printer of Nanoscribe allows minute three-dimensional objects from a few hundred nanometers to structures in the millimeter range to be produced with unparalleled resolution and maximum freedom of design. "Our 3D printers are the most precise units in the world for microfabrication," explains Nanoscribe Managing Director Martin Hermatschweiler. They surpass conventional 3D printing techniques and are used in a number of research areas. The expert jury of the German Startup Award was impressed by the technical skills and business competence of the team and attested to Nanoscribe and its extremely precise patented 3D printer a textbook high-tech creation and leadership in technology and the market.

ENGAGED IN CHINA

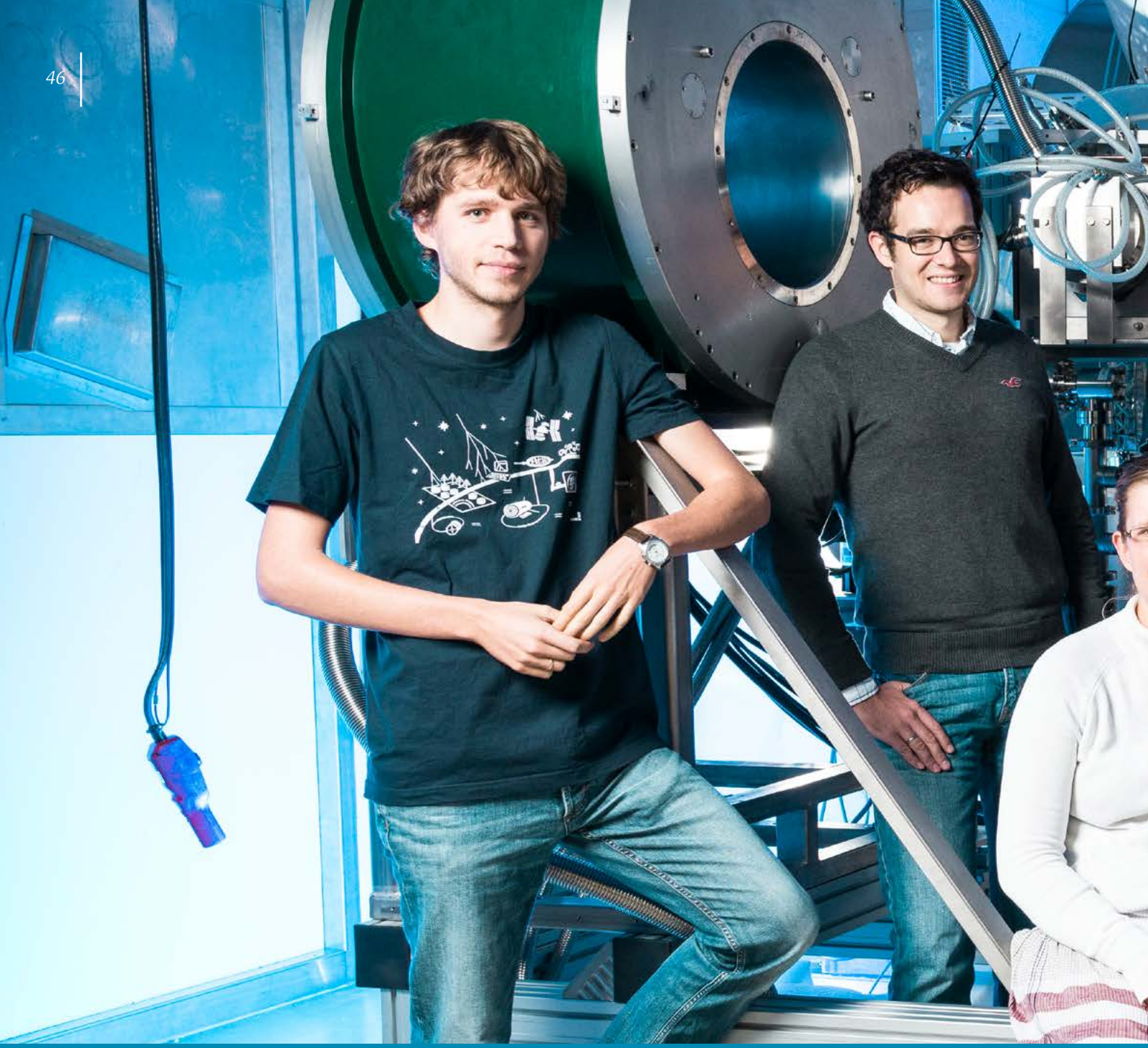
DEMONSTRATION AND INNOVATION CENTER OPENED IN SUZHOU

The KIT, in cooperation with the four Chinese universities of Nanjing University of Science and Technology (NUST), Tongji University Shanghai (TUS), Soochow University (SUDA), Shanghai Jiao Tong University (SJTU), is establishing an interdisciplinary research and innovation platform in the province of Jiangsu and in the conurbation area of Shanghai within the "StratP-China" project. Existing cooperative ventures at institute level are to be expanded into a strategic network. Areas of particular importance in this respect are production and materials sciences, biotechnology and nanotechnology, mobility, climatology and environmental research, and innovation management and entrepreneurship.

The Chinese branch of the KIT in Suzhou also includes a demonstration and innovation center.

Intelligent machines, work pieces and processes – this is the future of German production. In its "Industry 4.0" strategy, the German federal government intends to prepare industry for this objective, thus allowing the direct inclusion of customers and business partners in business and value-added processes. Also China, in its "Made in China 2025" strategy, more and more tries to automate and digitize its industry by emulating the German model. However, there are not enough experts to properly operate these production facilities. To prepare companies producing in China for the country-specific requirements to be met in "Industry 4.0," the KIT China Branch opened a demonstration and innovation center in Suzhou to serve also as a platform for joint projects of German and Chinese scientists in various disciplines. It is the first center in China to allow businesses and science to try, calibrate, and study German Industry-4.0 applications and the requirements of an intelligent factory in a real production line.

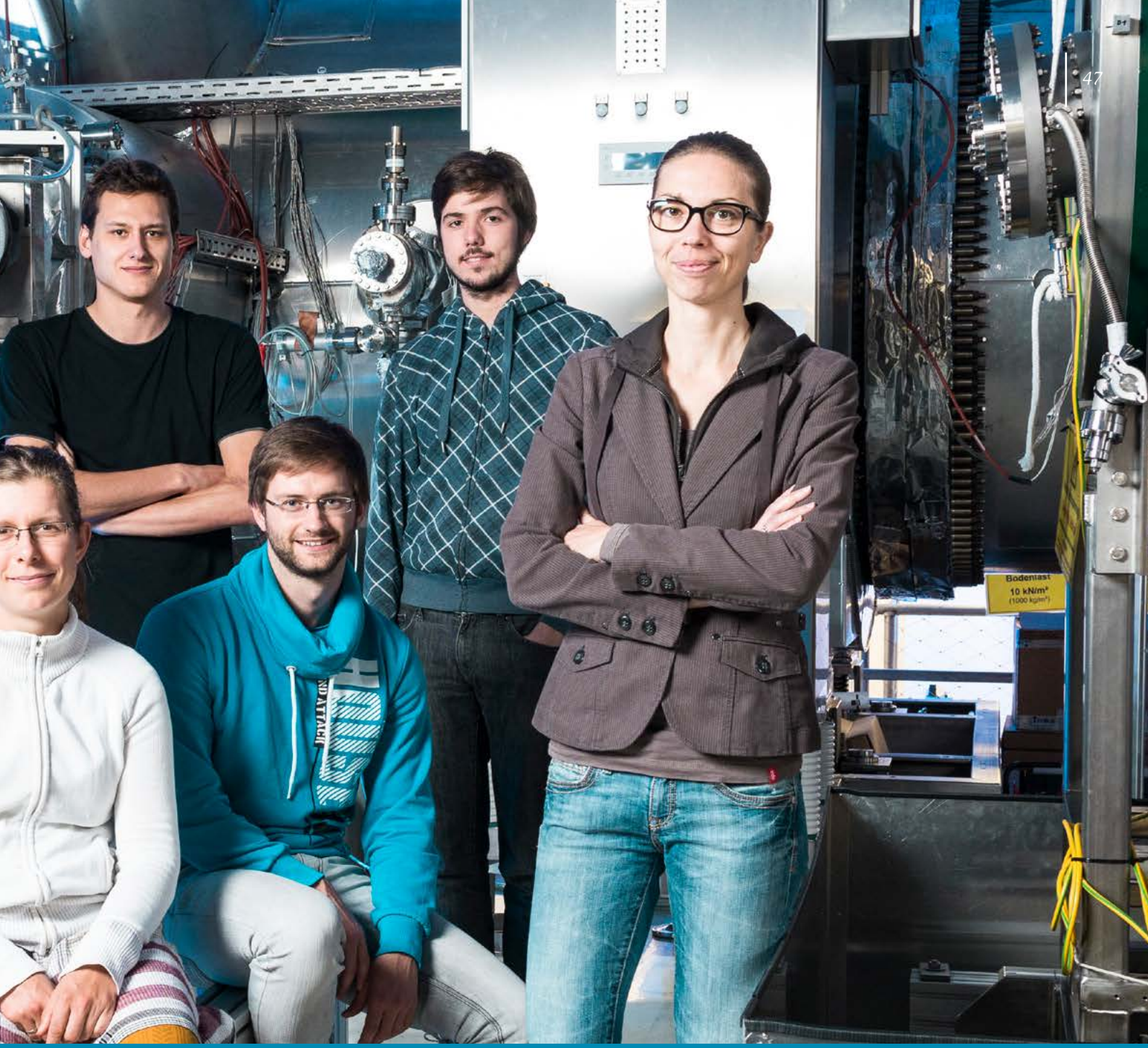
Opening ceremony of the Innovation Center of the KIT China Branch in Suzhou on November 25, 2015. On the far left, Professor Dr. Gisela Lanza, China Commissioner of the KIT and professor at the wbk Institute of Production Science.



PROMOTING YOUNG TALENT

Recruiting and promoting excellent young scientists is a factor of paramount strategic importance to the KIT. It is young scientists in particular who make important contributions to research, teaching, and innovation.

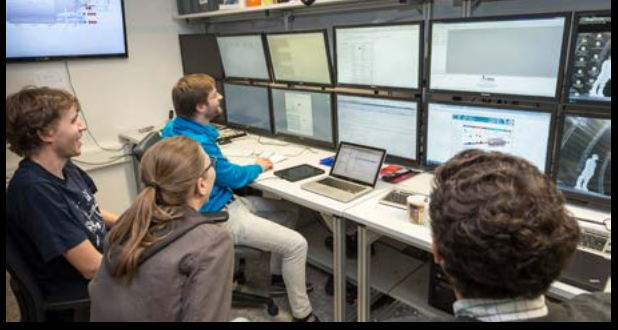
The KIT promotes postgraduate students at the KIT by enabling them to pursue independent activities while supervised by a mentor. This allows them to work at a high scientific level. In numerous Ph.D. programs financed by third-party funds, working for a doctorate is part of a coordinated research program carried out within the framework of a structured qualifica-



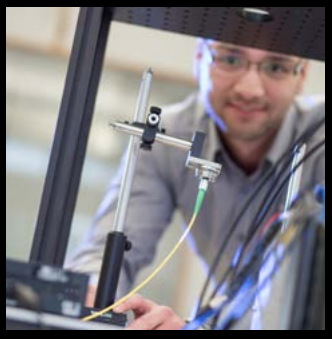
tion concept emphasizing personal career development and interdisciplinary cooperation among Ph.D. students.

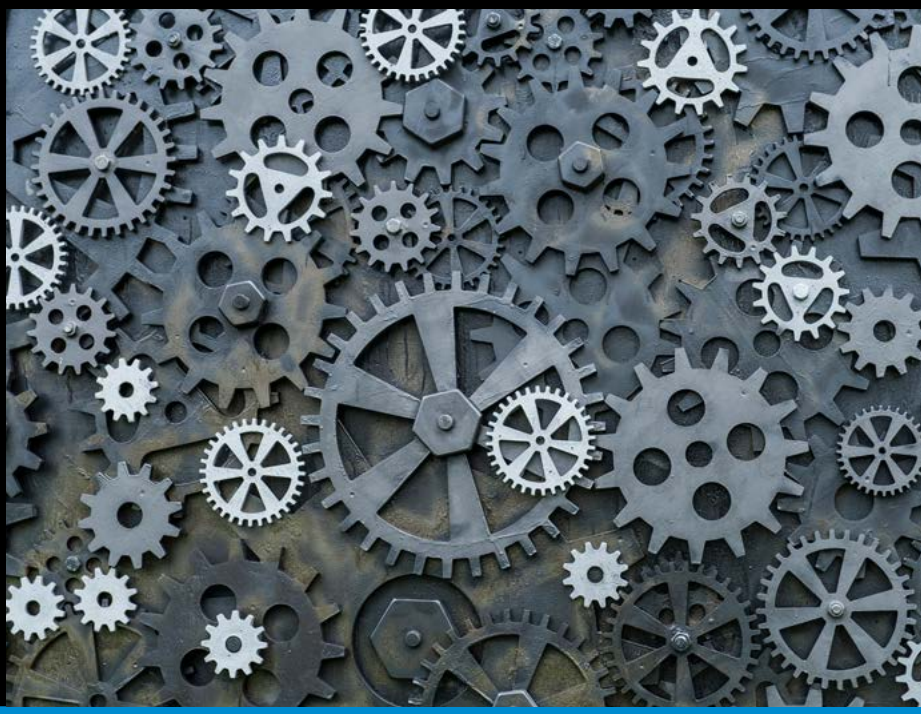
In the next career phase, the KIT promotes early scientific independence of its junior scientists by assigning to them personnel responsibility and giving them a chance to solicit third-party funds on their own.

One model case demonstrating this approach is management of a recognized Young Investigators Group at the KIT. The head of a Young Investigators Group also has teaching functions and supervises doctoral students as a KIT Associate Fellow. The status of KIT Associate Fellow can be acquired by outstanding junior scientists as yet without a "habilitation." Managing a recognized Young Investigators Group is a function especially for persons who obtained their doctorate outside the KIT or worked as postdocs and finance their work independently, for instance by acquiring an Emmy Noether Group, a Helmholtz Young Investigators Group, or an ERC Starting Grant.




Multi Track Optimum
Professur W3
befristete W2 Professur






KIT
Institut für Meteorologie
und Klimaforschung (IMK)


Kromasil
ϕ=0.25
S=0.03
n=1.455


HECTOR SCHOOL

KIT WINS "DOCTORATE QUALITY ASSURANCE" COMPETITION
EURO 100,000 FOR QUALITYDOC@KIT CONCEPT

A KIT doctorate is an outstanding foundation for careers in science, business, and society. The KIT thoroughly and sustainably supports this phase of life and work. Ph.D. students at the KIT pursue independent activities supervised by a mentor and distinguished by their high scientific level. This predoctoral phase at the KIT seeks to promote comprehensively independent scientific in-depth work in a core area, leading to a doctorate, and link it properly to advanced technical and general education. The focus of activity is on research; cooperation in teaching is desirable.

The KIT has begun to combine and supplement the tools of quality assurance in doctoral proceedings. The concept is referred to as QualityDoc@KIT. Its central aspects are ensuring and strengthening transparency and equality of the conditions for obtaining a doctorate, intensifying mentoring culture, and improving the culture of Ph.D. students.

Within the framework of the "Doctorate Quality Assurance" competition of ideas, the Baden-Württemberg State Ministry of Science, Research, and the Arts in November 2015 awarded prizes for innovative, far-reaching concepts ensuring the high standard of doctorates. "QualityDoc@KIT," one of the three concepts considered by the state, won the first prize in the amount of EURO 100,000.

The Karlsruhe House of Young Scientists (KHYS) is a central contact for advising and mentoring Ph.D. students at the KIT. The "QualityDoc@KIT" concept, among other things, intends to expand the registration portal of the KHYS into a comprehensive doctoral portal with a number of services designed for all user groups.

Another objective is strengthening the culture of mentoring. For this purpose, the KIT will formulate quality standards in mentoring guidelines establishing a binding framework and providing guidance to doctoral candidates and mentors alike. In addition, regular surveys among mentors are to supplement existing surveys among doctoral candidates. These latter surveys show that predoctoral students at the KIT are highly satisfied with their conditions of working for a doctorate. At the same time, the KIT has used the results of the survey to introduce additional offerings of consultancy and information, for instance about career planning and good scientific practice.

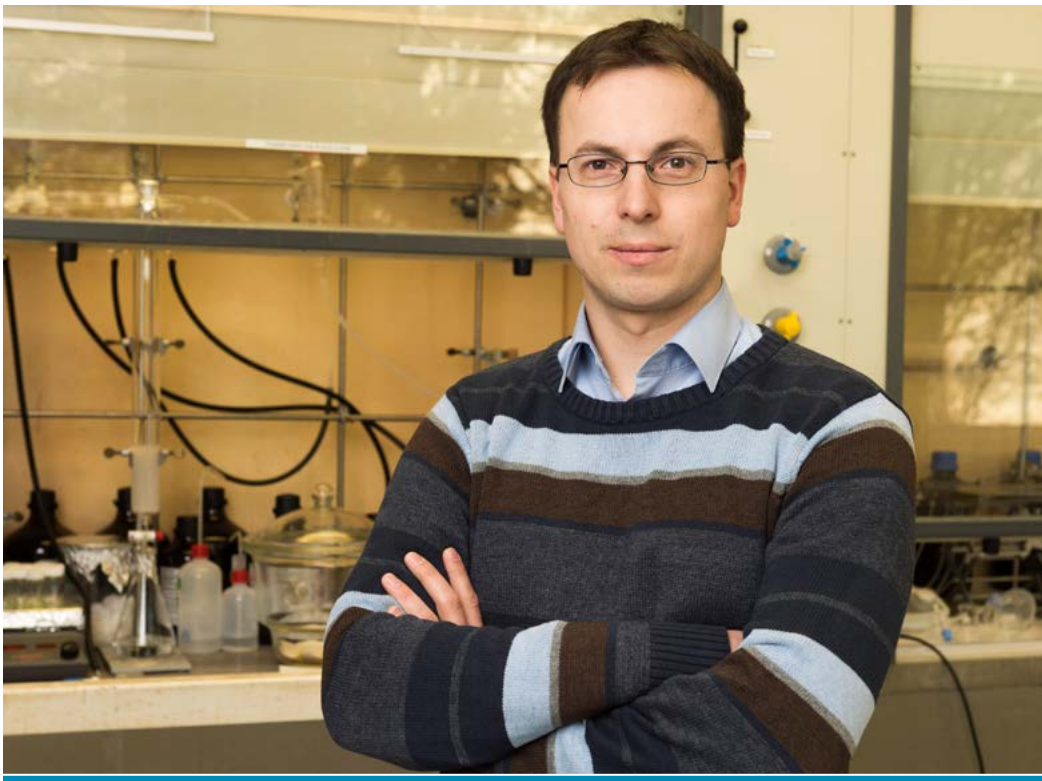
The third pillar of the advanced development concept is a quality management system for Ph.D. activities at the KIT whose structure will be influenced by experience with the successful systems accreditation in teaching.

The tools of quality assurance in doctoral studies are combined by the KIT in the "QualityDoc@KIT" concept.

MAJOR GERMAN DISTINCTION GOES TO JUNIOR SCIENTIST

HEINZ MAIER-LEIBNITZ PRIZE AWARDED TO PAVEL LEVKIN

Chemist Dr. Pavel Levkin of the Institute of Toxicology and Genetics has won the 2015 Heinz Maier-Leibnitz Prize. This distinction, which is awarded by the German Research Foundation (DFG), is considered the most prestigious distinction for young researchers in Germany. Pavel Levkin's scientific activities include studies of cell-surface interactions, the development of biofunctional materials and super-water-repellent surfaces as well as nanoparticles for drug and gene transport. He scored a major scientific success in synthesizing lipid-like molecules for gene modification of cells.



Polymer chemist Dr. Pavel Levkin received the 2015 Heinz Maier-Leibnitz Prize of the DFG.

Pavel Levkin's work is at the interface of polymer research, microtechnology, and biomedical application. He uses his profound knowledge of chemical applications to find new approaches to biological issues. The polymer chemist achieved his scientific breakthrough in the development of novel polymer systems regulating the interaction of living cells with modified surface structures. Levkin's research group at the KIT works on strategies modifying surfaces that contact cells, and the development of new nanoparticles designed to transport drugs and genes. Renowned scientists in molecular cell biology are now using Levkin's systems. His work has given rise to a spinoff company, Incella GmbH.

High Potential for the Future

"Polymer chemistry is developing new methods of synthesizing innovative materials with hitherto unparalleled properties, and offers a high potential for the future," explains KIT President Professor Dr.-Ing. Holger Hanselka. "One important area of application is molecular cell biology. Pavel Levkin has made important contributions to this field with his extraordinary knowledge in polymer chemistry and biology. I am happy to see that this great achievement has now been acknowledged by the award of the important Heinz Maier-Leibnitz Prize."

The DFG awards the Heinz Maier-Leibnitz Prize annually to junior scientists for their outstanding achievements. However, the prize not only acknowledges a doctorate; award winners, after having received the doctorate, have already developed scientific profiles for themselves. The distinction in the amount of EUR 20,000 is to help them continue their scientific career. The German Federal Ministry of Education and Research puts up the funds.

BETTER ENERGY SYSTEMS THROUGH DATA ANALYSIS

DFG FUNDS NEW RESEARCH TRAINING GROUP ON ENERGY INFORMATICS

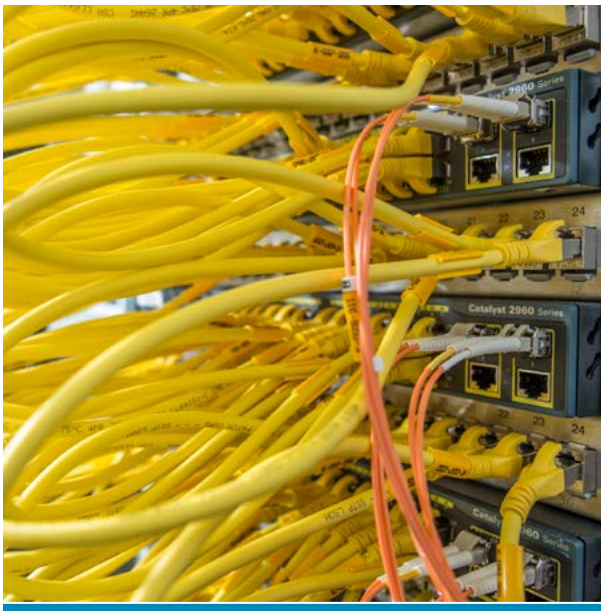
The new Research Training Group, among other things, focuses on photovoltaics as the most important pillar of future power supply.

Expanding energy systems with promise for the future is one of the most important societal concerns for the next few decades. These systems must be able to handle flexibly both fluctuating feed from renewable energy sources and different levels of demand. Complex informatics solutions are necessary to ensure this performance. The new "Energy Status Data – Informatics Methods for Capturing, Analyzing and Using" Research Training Group of the German Research Foundation (DFG) will be the setting for junior scientists at the KIT to develop methods of evaluating data flows from complex energy supply systems and show possibilities for optimization.

In its Research Training Groups, the DFG supports high-quality education of young scientists and engineers. The new Research Training Group offers predoctoral students at the KIT a sophisticated program of research and qualification in the young field of energy informatics. Focusing research in the fields of capture, analysis, and use of data is to further advance work in this area. The Research Training Group was approved in November 2015 and began work on May 1, 2016.

One objective of research by the new Research Training Group is finding, through data analysis, the weak spots in energy systems and making these systems more flexible, more efficient, and more failsafe. To achieve the ambitious goals of research, the Research Training Group pursues an interdisciplinary approach. A total of ten institutes from various disciplines participated in the application of the Research Training Group. The consortium of scientists includes experts on big data, but also scientists in the fields of IT security, information law, or electrical engineering.

At present, two Research Training Groups at the KIT are financed by the DFG within the Excellence Initiative, two others being funded by the Helmholtz Association; in addition, there are eleven Research Training Groups. The KIT doctoral programs offer possibilities to obtain a doctorate as part of a research program and a structured qualification concept. The doctoral programs focus on training and education of predoctoral students in research topics with promising futures and on supporting their personal career development and scientific independence. Moreover, the programs promote early networking, internationalization, and interdisciplinary cooperation among predoctoral candidates.



The new Research Training Group offers doctoral candidates sophisticated research and qualification programs in energy informatics.

BIOLICHT YOUNG INVESTIGATORS GROUP DEVELOPS SUSTAINABLE COMPONENTS

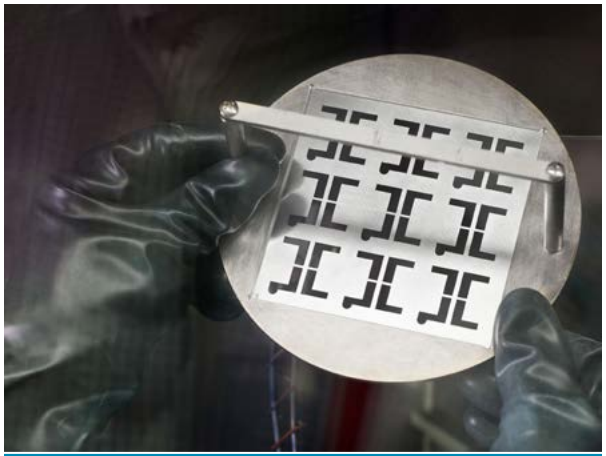
COMPOSTABLE ELECTRONICS FOR PRINTING

Smartphones or tablet PCs have service lives ranging between a few months and a few years. After that time, their technology is either outdated or defective, and successor models are already on the market. The consequence: Nearly two million tons of electronic scrap were generated in 2014 alone by information technology. Printed electronics will further stimulate this throwaway society by reducing production costs and opening up new markets for disposable products, such as interactive packages or intelligent adhesive plasters.

Junior scientists at the Karlsruhe Institute of Technology have found an innovative answer to this problem: They develop printed electronics made of compostable natural materials, such as plant extracts and gelatin. "Although they are not as longlived as their inorganic counterparts, they are stable for the lifetime of disposable electronic systems," says Young Investigators Group Leader Dr. Gerardo Hernandez-Sosa, who solicited 1.7 million euro for the project in the "NanoMat Future" competition organized by the German Federal Ministry of Education and Research. Electronic systems which are no longer of any use can simply be discarded as biowaste or composted to rot.

So far, this has not applied to conventional printed electronics, such as organic light emitting diodes (OLEDs). The carrier films of OLEDs are made of the same kind of polymer as conventional bottles for beverages; the BIOLICHT Young Investigators Group uses only materials for this purpose which actually occur naturally. Suitable materials are food starch, cellulose, or chitin. This is the advantage of a polymer: It is flexible, inexpensive, and can be processed into print films many kilometers long. For instance, stickers with an electronic traffic light indicating the best-before date, or adhesive plaster with sensors monitoring the healing process, can be produced on an industrial scale.

Organic light emitting diodes (OLEDs) can be produced simply and inexpensively. The use of compostable materials also makes them sustainable.



The Biolicht Young Investigators Group intends to make sure that printed electronics henceforth can be disposed of as biological waste.

First, however, electronic components have to be printed on non-polluting films; their function depends on the ink used; instead of dye particles, they contain dissolved conducting, semiconducting or non-conducting materials. The Young Investigators Group plans to develop inks which can be degraded biologically, are tuned to the new film material and, at the same time, can be printed on existing equipment. The scientists anticipate that compostable organic electronics will be commercially viable within the next three years.

The Biolicht Young Investigators Group is part of the KIT Light Technology Institute. It has its laboratories at the InnovationLab in Heidelberg, an application-oriented research and transfer platform of science and industry. The companies supporting the platform, besides the KIT, include BASF, Merck, Heidelberger Druckmaschinen, and SAP as well as the University of Heidelberg.

THE KIT 2025 STRATEGY PROCESS

The KIT 2025 Umbrella Strategy that was developed in 2014 and 2015 paves the way to and defines a lasting and fruitful cultural and scientific integration of Karlsruhe Institute of Technology. The strategy enhances the profile of KIT and gives direction to further development. Having positioned itself as The Research University in the Helmholtz Association, KIT has made it its objective to make full use of its potentials and synergies at the national and international level for excellent research, teaching, and innovation, and shape a joint identity that bespeaks quality.

For the first time, the umbrella strategy defines a joint mission for the entire KIT. It specifies, moreover, six major areas of action identifying special challenges to be accomplished by 2025. These include, among others, the three core tasks of research, teaching, and innovation laid down in the KIT Act. In line with these core tasks, the umbrella strategy emphasizes the perspectives of young researchers. KIT has set itself ambitious goals. The measures defined in the umbrella strategy are intended to support and encourage the scientists and researchers to advance into the circle of Europe's most renowned scientific institutions. To achieve this, KIT's central administration and technical infrastructure units need to play their parts too. In a young institution, these, in particular, are in a focus of attention and in need of clear developmental guidance. Stringent governance will provide the required framework.

The Presidential Committee mapped out the mission and strategy for these areas of action. In a participative process, the members and the staff of KIT contributed intensively to the discussion and to shaping the strategy.


KIT


Senatssaal


KIT
Wasserstofftankstelle
Zukunft
tanken


coffee-bike
coffee-bike


KIT
KIT

Professor Hanselka, in 2014, you initiated the KIT 2025 Strategy Process. What role does the development of an umbrella strategy play for KIT?

Let me first point out the situation I was facing at the outset. When I took office at KIT in October 2013, I was provided with lots of excellent strategy papers from which I was able to derive quite a few inspirations. I am well aware that before I came to KIT, many highly motivated and committed persons made great and constructive efforts to shape the future of our institution. In particular, my predecessors in office achieved a great deal. From my point of view, however, the connecting, overarching element was lacking. Joint goals are the basis for a successful future for KIT. The members of our Presidential Committee therefore have attached great importance to mapping out a ten-point program comprising the main areas of action for KIT to dedicate itself to for its successful further development. The core question: "What do we want KIT, in its entirety, to stand for in the future?" has always been the guiding issue in this process and revealed to us the need for an umbrella strategy. Our central objective has been to give KIT what it needs to succeed: A clear-cut mission with objectives and measures and with an adequate framework for action and regulation. The ten-point program and the umbrella strategy are closely connected with each other and, as a matter of course, give rise to various tasks to be pursued.

What are the particular challenges?

Since the 2009 merger, KIT has been one corporation. But, to this day, one corporation with dividing elements. The KIT financial management, for example, is still based on separate flows of federal and state funding. With the KIT 2025 Umbrella Strategy, we have at hand a paper identifying the changes required for KIT to eventually be able to act as one, with improved quality in research, teaching, and innovation. Let me give you an example: All scientific staff will contribute to all of KIT's research projects. Vice versa, all staff will contribute to teaching, irrespective of whether they belong to the world of large-scale research or the academic world. This, among others, is a signal to our federal and state sponsors to create, for us and with us, the framework needed to make this vision a reality. This is one of the basic ideas of the umbrella strategy.

Professor Dr.-Ing. Holger Hanselka, President of KIT.

How was the umbrella strategy prepared and worked out?

In view of the fact that the umbrella strategy eventually affects work and academic life at KIT in many ways, my intention was to enlist for the strategy input from as many employees as possible. To be able to analyze all contributions, we bundled the discussions at different levels and with different formats. More than 150 persons from all status groups of KIT were integrated intensively in four meetings of the sounding board and three workshop weeks. In addition, our employees were invited to give their feedback by e-mail via the KIT 2025 project website. Regular reports and information were provided in meet-

ings of the KIT Supervisory Board, the KIT Senate, and other bodies, such as the KIT Convention of our scientific staff. The whole process was closely accompanied by external advisors from science, industry, and politics. In its final discussion on September 21, 2015, the KIT Senate approved the content of the umbrella strategy. Votes by the committees and boards culminated in the Supervisory Board's positive vote on November 9, 2015. I considered the support I received from all participants throughout the process as constructive and valuable and would like to again express my sincere thanks. On November 11, immediately after the decision by the Supervisory Board, I informed the members of KIT in an employee meeting and expressed my thanks to them. The Presidential Committee and Heads of Divisions, moreover, have opened an exchange of views and experiences with all employees to broadly communicate the content of the umbrella strategy and by means of the transparency thus achieved support the implementation phase. Only together can we achieve our goals.

We understand that the Presidential Committee has not delegated mapping out of the content of the umbrella strategy …

Of course we didn't. My firm and full commitment as president is to guide to success this institution in its entirety. The Presidential Committee together with the Heads of Divisions thus pointed out the major areas of action for KIT to improve. Within these seven areas of action, guidelines were worked out for development of the entire KIT through 2025. In several iterations, these guidelines were then concretized into goals and subgoals and were furnished with appropriate measures. Whereas, in the entire procedure, feedback from KIT staff played an important role, the lead management in a strategy process must rest with the president.

How do you rate the prospects of KIT?

By adopting the KIT 2025 Umbrella Strategy, we have mapped out a mission that unites us. As "The Research University in the Helmholtz Association," KIT bears good prospects. I am fully convinced of that. Together, we will carry KIT through to success.

KIT – THE RESEARCH UNIVERSITY IN THE HELMHOLTZ ASSOCIATION
MISSION

We create and impart knowledge for the society and the environment.

From fundamental research to applications, we excel in a broad range of disciplines, i.e. in natural sciences, engineering sciences, economics, and the humanities and social sciences.

We make significant contributions to the global challenges of mankind in the fields of energy, mobility, and information.

Being a big science institution, we take part in international competition and hold a leading position in Europe.

We offer research-based study programs to prepare our students for responsible positions in society, industry, and science.

Our innovation efforts build a bridge between important scientific findings and their application for the benefit of society, economic prosperity, and the preservation of our natural basis of life.

Our working together and our management culture are characterized by respect, cooperation, confidence, and subsidiarity. An inspiring work environment as well as cultural diversity characterize and enrich the life and work at KIT.


Selbsterklärend formulieren
Mit Blick auf die Qualität der Forschung sollen folgende Teilziele erreicht werden
Mit Blick auf die Qualität der Forschung sollen folgende Maßnahmen umgesetzt werden


KIT
Herzlich Willkommen zur Mitarbeiterversammlung
„Dachstrategie KIT 2025"
Karlsruhe, 11. November 2015
Prof. Dr.-Ing. Holger Hanselka

KIT – THE RESEARCH UNIVERSITY IN THE HELMHOLTZ ASSOCIATION
RESEARCH

"Research is the central task of KIT. Researching means to be driven by curiosity to discover new things, to understand the things discovered, to share the knowledge found with others, to discuss it, stand up for it, and write it down to be preserved for posterity. All researchers are driven by the joy of discovering and by the discourse about their discoveries. Whereas this joy provides the basis for successful science, an institution can provide the appropriate framework only. This framework must have the proper width to give enough room to the disciplines as well as the proper height for developing a sufficiently sharp profile. With KIT 2025, we are on our way to building this appropriate framework."

Professor Dr. Oliver Kraft, Vice President for Research.

Professor Dr.-Ing. Detlef Löhe, Vice President Emeritus for Research and Information.

Freedom and Policy

Research at KIT is obliged to gain knowledge and to master the challenge of contributing essentially to the viability of our society and to the preservation of our natural basis of life. The research profile therefore combines the freedom of research and teaching in a broad range of disciplines with program- and priority-based research. Emphasis is placed on the skills and achievements of each researcher. The competence of the researchers to develop creative ideas and open up new fields of activity is as decisive as is their intrinsic motivation of joining in teams, groups, associations or Helmholtz programs of different sizes and durations and of coping most patiently with the most challenging tasks of research. KIT will continuously develop its research framework and will promote potential synergies in the best possible way. Its profile will be sharpened and enhanced through strategic cooperation to optimally support its scientific staff and to increase its national and international visibility and thus attract researchers and scientists from all over the world.

Quality Is the First Priority

KIT strives towards excellent achievements in fundamental and applied research. The research activities at KIT represent visible contributions to German science through efficient and continuously advancing disciplines and interdisciplinary projects and programs. To achieve excellence, strengths are consistently promoted with emphasis on high quality as the first priority. With its researchers, KIT competes in national and international support programs as well as in program-oriented funding by the Helmholtz Association.

High-profile Research

The profile of KIT as a scientific-technical research institution is determined by its fields of study and major areas of research, which are aligned to the long-term challenges facing society. Profile enhancement in energy, mobility, and information as the fields addressing the needs of today's society is based on interdisciplinary cooperation, with knowledge-oriented fundamental research and applied research inspiring each other. A quality-controlled incentive system is intended to strengthen the development of profile-enhancing topics on a broad disciplinary basis. This includes the support of fundamental research, which may become important to these topics in the future. Profile shaping and profile enhancement are dynamic processes promoting the visibility and attractiveness of KIT and, hence, the efficiency of research.

Well-established Networks

Strategic cooperation is a major element of successful research. Based on a well-established cooperation and internationalization strategy, KIT enters into research collaborations strengthening or extending its skills and competencies, in particular in the profile-shaping and

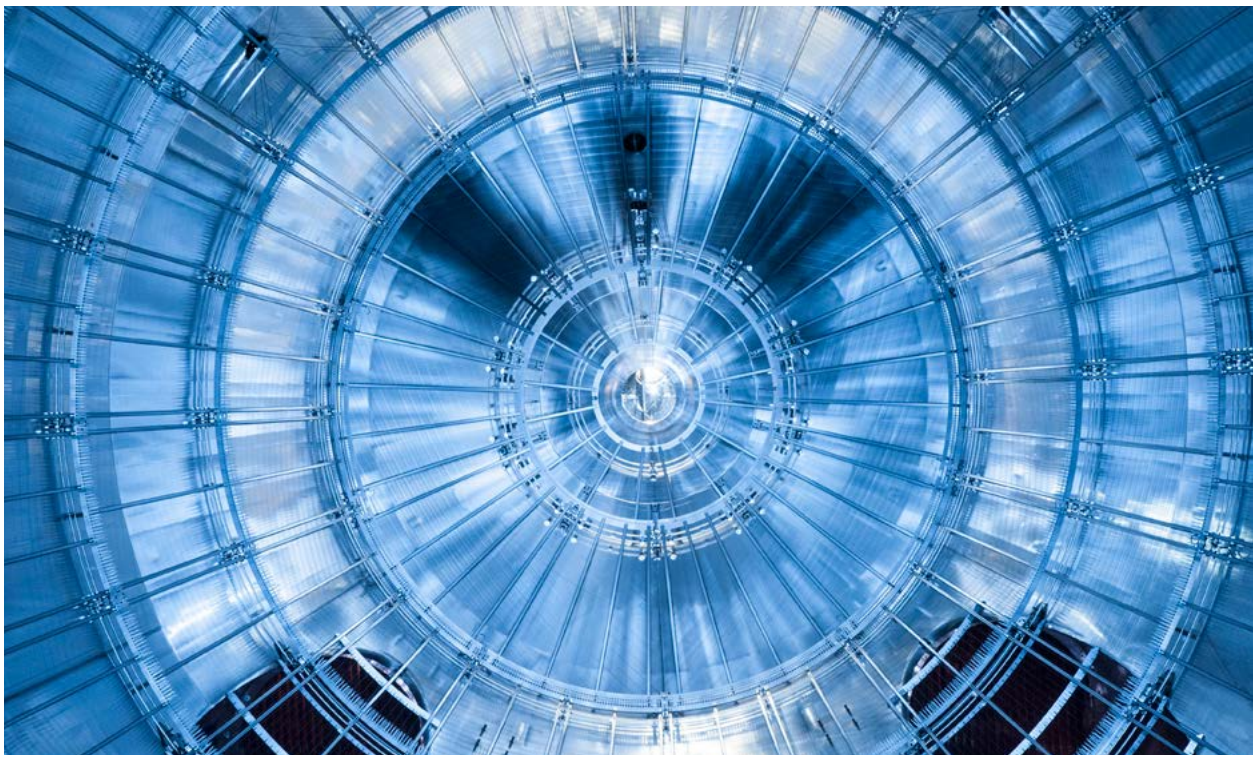
profile-enhancing areas. KIT aims to establish long-term cooperation and to support a continuous exchange of ideas and people with clear benefits not only for research, but also for teaching and innovation.

Competitive Research Infrastructures

KIT's large-scale facilities provide important tools and methods for research, open up new research horizons, and are essential drivers of technological development. These large facilities provide unique opportunities for experimentation as well as excellent conditions of work and are of great attraction to researchers from all over the world. Students and young researchers, too, can profit from unique further education options through early integration into highly complex research environments. One of KIT's strengths is the wide spectrum and diversity of large facilities integrated into a comprehensive research infrastructure and close interaction of large facilities, laboratory environments, and modern information infrastructures.

Towards the Top

Pooling all its strengths and forces, KIT is on its way towards a top position on the national and international level. KIT aims at achieving an outstanding position in national competitions promoting the advancement of the German science system e.g., in the follow-up programs within the Excellence Initiative. As an institution, KIT takes an active part in relevant rankings and competes in international competition with other technical-scientific research institutions in Europe. By 2025, KIT strives to be among the top 3 universities in Germany and the top 7 universities in the Conference of European Schools for Advanced Engineering Education and Research (CESAER).



KIT – THE RESEARCH UNIVERSITY IN THE HELMHOLTZ ASSOCIATION

TEACHING

"One of our core tasks is to prepare our students for responsible positions in society, industry, and science through research-based academic studies. We will consistently make use of our excellent capabilities to become one of the most attractive universities for students in Europe. The objectives set are in line with the spirit of our research university and receive broad support."

Professor Dr. Alexander Wanner, Vice President for Higher Education and Academic Affairs.

Research-based Teaching

KIT's work is guided by the principle of research and teaching being an entity. At KIT, all researchers and scientists participate in and contribute to shaping research-based teaching. According to the basic didactic conception of research-based teaching and learning, research is the most important basis of higher education. Higher education, on the other hand, enriches and inspires the core tasks of research and innovation. In this way, a bridge to company founding and entrepreneurship is built for students at an early stage. KIT prepares its students optimally for responsible positions in society, industry, and science.

Optimal Conditions of Study – Optimal Conditions of Teaching

KIT strives to become one of the universities in Europe that consistently attracts highly talented students from all over the world. This requires excellent equipment and facilities, an attractive ratio between students and research-active lecturers, and modern methods of teaching and learning. The portfolio includes research-based degree programs ensuring well-founded academic basic education. As a rule, the KIT departments develop and refine the degree programs in accordance with the basic principles of commitment, transparency, and creativity. The specific research infrastructures and large-scale projects provide KIT with an exceptional and unique basis for research-based teaching. To make full use of this potential, The Research University in the Helmholtz Association will develop and enhance its teaching formats. KIT wants to make teaching attractive and inspiring also for the lecturers. An incentive system supports the development of our culture towards the integration of all researchers and motivates innovative and student-oriented higher education.

An Attractive Place of Study

KIT wants to offer "knowledge marketplaces" on the campus. Apart from an agreeable architectural design of the university buildings, emphasis is placed on a reliable superior information infrastructure throughout KIT. KIT is a brick-and-mortar university aiming to consolidate its real and virtual campuses in a complementary manner.

Quality in System and Practice

KIT is committed to assuring and advancing the highest level of quality in higher education and academic studies. Personal responsibility in developing and shaping the degree programs is supported at all levels by KIT's quality management system. The KIT-PLUS system-accredited quality assurance concept considers both the perspective of the students and the perspective of the lecturers. The features and methodology of this concept are being enhanced continuously. Despite the increased opportunities of technology-enhanced learning, degrees in the future will be awarded only at the end of on-campus programs with compulsory attendance.

KIT Students Are Among the Best

KIT wants to attract the best applicants and train them to graduate with outstanding scientific skills and excellent opportunities on the national and international level. To this end, it is essential to assist the students in selecting their programs and orienting themselves from the very beginning. The relevant methods are being optimized and enhanced considering the specific requirements of the individual disciplines. Exacting admission procedures and/or examinations at the early stages of the studies give students insight into the requirements of their degree programs. Master's programs are open to internal and external graduates of bachelor's programs. International master's students are particularly welcome. Women applying for technical and scientific degree programs often are the best in their age group. KIT wants to develop and enhance this potential and plans to increase the overall percentage of female students to 40 percent.

Living Diversity

KIT, in all aspects, supports the diversity of students, lecturers, and researchers. The different nationalities and cultures of our lecturers and students are an important enrichment. KIT is guided and inspired by internationality. To make KIT the academic home to all its students, it takes an international perspective and cultivates multilingualism by offering a wide range of English and German language courses. KIT, moreover, gives students lots of opportunities to gain international and intercultural experiences.

KIT – THE RESEARCH UNIVERSITY IN THE HELMHOLTZ ASSOCIATION

INNOVATION

"In close cooperation with industry and in intense dialog with the society, KIT translates ideas and inventions into innovative products, processes, and services which contribute to the improvement of the quality of life and of competitiveness in Germany and Europe."

Professor Dr.-Ing. Holger Hanselka, President of KIT.

Professor Dr. Thomas Hirth, Vice President for Innovation and International Affairs.

Innovation as a Mission

The mission of innovation, as laid down in the KIT Act, is equivalent to the missions of research and teaching. From the idea to the solution, projects at KIT are implemented for societal benefit, economic prosperity, and the preservation of our natural bases of life. All members of KIT are to understand the basic innovation principle of transferring knowledge to application as their own contribution to the societal mission. In line with this, all researchers and scientists at KIT are to fathom the innovation potentials of their scientific and technological developments and implement these potentials wherever possible. KIT underlines the importance of innovation through establishing a separate presidential department at a level with and equivalent in importance to research and teaching (from 2016).

From the Idea to the Solution

Innovation is not an isolated process, but is propelled by the results from research and teaching with which it is connected most closely. Innovation may start from different positions of the scientific value chain. By combining the implemented ideas and inventions into systemic solutions, our quality of life and competitiveness are improved. KIT is not just committed to provident research. Being a member of the Helmholtz Association, KIT also lives up to its particular obligation to social responsibility. The core task of innovation not only is an added value for society, but also broadens the financing base for the core tasks of research and teaching. In line with this, KIT establishes a compelling definition of innovation that both considers the demands of the market and KIT's own demands: In the future, only findings that have been transferred to applications used and appreciated by third persons will be considered innovations by KIT. According to this conception, innovation is the application of a finding or a process, is a royalty or a spinoff, and is R&D that is wholly paid by the industry.

Innovation-friendly Climate

The KIT innovation strategy aims to implement an innovation culture developed and enlivened by students, administrative and technical staff, and researchers and scientists. Intelligent mechanisms and an entrepreneurial spirit are to promote involvement in and contributions to innovation from the very beginning. Innovation increasingly becomes part of a more comprehensive course of action comprising a clear-cut innovation process from the research idea to the transfer of results. In line with the conception of innovation as a core task, KIT strives to assume a pioneering role and leading position in the German science sector. Innovations are driven by science and by the market. Today, there already are initiatives to network science at KIT with industry, to facilitate cooperation, to jointly develop novel products or services, or to participate in research-based spinoffs. All activities e.g., the KIT Business Club and the Research-to-Business technology market, aim to bring together the potential users and the inventors at KIT.

Optimization of Framework Conditions

As of January 2016, clear lines of responsibility will be created at the highest management level, and the significance of innovation will be emphasized both within KIT and externally. Under the aegis of the new vice president, an innovation strategy with areas of action, measures, parameters, and the required resources will be developed and coordinated with the research strategy. Dynamic innovation demands specific processes that are optimized with regard to speed and flexibility. Particular infrastructural environments, such as offices and laboratories in the vicinity of the scientific institution, support growth processes and prepare the ground for technology-driven spinoffs. Suitable incentive models are provided to ensure that the rights of successful innovations largely remain with the inventors.

Suitable Cooperation Models

Cooperation can be established in many fields e.g., with industrial companies, scientific institutions, political organizations, public administrations, or private donors or sponsors. At KIT, cooperation with industry has an established tradition and is initiated and experienced in different ways, both by individual institutes and on a strategic level. There are various forms of cooperation, for example, contract research for individual companies, technology transfer projects, partly publicly funded research and development projects, and longer-term collaborations and companies on the premises of KIT. These forms of cooperation are being systematized, and relevant business models are being developed.

KIT – THE RESEARCH UNIVERSITY IN THE HELMHOLTZ ASSOCIATION
YOUNG RESEARCHERS

"Challenging and supporting young researchers means to actively shape the future. KIT has made it its objective to open up excellent opportunities of personal development and advancement to young researchers and scientists at the beginning of their careers. In addition to supporting excellent research, KIT thus promotes social and professional skills. Young researchers are offered reliable working conditions as well as committed supervision and promotion of work on their way to becoming professors or advancing to other executive positions in science, industry, and society."

Dr. Elke Luise Barnstedt, Vice President for Human Resources and Law.

Professor Dr. Oliver Kraft, Vice President for Research.

Professor Dr. Alexander Wanner, Vice President for Higher Education and Academic Affairs.

Commitment and Transparency

Qualified and motivated employees are the major pillar of success of KIT. A transparent personnel policy combined with the awareness of responsibility for our staff, therefore, are of particular importance. Both the recruiting and the postdoctoral support of excellent young researchers are of great strategic significance to KIT. It is the young researchers, in particular, who time and time again give new life, new impetus, and new ideas to research and academic education during their doctoral studies, as young scientific executives or as junior professors. KIT aims to offer young researchers a clear-cut and intelligible portfolio of career options. In this context, an important role is played by the executive staff of KIT who in caring for and supporting the careers of the young researchers are assisted by central policies. The ability to reconcile family and scientific career is promoted comprehensively, a visible proof being the repeated granting of the "Audit Familiengerechte Hochschule" (family-compatible university audit certificate). Observance of the equality principle in each and every respect including equal opportunities for men and women is a particular concern to KIT.

International Recruiting

All positions for young scientists are filled in accordance with high quality standards. It is the objective of KIT to achieve a high potential of creativity by mixing the KIT graduates with national and international external graduates. Whereas, during the first stage of qualification (when doing the doctorate), KIT's own graduates are given good starting opportunities, advanced positions after the postdoctoral phase are basically filled by open international competition. KIT is convinced that mutual benefits and profits arise from the different cultures, nationalities, and traditions, in particular for young researchers, and prepare them for national or international scientific careers.

Doctorate as a First Career Step

The proof of qualification for independent scholarly achievements is indispensable for a scientific career. KIT, of course, employs researchers without Ph.D.s. However, academic careers demand qualifications beyond the master's degree. KIT considers giving appropriate support to be one of its most important tasks. KIT boasts internationally acknowledged graduate schools and research training groups that are much in demand and are renowned for high freedom coexisting with intensive guidance. Recruit-

ing is a very careful process emphasizing an international composition of students. Quality assurance during the doctoral procedures is based on the QualityDoc@KIT concept, which has received an award by the State of Baden-Württemberg. Quality assurance mainly aims to ensure and increase the transparency and quality of the conditions for doctoral researchers and to strengthen the culture of guidance and doctoral research.

Optimal Entry into Scientific Careers

The phase after the doctorate is important for achieving further scientific qualifications, for one's orientation in the national and international science systems, and for decisions for a career in science, industry or society. Postdocs are supported by KIT in their development and their decisions so that clear-cut advanced prospects inside or outside of KIT are found at the end of the three-years postdoc phase. Academic careers are supported by KIT giving early scientific independence to young researchers, entrusting young researchers with responsibility for staff, giving them the opportunity of supervising their own doctoral students, and assisting and encouraging them through advisory support in acquiring third-party funds. As an institution committed to a policy of innovation, KIT also supports its young researchers in the economic exploitation of research results, for example through launching spinoff projects.

Networks for Young Researchers

Both for KIT and for the young researchers, networking and the initiation of collaborations are of significant importance. For young researchers, KIT's Young Investigator Network (YIN) is the most relevant and important network. Its further enhancement and increased funding are on the agenda. Through its various collaborations with other research institutions, industrial companies, and public organizations in Germany and abroad, KIT provides excellent conditions for careers without barriers between science, industry, and society.

KIT – THE RESEARCH UNIVERSITY IN THE HELMHOLTZ ASSOCIATION
GOVERNANCE

"Governance, in the first place, means bearing responsibility. At KIT, governance thus is intended to define clear-cut responsibilities and to support at all levels our executive staff in accordance with the principle of subsidiarity. Based on well-defined structures and procedures, uniform rules, and common values, we bring together decision-making powers and the assumption of responsibilities. In this way, we are prepared optimally for a successful future."

Professor Dr.-Ing. Holger Hanselka, President of KIT.

Orientation in Diversity

KIT thinks and acts as ONE institution. This is the basic orientation and objective of governance at KIT. The challenge lies in the large scope of university and non-university tasks requiring a uniform framework for action and regulation as well as sustainability and reliability of all structures and processes. Joint research and education profiles, a joint innovation approach, and standardized administrative processes underline the development of a common KIT spirit. The responsibility of the individual is reflected in the implementation of the principle of subsidiarity. All our values are laid down in the KIT rules and standards, which we will continue to develop dynamically.

Common Values

Our governance is guided by Article 5, Paragraph 3 of the German Basic Law, the Act on Karlsruhe Institute of Technology (KIT Act), and the joint KIT statutes. Emphasis is placed on KIT's central value of freedom of research and education. The basic tenor of our dealings with one another is determined by our mission and mission statement. The KIT guidelines for ethical principles pick up on these thoughts and enhance and refine them. KIT applies the rules for good scientific practice and compliance. The equal opportunities plan serves as a guideline for personnel policy and for dealing with our students in accordance with the principles of equal opportunities. Decision-making powers covering the necessary decision-making competencies and budget responsibilities are subject to the principle of subsidiarity and support our specialists and executive staff. Participation occurs in the bodies and committees of KIT and assists and supports the management. KIT strives for transparency, reliability, and trustful relationships both internally and externally. KIT considers diversity and variety to be factors determining its culture, which it wants to enhance by applying appropriate measures. KIT commits itself to the observance and continuous adaptation of its common principles.

Standardized Rules

Governance gives KIT a reliable framework for action and regulation, which as a solid basis for the development and implementation of efficient and sustainable processes enables a sustainable accomplishment of its three core tasks (research, teaching, and innovation) both nationally and internationally. Reliable structures are essential to any kind of research project, to the core task of teaching with its long-term obligations, to the full development of KIT's innovative strength striving to contribute to the successful economic development of Germany, and to fruitful cooperation with diverse external partners. In political and internal bodies, KIT therefore will work towards standardization of its framework conditions e.g., of the financial flows, the capacity to plan, build, and finance construction projects, the personnel budget, and statutory provisions.

Clear-cut Structures and Procedures

KIT accomplishes its core tasks based on a lean and clear-cut organizational structure with three hierarchical levels (Presidential Committee, Heads of Divisions, Heads of Institutes and Service Units, respectively) and three functional units (KIT Departments, Helmholtz Programmes, and KIT Centers). The KIT Centers, KIT Departments, and Helmholtz Programmes are open to all researchers at KIT. The interaction between the different levels is determined by transparency and subsidiarity regarding the assignment of responsibilities through rules of procedure within and between these hierarchical levels as well as by efficient and transparent decision-making processes. Based on the President's guidelines, the Presidential Committee is organized along departmental lines. The divisions and institutes are managed and organized by the executive staff on their own authority within the framework agreed on with the Presidential Committee. Research, teaching, and innovation are carried out by the researchers in the institutes. They are the core of the performance and efficiency of KIT. Resources are distributed transparently and traceably. Whereas distribution is supported in part by indicators, target agreements are drawn up to be able to retrace contracts and arrangements. The core tasks are supported by a comprehensive quality management system considering the different subject cultures. This system is complemented by internal evaluations and customer satisfaction surveys for optimization of processes in central administration and technical infrastructure. KIT places emphasis on a culture of welcome and open feedback as well as on lively and respectful communication.

KIT – THE RESEARCH UNIVERSITY IN THE HELMHOLTZ ASSOCIATION

CENTRAL ADMINISTRATION AND TECHNICAL INFRASTRUCTURE

"Our objectives in the field of central administration and technical infrastructure are to eventually overcome the administrative separation and to increase the efficiency of the different service units. Assisting the three core tasks of research, teaching, and innovation, the KIT service units strive for an efficient, prompt, and cooperative support, a transparent use of resources, and a central and decentralized cooperation on an equal footing."

Dr. Elke Luise Barnstedt, Vice President for Human Resources and Law.

Dr. Ulrich Breuer, Vice President for Finance and Business Affairs.

Objectives of KIT's Central Administration and Technical Infrastructure

Rendering services to research, teaching, and innovation is the major objective and most important task of KIT's central administration and technical infrastructure. As partners for research and science, the KIT service units use their resources efficiently, advise and support the institutes in competently using their respective means for optimal execution of the core tasks of KIT, and ensure sufficient levels of provision of equipment as well as appropriate technical conditions throughout KIT. The KIT service units aim to take work off the shoulders of the researchers by advising and supporting them in managing their decentralized administrative tasks. Mutual understanding for the position and factual and legal limits of one's counterpart are a precondition of successful collaboration.

Uniform Rules, Transparent Core Processes

Uniform rules (for example regarding the financial flows and the capacity to plan, build, and finance construction projects) enable synergy effects, open up optimization potentials, and prevent unequal treatment. To be able to efficiently support the objectives in research, teaching, and innovation with regard to strategy and content, merging of the separate financial flows of the two funding partners is particularly important to KIT. Campus development is being promoted optimally through implementation of KIT's own and independent capacity to plan, build, and finance construction projects. Central administration and technical infrastructure strive for solid, transparent, uniform, and efficient core processes leading to uniform services and service levels. Electronic workflows based on central IT-based services improve the interaction between central and decentralized units. Based on the projects of KIM (Karlsruhe Integrated Information Management), KIT started to set up a management information system.

Clear-cut and Structured Tasks

Optimization of the work and structure of the central service units, for example through the elimination of double structures, is being continued. Emphasis is placed on integrating the staff into the process of change. To the extent possible, the decision-making authority is passed on to the service units, and processes are organized in a decentralized manner. Similar tasks are organized in one and the same service unit. The improved organization helps the staff of the service units make their way of working and communicating be more service-oriented and transparent and enables central administration and technical infrastructure to become true partners of and service providers for science.

Optional and Obligatory Services

The obligatory services of an institution comprise e.g., human resources management processes, internal and external accounting, representative functions, building

operation, and media supply and disposal. Student administration and administration of courses play a central role for KIT as a university. All tasks related to the core processes at KIT automatically are obligatory services and are rendered by KIT itself. Sufficient staff is provided for dealing with these tasks, and basic funding sustainably secures continuous performance and prompt and efficient task completion. The cost incurred is borne either centrally or is paid by the internal customers. Over the decades, however, the central administration and infrastructure have been rendering additional services which can be purchased on the market in similar quality today and in the future. These optional services are determined with participation of the institutes and other service units and will continue to be offered only if demanded by the scientific staff and on condition that adequate prices are achieved. In this way, the use of resources can be controlled efficiently.

Indicator-based Distribution of Funds

The implementation of an (indicator-based) model for the distribution of funds and the refinement of cost and activity accounting in accordance with the classification into optional and obligatory services support the use of all synergy potentials at KIT and are cornerstones of a long-term financial capacity to act. Cost-incurring patterns of behavior are consistently changed through cost awareness and cost responsibility. The refinement of cost and activity accounting is an important basis for raising cost awareness and promoting resource-saving behavior.

EMPLOYER KIT

Its staff of 9315 makes the KIT one of the largest employers in the region. 5859 staff members are scientists, 3456 are non-scientific personnel, which includes 471 trainees and the students of the Baden-Württemberg Cooperative State University. The share of women is 36.1%. 1156 foreign staff members and 355 university teachers and senior scientists work at the KIT.

Against this backdrop, personnel development and personnel selection are important factors. Thus, the scheme of systematic selection of personnel was expanded in 2015, and procedures were developed

further. Also the consulting and continuing education program for all employees, especially for executives, and qualification measures for junior scientists, were enlarged.

The KIT strongly opted for diversity and equal opportunities. In 2015, the first Gender Monitoring Report was written on the basis of the Equal Opportunities Plan. Effective April 1, 2015, four Equal Opportunities Commissioners and their deputies were elected and appointed by the President. In the interest of life-work balance, an emergency system providing for unforeseen instances of child care has been available at the KIT since 2015. Day nurses can be hired to cover temporary needs for child care.

The Health Network provides for the health of the staff. Its objective is to protect and promote health by measures meeting specific needs of personnel. Towards this end, the 3rd KIT Health Day was organized to offer to staff information and consulting services. Other offerings valid over a full year are the "Active Break" training program or the "Live Balance" preventive program.


CAREER SERVICE QUIZ
KIT


KIT


KIT


Vegetarisch
Vegan


KIT
Riesige Experimente
für kleine Teilchen

NEW COUNSEL OF CHOICE AND ONLINE TRAINING COURSES
COMPLIANCE AND PREVENTION OF CORRUPTION

Acting in conformity with rules and regulations, i.e. compliance and prevention of corruption, are topics of great importance at the KIT. Acting in conformity with rules and regulations is a most valuable principle to the KIT and all its staff members, and constitutes the basis of good cooperation in a spirit of trust and confidence. All persons working at the KIT and students are informed of the rules and regulations in force and are required to comply with them in order to ensure safety, security, and protection and maintain the reputation of the KIT.

In support of these endeavors, the KIT appointed Margarita Bourlá as Commissioner for Compliance and Prevention of Corruption responsible for further development of, and compliance with, rules and regulations in force at the KIT. She and her team advise in matters of conformity with the rules and organize the clarification and investigation of compliance infringements, if any. Everybody working at the KIT may contact the Compliance Officer, even anonymously. She is bound to confidentiality if the persons providing information or seeking advice so desire.

In addition, a Counsel of Choice appointed by the Baden-Württemberg State Ministry of the Interior effective July 1, 2015 was commissioned to receive any information about potential compliance violations. The Counsel of Choice is the contact for all members and other staff of the KIT, but also for external persons. He or she collects anonymous information about potential criminal or ethical violations. The Counsel of Choice decides, on the basis of his or her best judgment, whether and to what extent he or she submits information received to the Compliance Officer for further investigation. This ensures that only cases involving substantial suspicion will be reported to the KIT. If necessary, the Counsel of Choice cooperates in elucidating the subject matter, of course while protecting the anonymity of the person providing the information.

Besides preventing corruption, data protection is an important topic at the KIT represented by the Data Protection Commissioner, Marina Bitmann. In view of the fact that a number of rules and regulations must be observed in the fields of both data protection and prevention of corruption, the Presidential Committee has introduced e-learning courses in data protection and corruption prevention. Towards this end, all KIT staff working at the KIT for more than four months receive invitations by e-mail to attend a respective e-learning course within a period of four months. These e-learning courses are to be repeated for refresher purposes in a regular cycle of three years, if necessary with updated contents.

Compliance and prevention of corruption are very important functions at the KIT.

SUCCESSFUL LAUNCH
JOINT PAY ACCOUNTING SYSTEM

Since the KIT was founded on October 1, 2009, its headcount has risen from 8573 to 9315 within six years. The scheme devised in 2014 for joint pay accounting of the Large-scale Research Sector and the University Sector was successfully implemented in January 2015.

In January 2015, the entire pay accounting system for the Large-scale Research Sector and the University Sector was implemented successfully.

Effective January 1, 2015, the pay accounting system for some 7000 employees under collective contracts and student and scientific assistants in the University Sector so far managed by the State Office for Remuneration and Pensions was taken over by the KIT. This switch proceeded without any problems.

Its nearly 9500 employees, of whom some 6000 work in scientific and teaching functions, and roughly 25,000 students make the KIT a major science institution ranking at the top in Europe. The KIT also is in the lead when it comes to vocational training. More than 470 young adults are trained in some 45 promising vocations, i.e. in commercial and technical vocations, also in combination with the Baden-Württemberg Cooperative State University.

The KIT offers its workforce an interesting interdisciplinary working environment with many possibilities in research and teaching in more than 100 institutes. Its excellent scientific infrastructure, unique in the world, provides for outstanding working conditions supported by service units in administration and engineering.

Qualified and motivated employees are the most important pillar of KIT's success. As a consequence, transparent and responsible personnel planning, promotion, and recruitment as well as cooperation in a spirit of respect, confidence and subsidiarity are objectives of top priority.

Personnel planning, promotion and recruitment are supported centrally by a separate KIT service unit, Personnel Development and Vocational Training. Internally as well as externally, the KIT seeks to achieve transparency, reliability, and cooperation in trust and confidence.

A large number of different social, cultural and individual backgrounds and experiences characterizes the spirit of cooperation at the KIT. The KIT is proud of this diversity, considering it an important part of successful development in research, teaching, and innovation. In line with this objective, the following dimensions of diversity are considered at the KIT: Equal opportunities, internationality, persons with handicaps, generation management, and work and family.

"GOOD WORK AT THE KIT"
RESPONSIBLE MANAGEMENT OF FIXED-TERM CONTRACTS

Appropriate and reliable working conditions, secure jobs, and plannable careers are fundamental principles of the KIT. It is for these reasons that the Presidential Committee, the KIT Senate, and the Staff Council adopted the "Good Work at the KIT" commitment principle in which the boundary conditions are laid down for responsible management of fixed-term working contracts. This commitment takes into account that more than 40% of the KIT budget is financed by third-party funds. It is precisely this success of KIT scientists in soliciting third-party funds which constitutes the reason for the large number of fixed-term contracts.

The KIT endeavors to clearly reduce working contracts for periods under two years, especially those for a term of less than one year. Exceptions, among others, are deputizing functions, for instance for family reasons or interim funding of projects financed by third-party funds.

All scientific staff members employed at the KIT after completion of their master's or diploma graduations are to be given the possibility to work for a doctor's degree while offered their first working contract. Within their post-doc phase, a personnel planning scheme should be available after three years at the latest showing whether an activity outside of the KIT, a junior professorship, junior group leader position, post-doctoral lecture qualification, project-related activity or a permanent job at the KIT is envisaged. For non-scientific staff, personnel planning must be in place after four years of work at the latest, if a follow-on contract is offered.

This commitment is accompanied by an earlier service agreement about staff discussions. These staff discussions, to be organized once a year, are the point where the career perspectives at the KIT are to be defined in particular for staff working under fixed-term contracts.

Negotiators of the "Good Work at the KIT" commitment: Dr. Elke Luise Barnstedt, Vice President for Human Resources and Law, and Staff Council Chairman Dr. Wolfgang Eppler.

OUTSTANDING ACHIEVEMENTS

NINE KIT TRAINEES AMONG THE BEST

The best trainees in the region, among them nine from the KIT, won distinctions by the Karlsruhe Chamber of Industry and Commerce.

The Karlsruhe Chamber of Industry and Commerce (IHK) annually honors the best graduates of its final exams. On October 27, 2015, the ceremony took place at the fully booked Gartenhalle of the Karlsruhe Congress Center. The 243 best graduates of the year included nine former trainees of the Karlsruhe Institute of Technology.

Distinctions for scientific vocations were won by Simone Staudt and Maximilian Merkel, both laboratory assistants, and Nadja Wunsch, Madeleine Burger, and Lukas Geschwender won awards for outstanding achievements in training for biological laboratory assistants.

Simon Wolfinger, Norman Redemann, and Patrick Ochs received certificates for their industrial mechanics training. Markus Neumayer won the certificate of merit for training as a technical product designer awarded by Wolfgang Grenke, President of the Karlsruhe IHK.

After the ceremony, IHK President Wolfgang Grenke and IHK Managing Director, Professor Hans-Peter Mengele, presented the certificate honoring outstanding performance in dual education to Andreas Schmitt who, since October 2015, has been new Head of the Vocational Training Unit in the Personnel Development and Vocational Training Service Unit of the KIT.

The KIT offers practical training in more than 30 technical, scientific, and commercial vocations. Some 160 young persons with secondary-school graduate levels, "Mittlere Reife" exam or a high-school graduation exam annually start training at the KIT supported by some 200 full-time or part-time trainers.

In addition to the classical vocations for which training is offered, numerous possibilities of studying for a bachelor`s degree are available in cooperation with the Baden-Württemberg Cooperative State University. For the three-year period of studies, phases of theory taught at the Cooperative State University alternate with practical work at the KIT.

To prepare trainees and students for the internationalized working world, they can spend part of their practical training with companies in other European or non-European countries. Students thus can improve their skills in foreign languages and experience the culture of their host country. Since 2014, this opportunity has been promoted by the new Erasmus+ EU Program.

LIFE AT KIT

Our society is changing, everyday life is increasingly influenced by information technologies. These technologies are omnipresent in our lives and are indispensable for our actions. These changes also affect the work environments of scientists and students and their habits. The KIT as “The Research University in the Helmholtz Association” perceives an increasing interconnection between the worlds of life and work. Working at KIT also means living at KIT. Students come early in the morning and stay on the campus until late at night.

Accordingly, working practices of science and administration staff adapt to this changing environment. Moreover, perspectives are changing throughout the population. Concepts of sustainability and resource-efficient lifestyles are gaining importance in our private and professional lives. Organizations are increasingly expected to save resources for future generations, in particular those science institutions that conduct environmental research. As one of the biggest employers in the region, KIT takes its responsibility seriously and defines its internal goals, processes, and tasks accordingly. These new perspectives and requirements result in new concepts, such as a master plan for integrated climate protection on all premises of KIT. All efforts are aimed at ensuring intergenerational justice in research, teaching, innovation, and administration. The employees of KIT essentially contribute to translating KIT's social and economic responsibilities into business operations. Only when concrete projects are implemented can sustainable action be reproduced and felt by the parties involved.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LIVING A CULTURE OF WELCOMING

STATE REFUGEE RECEPTION CENTERS ON THE PREMISES OF KIT

As a response to the high influx of refugees in the second half of 2015, public buildings in Baden-Württemberg were used as temporary branches of the State Reception Center. On September 11, 2015, the old canteen on Campus North was also included in the list of such accommodations. As of that date, two reception centers were operated on the premises of KIT: Refugees already had been accommodated on Campus East since October 2014.

The refugee aid organization "Flüchtlingshilfe am KIT" helps collect and distribute food and other donations to the refugees in Karlsruhe.

The refugees finding accommodation on our campuses are in a very early phase of arrival. Most have not yet been registered or able to apply for asylum. Asylum seekers coming to Germany are distributed to the federal states according to defined admission quotas, that of Baden-Württemberg being 12.9%. All refugees arriving in Baden-Württemberg first come to Karlsruhe for initial registration and subsequent distribution. This process is organized by the Regional Council in Karlsruhe.

Committed Employees and Students

An initiative of highly committed employees, the Staff Council, and student organizations of KIT wishes to improve the humanitarian situation at the emergency shelters on Campus East and Campus North. Since October 2014, the association "Flüchtlingshilfe am KIT" (KIT refugee aid organization) has been organizing various offers for up to 1700 refugees and actively living a culture of welcoming. Many voluntary helpers assist refugees, make or coordinate donations, help in tearooms, in childcare, or teach German. The refugee aid organization wants to reduce fears of contact, offer low-threshold activities, and facilitate the first steps of these people into our society.

Overcoming fears of contact and enhancing exchange between refugees and citizens: This also is the objective of the "Enactus KIT e.V." university group. The students have launched a number of projects to assist refugees, offer language courses, and organize soccer games, among others. In a photobook, they tell the refugees' stories in text and pictures together with the refugees. "Fluchtweg Fünfundzwanzig" was published in December 2015. Funds for editing, layout, and sales were acquired very successfully by the students on the "KITcrowd" platform.

Committed KIT

KIT has seized the opportunity associated with the initiative of the Baden-Württemberg State Ministry of Science, Research, and the Arts to grant scholarships to 50 Syrian

refugees for continuing or starting their university studies. About ten scholarship holders now want to study at KIT and attended the preparation courses in mathematics, informatics, chemistry or physics offered by the MINT-Kolleg. Since October 2015, German language courses for refugees have been offered by the Studienkolleg.

Moreover, KIT has opened its guest auditor program to refugees. Together with representatives of the General Students Committee, it organizes information events and provides advice. As early as possible, refugees are to start academic life as guest auditors, attend lectures, and meet other students.

Childcare at the state reception centers on the premises of KIT is an important element of the services offered by "Flüchtlingshilfe am KIT".

The Helmholtz Association and the Federal Employment Agency have launched a joint initiative to facilitate scientific or close-to-science employment of refugees. In the medium term, ten to twenty refugees are expected to be employed at each Helmholtz Center.

In the 2015/16 winter semester, KIT's Center for Cultural and General Studies started to offer the service learning seminar "Aktiv in 'fremden' Welten – Studienbegleitendes Engagement in der Flüchtlingsarbeit" (active in foreign worlds – aid for refugees parallel to studies). Here, students can combine the acquisition of knowledge with social commitment. For participation in the seminar, credit points are granted in the area of key qualifications.

An initiative of employees, supported by the KIT Institute of Applied Informatics and Formal Description Methods and the Verein Angewandte Informatik Karlsruhe e.V. (Karlsruhe association for applied computer science), offers a cost-free course on fundamentals of computer science and Java programming for refugees.

The International Scholars & Welcome Office of KIT provides information for threatened scientists on its website under "General Information," "Threatened Researchers."

In addition, KIT actively supports the action "Weltoffene Hochschulen – Gegen Fremdenfeindlichkeit" (against xenophobia – universities for a global community) of the German Rectors' Conference that began on November 11, 2015. With 5000 foreign students and 1000 international scientists, KIT clearly stands for a global community and tolerance.

WELTOFFENE HOCHSCHULEN
GEGEN FREMDEN-FEINDLICHKEIT

EFFECTS AT KIT

SCIENCE TO JOIN IN DURING THE OPEN DAY

In 2015, the city of Karlsruhe celebrated its 300th birthday, and KIT joined the celebration. As part of the EFFEKTE science festival, KIT opened its Campus South on June 27, the motto being "Effektvoll am KIT" (effects at KIT).

KIT presented a multi-facetted program with about 200 events, including vivid presentations and hands-on activities, spectacular experiments, and popular science lectures. More than 35,000 visitors got a glimpse behind the scenes and discovered the large scope of research activities at KIT.

The visitors had the opportunity to inform themselves about KIT's contributions to the energiewende, future mobility, climate and environmental research, sustainability research, and robot development. Research into solutions for the information era was presented, as was the development of new materials and astroparticle research.

The central contribution of KIT to the celebration of the 300th birthday of the city of Karlsruhe was an Open Day on Campus South.

Highlights from the World of Science

The program of the Institute for Anthropomatics and Robotics focused on "Our friend, the robot." Visitors were invited to see the ARMAR household robot in action. In the area of information technology, scientists presented IT security approaches, virtual worlds, and computer simulations for science.

Visitors interested in research for the energiewende were invited to visit the Energy Smart Home Lab, where future energy systems are studied and tested. The intelligent and energy-efficient building demonstrates the latest networked technologies for living, electric mobility, and energy supply.

The Institute of Electrical Engineering presented modern and historical exhibits and fascinating experiments with electrical drives. At the Theodor Rehbock Hydraulic Engineering Laboratory, scientists explained the functioning of fish ladders and elevators. The exhibition "Art of Science – Beauty in Creation," works of international artists in cooperation with astroparticle researchers revealed what holds the world together in its innermost folds.

Visitors were asked to let their bags or daypacks be carried by FiFi, the logistics robot, which was designed for use in factory halls. KIT's spinoff Nanoscribe GmbH congratulated the city of Karlsruhe with a very small present, a 3D print of the smallest Karlsruhe Palace in the world, measuring just 10 mm.

At ten stations, children were invited to answer tricky questions and to go on an exciting discovery journey through science and engineering by taking part in the researchers' rallye. The Institute of Sports and Sports Science alone organized a program with more than 50 contributions. Apart from diving, football, and boxing training, visitors could walk on a dementia trail and attend presentations on health and nutrition.

President Holger Hanselka opens the "Walk of Innovation" together with Karl-Heinz Meisel, Rector of Karlsruhe University of Applied Sciences, Christine Böckelmann, then President of Karlsruhe University of Education, and Frank Mentrup, Mayor of the city of Karlsruhe (from right to left).

EFFEKTE, the City's Birthday, and More

The EFFEKTE science festival was begun by opening the outdoor exhibition "Walk of Innovation" coordinated by KIT. Visitors were invited to walk from Karlsruhe Palace to Campus South and make a time travel past epoch-making innovations of the last 300 years by stopping at about 30 posters. These posters also provided information as to how these innovations live on in a variety of today's research projects and applications.

In cooperation with saai | KIT Archive for Architecture and Engineering in Southwest Germany, the Karlsruhe Municipal Gallery presented a comprehensive exhibition on Friedrich Weinbrenner, who shaped the cityscape of Karlsruhe.

At the Pavilion in the Palace Gardens, KIT took part in the "Wissenschaftsdienstage" (science Tuesdays) as well as in the "Stadtgespräche" (municipal talks). At the "Wissenschaftliches Nachtcafé" (scientific night café), visitors discussed the "City of the Future" with Professor Dr. Markus Neppl of the KIT Institute for Urban and Landscape Design.

On three evenings, the first Karlsruhe Science Film Days presented scientific films. Afterwards, KIT's ZAK | Center for Applied Cultural and General Studies and Stadtmarketing Karlsruhe invited the audience to discuss the respective topics with scientists.

Under the heading of "Effektvoll am KIT," KIT's Open Day on Campus South attracted about 35,000 visitors.

INNOVATIONS FOR A DIGITAL WORLD

KIT TWICE WON THE "SELECTED PLACE 2015" PRIZE

Under the heading of "Stadt, Land, Netz! Innovationen für eine digitale Welt" (city, land, network! Innovations for a digital world), ZAK | Center for Cultural and General Studies and the Institute for Anthropomatics and Robotics of Karlsruhe Institute of Technology, in cooperation with ZKM | Center for Art and Media, Karlsruhe, were granted the "Selected Place 2015" prize as one of 100 winners of the competition "Deutschland – Land der Ideen" (Germany – Land of Ideas) for their joint "e-Installation" project.

The "e-Installation" project saves works of art from extinction by making them perceptible in virtual space in a time- and place-independent manner.

The "e-Installation" project allows people to experience media art on smallest space and in a location-independent manner with the help of three-dimensional and tele-presence technologies, such as data goggles. In this way, audio-visual works of art are saved from extinction. This technology allows for a digital re-staging and close-to-reality experience of media arts. Interested persons and experts from all over the world can visit the installations virtually and experience them in a location-independent manner, as if they were there.

The initiative "Deutschland – Land der Ideen" (Germany – Land of Ideas) has launched the competition "Ausgezeichnete Orte im Land der Ideen" (selected places in the land of ideas) to honor projects of beacon character for Germany. Another project of KIT also won this competition in 2015: KIT's Institute of Concrete Structures and Building Materials was successful with its "ResoCable" digital rapid test to determine the condition of pre-stressed concrete and cable-stayed bridges much quicker and cheaper. Since the start of the competition in 2006, KIT has been selected "Place in the Land of Ideas" for the 15th time now.

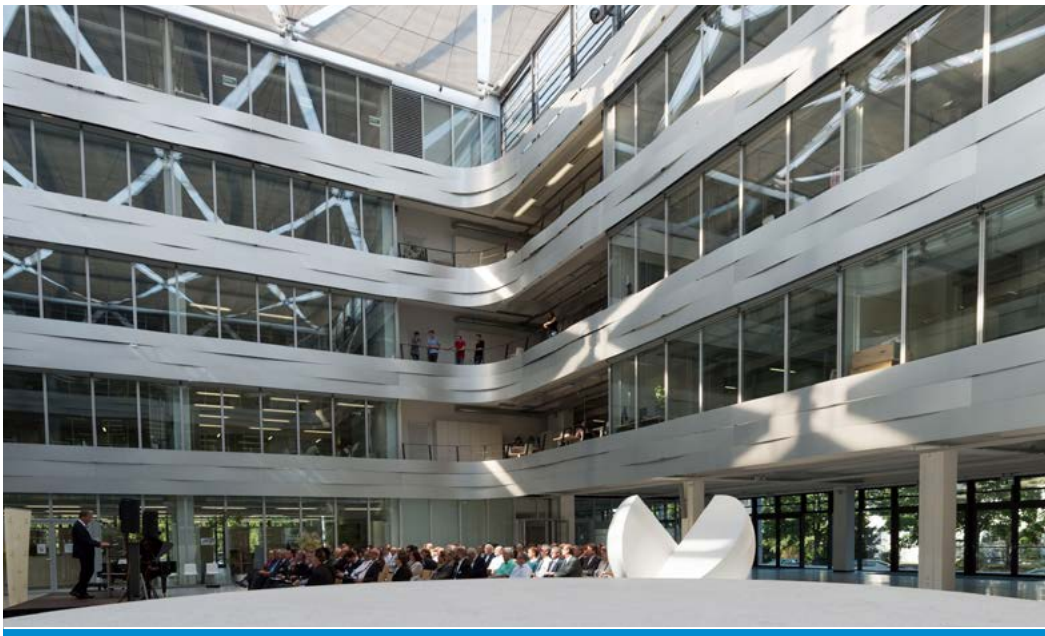
ZAK was not only "Selected Place 2015," but also celebrated an anniversary: For 25 years now, it has been offering an applied cultural science course to students, an additional qualification course that is the only one of its kind in Germany. Nowhere else is it possible to attend such a course parallel to scientific or technical studies or the doctorate. Within this interdisciplinary program, students can sharpen critical and socially responsible thinking on issues, such as technical research, acquire fundamental information on cultural interaction in a globalized world, obtain basic insight into different fields of cultural policy and cultural institutions, or familiarize themselves with cultural management or creative business.

Since the 2015 summer semester, another course on "Sustainable Development" has been offered in cooperation with the Karlsruhe School of Sustainability. Here, students as future researchers and decision-makers are invited to reflect on their actions in terms of sustainability.

SUSTAINABLE CAMPUS ARCHITECTURE BY ENERGY-EFFICIENT REFURBISHMENT

KIT MATHEMATICS BUILDING OPENED AGAIN

Half the energy consumption, but a nearly doubled usable area: The refurbished mathematics building on Campus South of KIT sets new standards in energy efficiency and offers modern education and research facilities. After five years, the institutes and facilities of the KIT Department of Mathematics are now accommodated under one roof again.

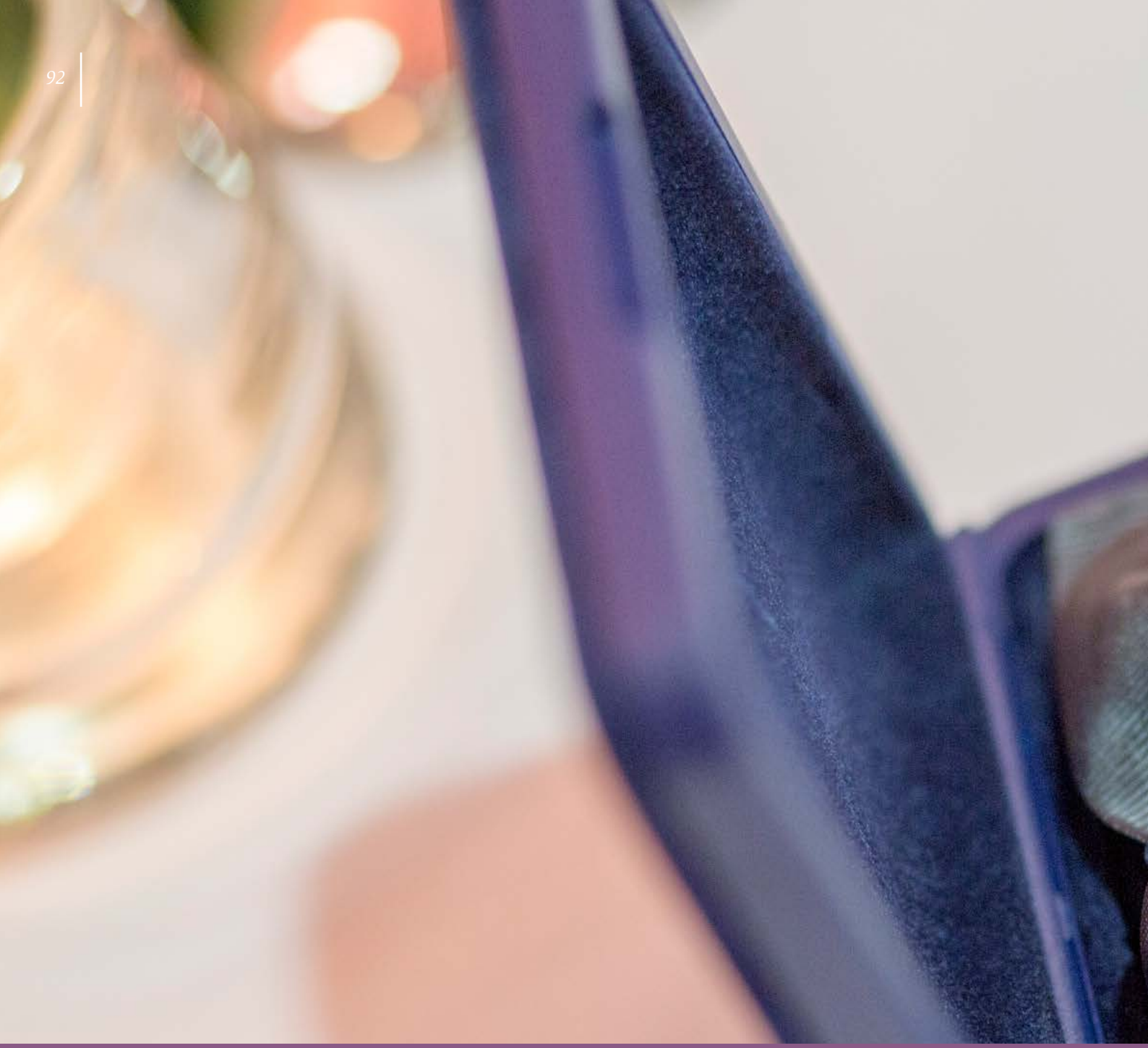


The atrium with the cafeteria of the refurbished mathematics building has become the central meeting point and can also be used for events.

Energy consumption of the refurbished mathematics building now is below 100 kWh per year and m². Prior to refurbishment, consumption totaled 260 kWh. After a reorganization of the layout, integration of the basement and atrium in the supply scheme, and construction of an additional stacked story, the usable area now is about 9 700 m², approximately 4 000 m² more than prior to the refurbishment. The center of the low-energy building is the light-filled atrium. This inner courtyard represents a heat buffer that minimizes energy loss in the winter and provides for a nice, cool climate in the summer. The atrium with a new cafeteria has become a central meeting point and can also be used for conferences and public events. More than 1 000 students of mathematics and other KIT departments can use the additional seminar rooms and more than 100 workplaces. In this way, education and learning conditions are improved and space is available for individual work and joint discussions prior to, in between, and after the lectures.

More space and short distances are also advantageous for the numerous research projects in mathematics. The building now accommodates workplaces for more than 300 employees working in the areas of teaching, research, and administration. In addition, a spacious library with additional workplaces and a mathematics pupils laboratory are found in this building. Together with the mathematicians, the National Institute for Science Communication (NaWik) and the Institute for German Studies moved into the new rooms in the building in April 2015.

In a survey of the CHE Center for University Development in 2015, the bachelor's and master's programs of mathematics of KIT were rated top by students in seven categories. The programs offered by about 40 lecturers, including 24 professors, of the KIT department do not only address the 1 000 students of mathematics. They also convey basic mathematical knowledge to all students of natural and engineering sciences.



PRIZES, HONORS, AWARDS, AND APPOINTMENTS

In 2015, KIT had the pleasure to confer several very high honors. President Professor Dr.-Ing. Holger Hanselka, for instance, granted the Honorary Senatorship to entrepreneur Professor Dr. h. c. mult. Reinhold Würth, Chairman of the Supervisory Board of the Würth Group's Family Trusts, for his merits in establishing an entrepreneurial culture at KIT.

Engineer and manager Jürgen Hubbert was appointed a new Honorary Citizen of KIT. The former member of the Board of Management of Daimler AG supports internationalization of education of engineers at KIT and chairs the Industry Board of KIT's International Department.

KIT Medals of Merit were awarded to Hedvig Mosonyi, Hermann Fabricius, Eberhard Hinderer, Martin Litschel, Helmut List, and Dr. Rolf Leonhard for their outstanding commitment to foundations granting scholarships and prizes to students and graduates of KIT.

Engineer Dr. Tobias Radke of the Institute of Vehicle System Technology received the Otto Haxel Prize for outstanding scientific and technical achievements. His studies focus on energy consumption of vehicles. His doctoral thesis revealed how the style of driving affects overall vehicle efficiency and, ultimately, fuel consumption.

The KIT Doctoral Award is granted to outstanding doctoral researchers and reflects the high priority KIT attaches to its young scientists. In the seventh round in 2015, the three awards were conferred on Dr. James Edward Daniell, Dr. Friedrich Fauser, and Dr. Anna Schmieg.


KIT
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Der Innovationspreis am KIT
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Bielefeld MARKETING
Lab
Germany


KIT

TWO EXPERTS OF KIT ARE NEW MEMBERS OF THE COUNCIL OF SCIENCE AND HUMANITIES

GAUCK APPOINTS DOROTHEA WAGNER AND PETER GUMBSCH

Professor Dr. Peter Gumbsch, Institute for Applied Materials.

Federal President Joachim Gauck appointed two scientists of Karlsruhe Institute of Technology to the Scientific Commission of the German Council of Science and Humanities: Professor Dr. Dorothea Wagner of the Institute of Theoretical Informatics and Professor Dr. Peter Gumbsch of the Institute for Applied Materials.

Professor Dorothea Wagner develops algorithms for cross-linked infrastructures at KIT's Institute of Theoretical Informatics. Examples are algorithms for quick route planning in large transportation grids taking into account changes in means of transportation or delays and traffic jams.

At the Institute for Applied Materials, Professor Peter Gumbsch studies the inner structure and behavior of materials and components to enhance their safety, reliability, and durability.

With Wagner and Gumbsch, the number of KIT experts in the German Council of Science and Humanities now totals three. Since 2012, Professor Dr. Doris Wedlich, then Head of the Cell and Developmental Biology Unit of KIT's Zoological Institute and now Head of Division I – Biology, Chemistry, and Process Engineering of KIT, has been working in this council.

The German Council of Science and Humanities is one of the leading advisory bodies in science policy in Germany. It advises the Federal Government and the governments of the German federal states on the further development of science, research, and higher education in terms of structure and content.

The Council consists of two commissions, the Scientific Commission and the Administrative Commission. The Scientific Commission has 32 members. The 24 scientists and 8 public figures are appointed by the President of the Federal Republic of Germany. The scientists appointed to the Council of Science and Humanities are not expected to represent the interests of any specific discipline, institution, or organization, but to provide scientific excellence, combined with competence and experience in matters of science policy.

Professor Dr. Dorothea Wagner, Institute of Theoretical Informatics.

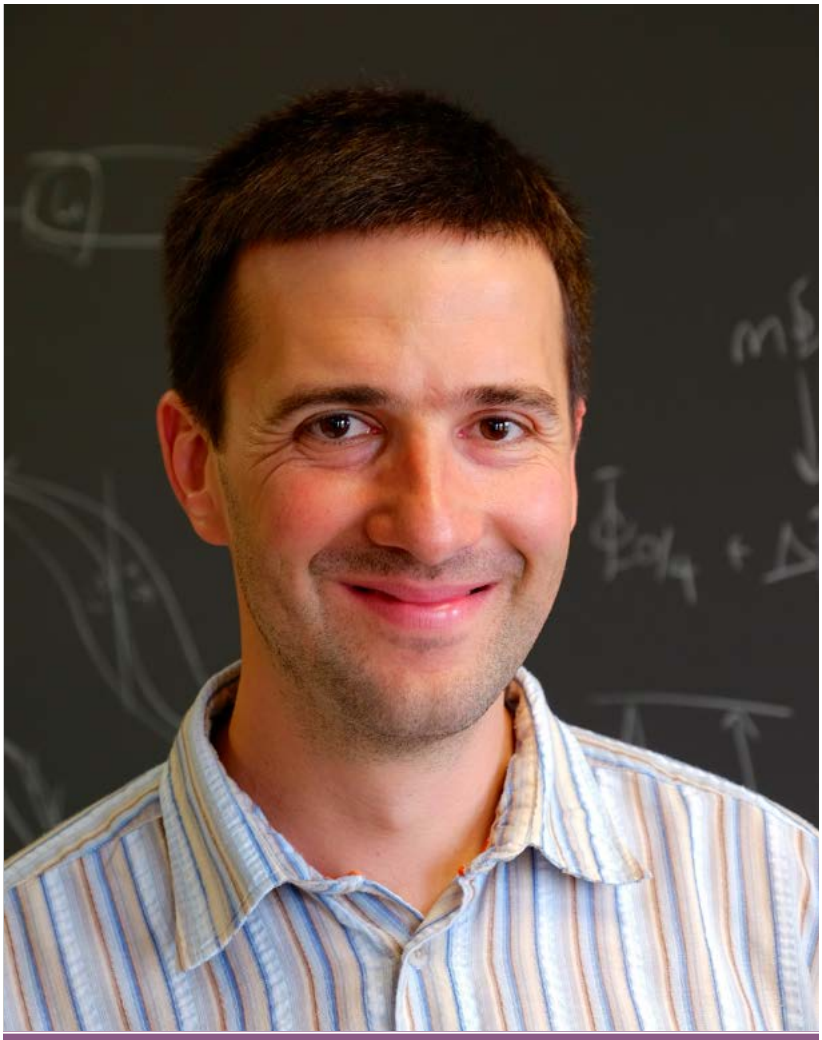
TOP-RANK JUNIOR RESEARCHER OF YALE UNIVERSITY COMES TO KIT

IOAN M. POP WAS GRANTED 2015 SOFJA KOVALEVSKAJA AWARD

Physicist Dr. Ioan M. Pop was one of six international top-rank junior researchers receiving one of the highest endowed science awards in Germany, the 2015 Sofja Kovalevskaja Award of the Alexander von Humboldt Foundation. The junior researcher, who thus far has been working at Yale University in the USA, will use the prize money of up to EUR 1.65 million to establish his own working group at KIT's Physikalisches Institut.

Ioan Pop's research is geared towards understanding and harnessing quantum mechanics effects in superconducting circuits. One example is the so-called Josephson effect which describes the flow of current between two superconductors separated by an insulating barrier. At Karlsruhe Institute of Technology, Ioan Pop will develop topologically protected superconducting circuits which might advance quantum information processing.

Quantum computers based on the laws of quantum mechanics promise to launch a new era of faster, more efficient information processing. The laws of the quantum world, however, are very different from those of classical physics with which we are familiar. For three decades now, physicists across the world have been exploring the potential use of quantum machines for information processing. During this time, there has been spectacular progress in both the theoretical understanding of quantum information processing and the realization of prototype physical platforms. Superconducting circuits are considered a very promising technology, one reason being that they exhibit no electrical resistance below certain temperatures. Hence, they attain a high degree of quantum mechanics coherence.



Dr. Ioan M. Pop, Physikalisches Institut, was granted the 2015 Sofja Kovalevskaja Award of the Alexander von Humboldt Foundation.

The Alexander von Humboldt Foundation grants the Sofja Kovalevskaja Award that is funded by the Federal Ministry of Education and Research to international top-rank junior researchers aged from 31 to 33. With the prize money, these young scientists are given risk capital for innovative projects in the early phase of their careers. For a period of up to five years, they will conduct research at German universities and research institutions and establish their own working groups. The Award is named after Russian mathematician Sofja Kovalevskaja, born in 1850.

OTHER PRIZES, HONORS, AWARDS, AND APPOINTMENTS

■ **Dr. Stefanie Betz,** who conducts research at the Institute of Applied Informatics and Formal Description Methods of KIT, was chosen for the Margarete von Wrangell Program for Post-doctoral Lecture Qualification, under which the State of Baden-Württemberg supports outstanding female researchers on their way towards professorship.

■ **Professor Dr. Hans-Joachim Blaß,** Research Center for Steel, Timber, and Masonry, was conferred the Julius von Haast Fellowship Award. Since 2003, the award has been granted annually to internationally acknowledged German researchers by the Royal Society of New Zealand. It honors outstanding achievements and serves to intensify cooperation with scientists from New Zealand.

■ **Eliane Dominok,** Institute of Sports and Sports Science, and **Sarah Holstein**, House of Competence, received the "digita" German Education Media Prize in the category of studies. The prize was to acknowledge their project "MOOCen gegen chronisches Aufschieben!," a technology-enhanced massive open online course about and against procrastination.

■ **Dr. Christian Greiner,** Institute for Applied Materials, was granted the Masing Memorial Prize for his work on the modification of material under friction loading. Every year, the German Society for Materials Sciences grants this award to honor the best achievements of its young members in metals research.

■ **Professor Dr. Herbert Gleiter,** Institute of Nanotechnology, was granted the Cothenius Medal, a science award with which the Leopoldina Academy has been honoring scientific lifetime achievements since 1792.

■ **Dr. Wilfried Goldacker,** Institute for Technical Physics, received the "ESAS Award for Excellence in Applied Superconductivity 2015" for his outstanding research into applied superconductivity in the past five years.

■ **Professor Dr. Mathias Gutmann,** Institute of Philosophy, and **Professor Dr. Peter Nick,** Botanical Institute, were granted the 2015 Baden-Württemberg State Teaching Award for their innovative concept bridging the gap between technology, biology, and philosophy as well as between science and its application in everyday life (see also page 34).

■ **Professor Dr. Norbert Henze,** Institute of Stochastics, received the Ars legendi Prize for Excellence in University Teaching – Mathematics. It is granted by the Stifterverband for Promoting Science and Education, the German Association of Mathematicians, the German Society of Physics, the Society of German Chemists, and the Association for Biology, Biosciences, and Biomedicine in Germany for outstanding commitment in university teaching.

■ **Professor Dr. Bernhard Holzapfel**, Institute for Technical Physics, was elected President by the European Society for Applied Superconductivity.

■ **Florian Jacob,** KIT Department of Informatics, received the ITK Student Award 2015 for his bachelor's thesis.

■ **Professor Dr. Suk-Joong L. Kang,** Professor of the Department of Materials Science and Engineering of the Korea Advanced Institute of Science and Technology, was conferred the Helmholtz International Fellow Award following a proposal made by the KIT Institute for Applied Materials. Professor Kang will spend the research stay associated with this award at the proposing institute.

■ **Dr. Sven J. Körner** received the Software Engineering Prize of the Ernst Denert Foundation for his RECAA tool chain developed as part of his doctoral thesis written at the Institute for Program Structures and Data Organization.

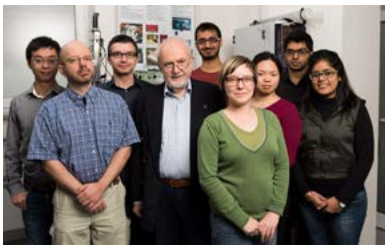
■ **Professor Dr. Thomas Kohl**, Institute of Applied Geosciences, was the first scientist of a German research institution to be granted the "Henry J. Ramey Jr. Award" of the American Geothermal Resources Council for outstanding achievements in the area of geothermal reservoir engineering.

■ **Dr. Pavel Levkin,** Institute of Toxicology and Genetics and Institute of Organic Chemistry, was conferred the Heinz Maier-Leibnitz Prize by the German Research Foundation, the highest distinction for young researchers in Germany. This prize honors his work at the interface of polymer research, microtechnology, and biologico-medical applications (see also page 51).

■ **Professor Dr. Ingrid Ott,** Institute for Economic Policy Research, has been a member of the Research and Innovation Experts Commission appointed by the Federal Government since May 2014.

■ **Dr. Bastian Rapp**, Institute of Microstructure Technology, was granted the GMM Prize 2015 by the VDE/VDI Society of Microelectronics, Microsystems and Precision Engineering for his outstanding scientific publication in the area of microelectronics and microsystems engineering.

■ **Professor Dr. Caroline Y. Robertson-von Trotha**, ZAK | Center for Cultural and General Studies, was elected Member of the Research Advisory Board of the Institut für Auslandsbeziehungen and Member of the Culture Committee of the German Commission for UNESCO.



■ **Dr. Nicole Ruiter** and her team at the Institute for Data Processing and Electronics won the "NEO 2015" Innovation Prize of the Karlsruhe Technology Region for the project "3D Ultrasonic Computer Tomography."

■ A team of students around **Michael Sbitnev** and **Karl Lorey** from the KIT Department of Informatics won the first prize in the "codeFEST8" programming competition of Volkswagen AG. They convinced the jury at CeBIT 2015 with their "Road Genius," a quiz that keeps children busy during car journeys by asking them questions about the surroundings through which the car passes.

■ **Dr. Daniel Volz,** now staff member of CYNORA GmbH, a spinoff of KIT, received the Klaus Tschira Award for Understandable Science 2015 in the subject of chemistry for his article "Licht aus dem Drucker" (light from the printer), in which he presented results of his doctoral thesis written at the KIT Department of Chemistry and Biosciences.

■ **Professor Dr. Dorothea Wagner,** Institute of Theoretical Informatics of KIT, together with other selected experts of science, politics, and industry, was appointed Member of the IT Summit Platform "Digitization in Education and Science" headed by Professor Dr. Johanna Wanka, Federal Minister of Education and Research.

■ The Research Council of the European Union funds the project "QuantenMagnonics" of **Dr. Martin Weides** of KIT's Physikalisches Institut with an ERC Consolidator Grant.

■ **Dr. Karl-Friedrich Ziegahn,** Head of Division IV – Natural and Built Environment, was elected Member of the Executive Council by the German Society of Physics (DPG).

■ The students group "accessoria" was honored for its innovative product facilitating the use of smartphones or navigation systems in cars under the Germany-wide Program for the Education of Young Entrepreneurs of the Heinz Nixdorf Foundation and the Stiftung der Deutschen Wirtschaft (German Industry Foundation).

■ CYNORA GmbH, a spinoff of KIT, received the 2014 German Resource Efficiency Prize of the Federal Ministry for Economic Affairs and Energy.

■ For the "ResoCable" digital rapid test to determine the condition of pre-stressed concrete and cable-stayed bridges much more quickly and cheaply, KIT's Institute of Concrete Structures and Building Materials was chosen one of the "100 Selected Places" under the Initiative "Germany – Land of Ideas" (see also page 90).

■ The 2015 Gips-Schüle Research Award in the amount of EUR 50,000 was granted to the research project "Nanoparticles for the environmentally compatible production of organic solar cells." Under the project, engineers, physicists, chemists, and biologists of Karlsruhe Institute of Technology cooperate with MJR PharmJet GmbH.

■ With its self-inflatable life buoy that may rescue the lives of drowning persons, RESTUBE, a startup of KIT graduates, impressed the jury of the Deutscher Gründerpreis (German Startup Award) 2015 and reached the first place in the "Startup" category (see also page 44).

■ GasVersorung Süddeutschland GmbH honored KIT's Geophysics Pupils Laboratory under the competition "Energie für Bildung" (energy for education).

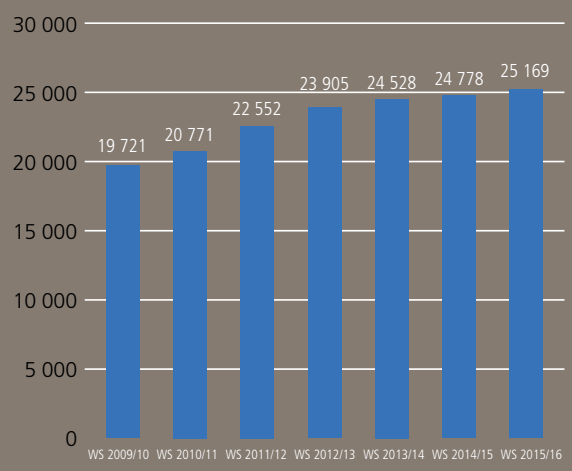
■ The students group "vomMarkt.de" was winner of the Germany-wide Program for the Education of Young Entrepreneurs of the Heinz Nixdorf Foundation and the German Industry Foundation with its concept of a new online portal for purchases of farmer`s market products.

■ In the international competition iCAN'15 in Anchorage, Alaska, USA, a team of KIT students won second place with "JointWatchR," a running shoe with variable damping features that can be adjusted via an app.

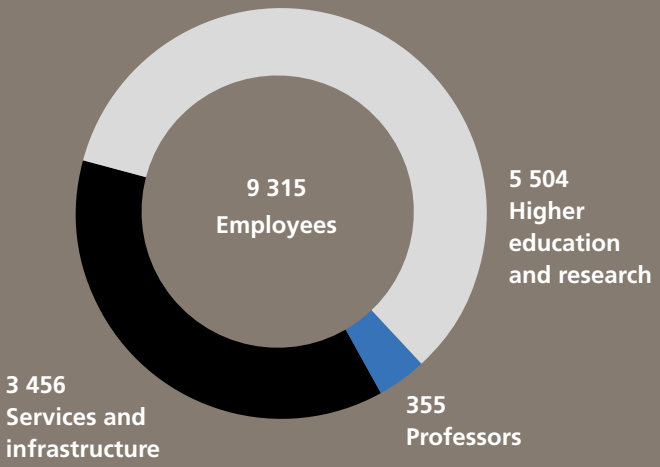
■ The ZAK | Center for Cultural and General Studies and the Institute for Anthropomatics and Robotics of KIT, together with ZKM | Center for Art and Media, Karlsruhe, were chosen one of the "100 Selected Places" under the initiative "Germany – Land of Ideas." Their "e-Installation" project enables people to experience media art in a space-saving and place-independent manner with the help of data goggles and, thus, saves audiovisual works of art from extinction (see also page 90).

FACTS AND FIGURES

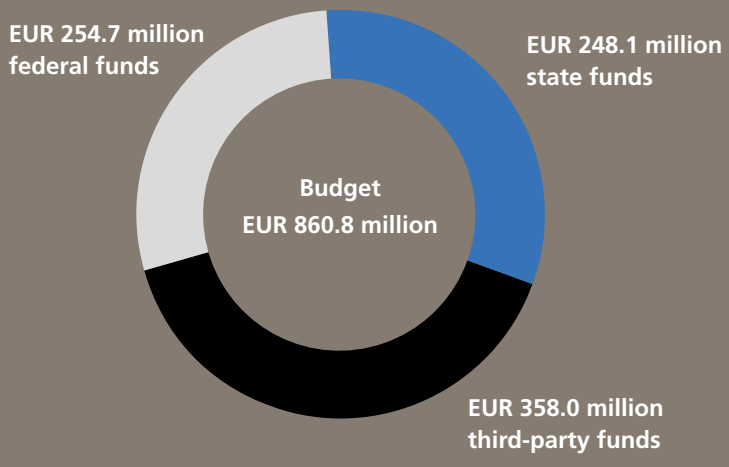
Number of students



Employees 2015



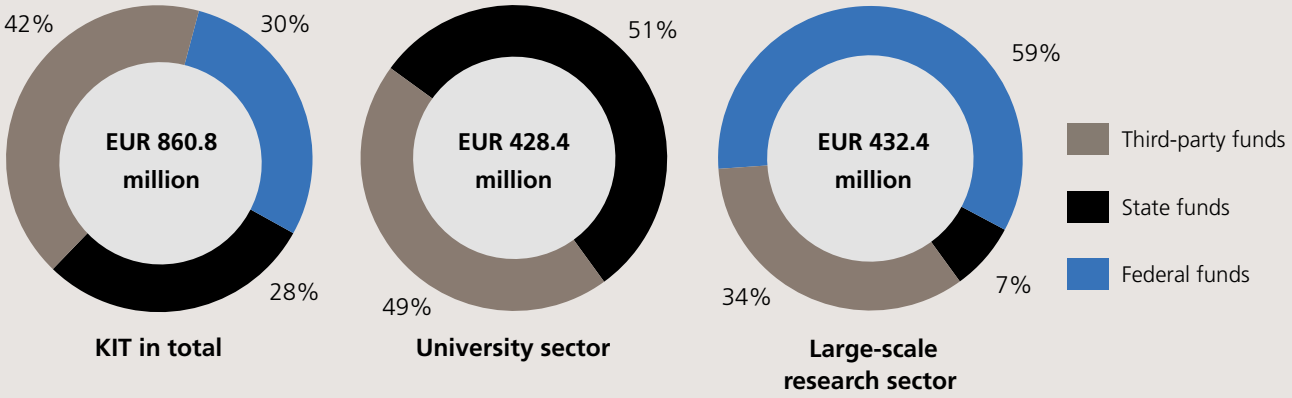
Total Budget 2015 (Preliminary)



CONTENT

FUNDING

Federal, State, and Third-party Funds Acquired in 2015 (Preliminary)



Sources of Funding

KIT in Total

In million euros	2011	2012	2013	2014	2015
Income in total	786.0	784.7	844.6	847.4	860.8
Third-party funds	350.0	336.5	357.5	369.2	358.0
State funds	207.2	212.0	216.0	221.3	248.1
Federal funds	228.8	236.2	271.1	256.9	254.7

University Sector

In million euros	2011	2012	2013	2014	2015
Income in total	394.4	406.7	427.3	420.0	428.4
Third-party funds	213.5	223.8	239.3	230.5	208.7
State funds	180.9	182.9	188.0	189.5	219.7**
Federal funds*	0.0	0.0	0.0	0.0	0.0

* In the University Sector, federal funds are included in the third-party funds, as they are granted for special projects rather than for basic funding.
** Incl. quality assurance funds of EUR 15,400. Prior to the entry into force of the new University Funding Agreement, these funds were included in the third-party funds until 2014.

Large-scale Research Sector

In million euros	2011	2012	2013	2014	2015
Income in total	391.6	378.0	417.3	427.4	432.4
Third-party funds	136.5	112.7	118.2	138.7	149.3
State funds	26.3	29.1	28.0	31.8	28.4
Federal funds	228.8	236.2	271.1	256.9	254.7

Sources of Third-party Funding

KIT in Total

In million euros	2011	2012	2013	2014	2015
Third-party funding in total	350.0	336.5	357.5	369.2	358.0
Third-party funding by DFG, incl. CRC	51.2	48.2	45.3	47.3	44.1
Third-party funding by EU	27.6	25.4	30.3	31.6	32.3
Third-party funding by ExIn I	20.5	18.3	20.9	3.2	0.0
Third-party funding by Fed. and State	112.5	115.8	123.9	133.8	133.8
Other income	138.5	128.8	137.1	153.3	147.8

University Sector*

In million euros	2011	2012	2013	2014	2015
Third-party funding in total	213.5	223.8	239.3	230.5	208.7
Third-party funding by DFG, incl. CRC	46.4	43.6	39.2	39.7	38.8
Third-party funding by EU	12.5	9.5	14.0	11.9	13.3
Third-party funding by ExIn I	20.5	18.3	20.9	3.2	0.0
Third-party funding by Fed. and State	59.1	84.0	92.0	101.7	92.1
Other income	75.0	68.4	73.2	74.0	64.5

* Third-party funds shall be all income of and grants awarded to the University Sector under the Solidarity Pact in addition to basic funding.

Large-scale Research Sector

In million euros	2011	2012	2013	2014	2015
Third-party funding in total	136.5	112.7	118.2	138.7	149.3
Third-party funding by DFG, incl. CRC	4.8	4.6	6.1	7.6	5.3
Third-party funding by EU	15.1	15.9	16.3	19.7	19.0
Third-party funding by ExIn I	0.0	0.0	0.0	0.0	0.0
Third-party funding by Fed. and State	53.4	31.8	31.9	32.1	41.7
Other income	63.2	60.4	63.9	79.3	83.3

Use of the Funds in 2015 (Preliminary)

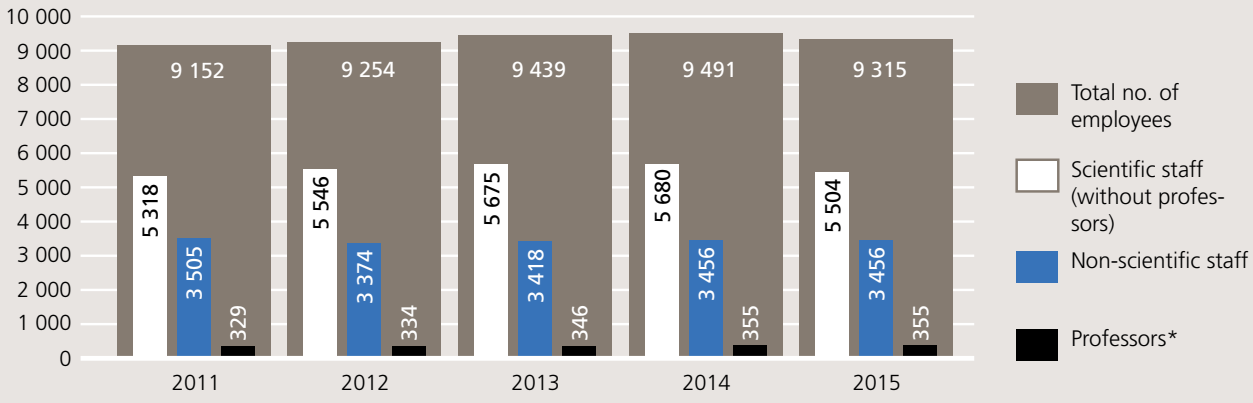
In million euros	KIT in total	University sector	Large-scale research sector
Expenses in total	860.8	428.4	432.4
Investments in total	93.5	43.9	49.6
of these, major investments	23.5	-	23.5
of these, ongoing investments	70.0	43.9	26.1
Personnel expenses	531.2	292.5	238.7
Material expenses	236.1	92.0	144.1

* Figures taken from the financial statement corrected by cost items not relevant to expenses (e.g. provisions).

PERSONNEL INFORMATION

KIT Staff in Total

Staff (headcount)	2011	2012	2013	2014	2015
Total number of employees	9 152	9 254	9 439	9 491	9 315
of these, female employees	3 097	3 234	3 334	3 380	3 363
Professors*	329	334	346	355	355
of these, female professors	31	33	37	40	44
of these, junior professors	12	10	15	13	8
of these, female junior professors	4	4	6	7	3
of these, international professors	30	28	27	29	32
of these endowed professors	7	8	8	7	8
Scientific staff (without professors)	5 318	5 546	5 675	5 680	5 504
of these, female scientists	1 356	1 553	1 596	1 607	1 545
of these, staff financed from third-party funds	2 579	2 670	2 747	2 699	2 507
of these, international employees	872	938	941	973	967
of these, employment contracts of limited duration	3 845	4 065	4 187	4 215	3 934
of these, part-time employees	1 296	1 423	1 535	1 635	1 619
Non-scientific staff	3 505	3 374	3 418	3 456	3 456
of these, female staff	1 706	1 644	1 695	1 726	1 769
of these, staff financed from third-party funds	690	683	663	649	604
of these, international employees	162	157	159	158	157
of these, employment contracts of limited duration	1 023	1 008	963	945	901
of these, part-time employees	857	793	831	856	875
of these, trainees and students of the Baden-Württemberg Cooperative State University	509	474	454	474	471
of these, female trainees and students	165	150	146	146	139
Trainees' share in the total number of employees [%]	6	5	5	5	5



* Professors, junior professors, and executive scientists receiving W-type salary according to Article 14 of the KIT Act.

Post-doctoral Lecture Qualifications

	2011	2012	2013	2014	2015
Total	15	14	11	8	22
Men	14	11	8	7	17
Women	1	3	3	1	5

Appointments

	Appointments accepted	Appointments rejected
Appointments 2011	22	17
Appointments 2012	25	11
Appointments 2013	24	11
Appointments 2014	20	11
Appointments 2015	24	11

Appointments to W 3 University Professor at KIT in 2015

Name	W salary grade – professorship	Previous employer institution
Professor Dr. Matthias Bäcker, Division II	W 3-Professur für Öffentliches Recht, insbesondere öffentliches Informationsrecht, Datenschutzrecht und Regulierungsrecht	LMU München
Professor Dr. Gregor Betz, Division II	W 3-Professur für Wissenschaftstheorie mit dem Schwerpunkt Zukunftswissen	KIT
Professor Dr. Franziska Boehm, Division II	W 3-Professur für Immaterialgüterrechte in verteilten Informationsinfrastrukturen	Universität Münster
Professor Dr. Olivier Eiff, Division IV	W 3-Professur für Strömungsmechanik	University of Toulouse, France
Professor Dr. Sabine Enders, Division I	W 3-Professur für Technische Thermodynamik	TU Berlin
Professor Marc Frohn, Division IV	W 3-Professur für Raumgestaltung und Entwerfen	Architekturbüro FAR, Berlin/Santiago de Chile
Professor Dr. Oliver Grothe, Division II	W 3-Professur für Analytics and Statistics	Universität Köln
Professor Dr. Marc Hiller, Division III	W 3-Professur für Leistungselektronische Systeme	Siemens AG
Professor Dr. Rafaela Hillerbrand, Division II	W 3-Professur für Technikethik und Wissenschafts-philosophie, Schwerpunkt Beurteilung komplexer Wissensformen	TU Delft
Professor Dr. Ju-Young Hinz (born Kim), Division II	W 3-Professur für Service Management	Universität Frankfurt/Main
Professor Dr. Dennis Hofheinz, Division II	W 3-Professur für Verfahren der Kryptographie	KIT (tenure track)

→

PERSONNEL INFORMATION

➔ **Appointments to W-3 University Professor at KIT in 2015**

Name	W salary grade – professorship	Previous employer institution
Professor Dr. Dietmar Koch, Division III	W 3-Professur für Technologie der Verbundkeramiken	DLR Stuttgart
Professor Dr. Jan Gerrit Korvink, Division III	W 3-Professur für Mikrotechnologie	Universität Freiburg
Professor Dr. Ferdinand le Noble, Division I	W 3-Professur für Zell- und Entwicklungsbiologie	Charité – Universitäts-medizin Berlin
Professor Dr. Alexander Mädche, Division II	W 3-Professur für Information Systems and Service Design	Universität Mannheim
Professor Dr. Milada Margarete Mühlleitner, Division V	W 3-Professur für Theoretische Physik	KIT (tenure track)
Professor Dr. Riklef Rambow, Division IV	W 3-Professur für Architekturkommunikation	KIT
Professor Dr. Michael Schefczyk, Division II	W 3-Professur für Praktische Philosophie	Universität Lüneburg
Professor Dr. Melanie Schienle, Division V	W 3-Professur für Ökonometrie	Universität Hannover
Professor Dr. Thomas Schwetz-Mangold, Division V	W 3-Professur für Theoretische Astroteilchenphysik	Max Planck Institute for Nuclear Physics, Heidel-berg
Professor Dr. York Sure-Vetter, Division II	W 3-Professur für Web-Science	Universität Mannheim
Professor Dr. Jens Tübke, Division I	W 3-Professur für Materialien und Verfahren für elektrochemische Speicher	FhG-ICT, Berghausen
Professor Dr. Armin Zeh, Division IV	W 3-Professur für Petrologie	Goethe Universität Frankfurt /Main

Appointment to W-2 University Professor at KIT in 2015

Name	W salary grade – professorship	Previous employer institution
Professor Dr. Markus Golder, Division III	W 2-Professur für Sichere mechatronische Systeme der Intralogistik	STAHL CraneSystems, Künzelsau

Appointments to W-1 University Professor at KIT in 2015

Name	W salary grade – professorship	Previous employer institution
Professor Dr. Andreas Braun, Division IV	W 1-Juniorprofessur für Risikoorientierte Regionalentwicklung	Universität Freiburg
Professor Dr. Boris Neubert, Division II	W 1-Juniorprofessur für Visual Computing	École Polytechnique Fédérale de Lausanne, Switzerland

Appointments to apl. Professor and Honorarprofessor in 2015

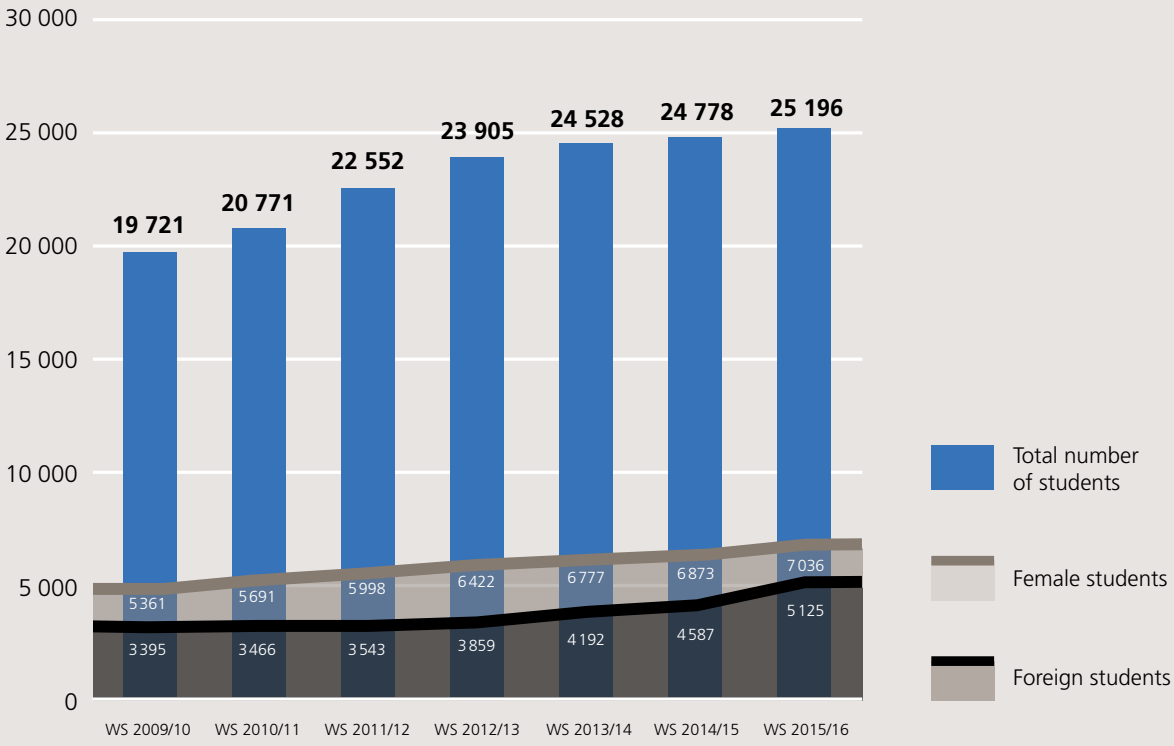
Name	Type	Institute, division
Professor Dr. Bernd-Steffen Bernstorff	Honorarprofessor	Institute for Applied Materials, Division III
Professor Dr. Robert Blackburn	Honorarprofessor	Institute of Operations Research, Division II
Professor Dr. Wolf-Dieter Heller	apl. Professor	Institute for Economic Policy Research, Division II
Professor Dr. Christian Pylatiuk	apl. Professor	Institute for Applied Computer Science, Division III

Emeriti/Retirements in 2015

Name	Institute	Division
Professor Dr. Günter Aumann	Institute for Algebra and Geometry	Division V
Professor Dr. Georg Bretthauer	Institute for Applied Computer Science	Division III
Professor Dr. Friedrich Jondral	Communications Engineering Lab	Division III
Professor Dr. Wilfried Juling		Head of Division II
Professor Dr. Detlef Löhe		Vice President for Research and Information
Professor Dr. Hilbert v. Löhneysen	Physikalisches Institut	Division V
Professor Dr. Volker Saile		Head of Division V
Professor Dr. Karlheinz Schaber	Institute for Technical Thermodynamics and Refrigeration	Division I
Professor Dr. Georg Schaub	Engler-Bunte Institute	Division I
Professor Dr. Detlef Seese	Institute of Applied Informatics and Formal Description Methods	Division II

STUDENTS

Students in Total



Students and Degrees Desired

Desired degree	WS 2009/10	WS 2010/11	WS 2011/12	WS 2012/13	WS 2013/14	WS 2014/15	WS 2015/16
Bachelor	6 955	9 433	12 108	13 609	14 077	14 086	14 136
Master	725	1 172	2 010	3 492	5 256	6 819	8 181
Teacher of German second. schools	715	785	834	792	782	750	780
Doctorate	477	535	670	748	880	809	664
State examination	139	164	148	113	95	70	50
Diploma	10 209	8 209	6 281	4 554	2 801	1 579	796
Studienkolleg	216	205	215	218	217	227	224
No degree*	285	268	286	379	420	438	365
Total	**19 721**	**20 771**	**22 552**	**23 905**	**24 528**	**24 778**	**25 196**

*No degree: In particular exchange students, who do not aim at a degree at KIT.

Allocation of Students to Subject Groups

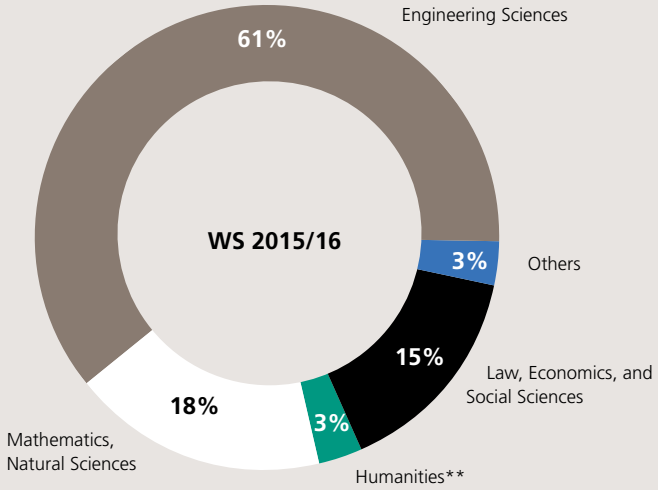
Subject group	WS 2009/10	WS 2010/11	WS 2011/12	WS 2012/13	WS 2013/14	WS 2014/15	WS 2015/16
Engineering Sciences	8 347	8 888	9 640	10 386	10 824	11 169	* 15 204
Mathematics, Natural Sciences	6 691	7 012	7 715	8 116	8 173	8 028	* 4 536
Law, Economics, and Social Sciences	3 164	3 307	3 521	3 574	3 685	3 751	3 831
Humanities**	913	920	960	1 035	1 032	1 030	832
Others	606	644	716	794	814	800	793
Total	**19 721**	**20 771**	**22 552**	**23 905**	**24 528**	**24 778**	**25 196**

Allocation of Foreign Students to Subject Groups

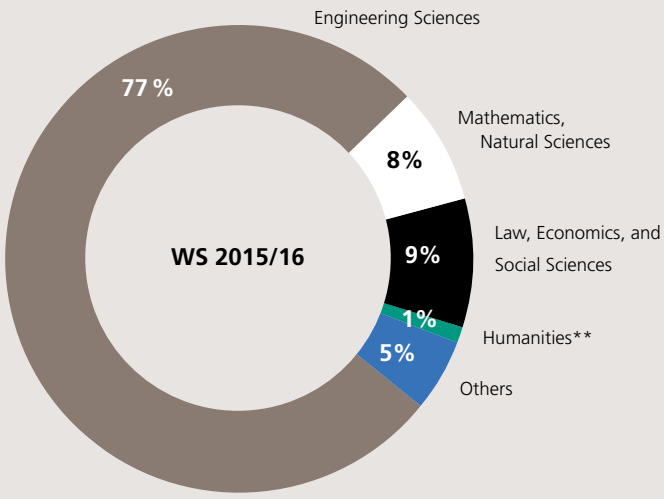
Subject group	WS 2009/10	WS 2010/11	WS 2011/12	WS 2012/13	WS 2013/14	WS 2014/15	WS 2015/16
Engineering Sciences	1 819	1 916	1 911	2 170	2 440	2 798	* 3 951
Mathematics, Natural Sciences	915	905	933	978	1 008	1 028	* 391
Law, Economics, and Social Sciences	373	362	381	385	422	438	473
Humanities**	85	84	99	101	93	88	70
Others	203	197	219	225	229	235	234
Total	**3 395**	**3 464**	**3 543**	**3 859**	**4 192**	**4 587**	**5 119**

* From 2015, Informatics – so far allocated to Natural Sciences – is allocated to Engineering Sciences.
** From 2015, the subject group of Linguistics and Cultural Sciences is renamed Humanities.

Allocation of Students to Subject Groups

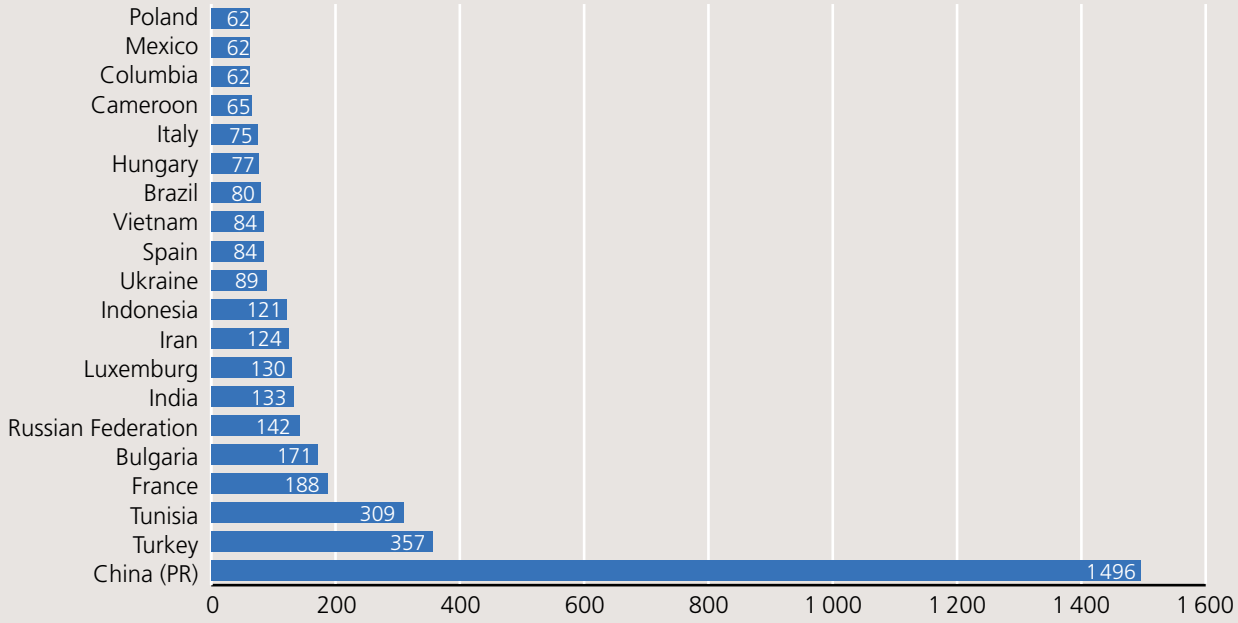


Allocation of Foreign Students to Subject Groups



STUDENTS

Home Countries of Foreign Students (Top 20 of 117)

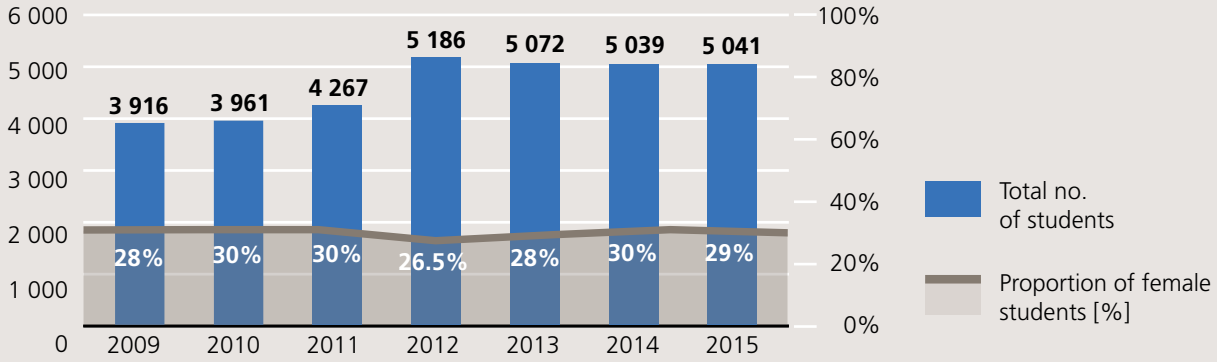


Student Beginners and Degrees Targeted in the 1st Semester

Desired degree	2011	2012	2013	2014	2015
Bachelor	3 786	4 617	4 488	4 378	4 246
Master	725	1 249	1 935	2 613	3 215
Teacher of German sec. schools	236	225	155	171	136
Doctorate	169	206	159	201	115
State examination	55	1	0	0	0
Diploma	8	3	1	0	0
Studienkolleg	223	219	233	251	285
No degree*	19	45	60	22	159
Total	**5 221**	**6 565**	**7 031**	**7 636**	**8 156**

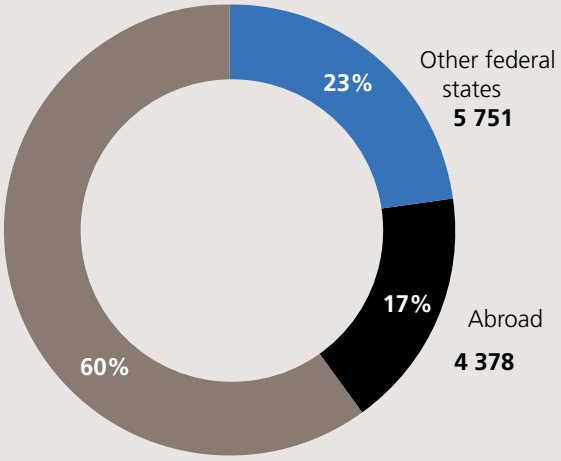
*No degree: In particular exchange students, who do not aim at a degree at KIT.

Number of First Student Registrations*



* First student registrations: Students registered for the first time at a German university.

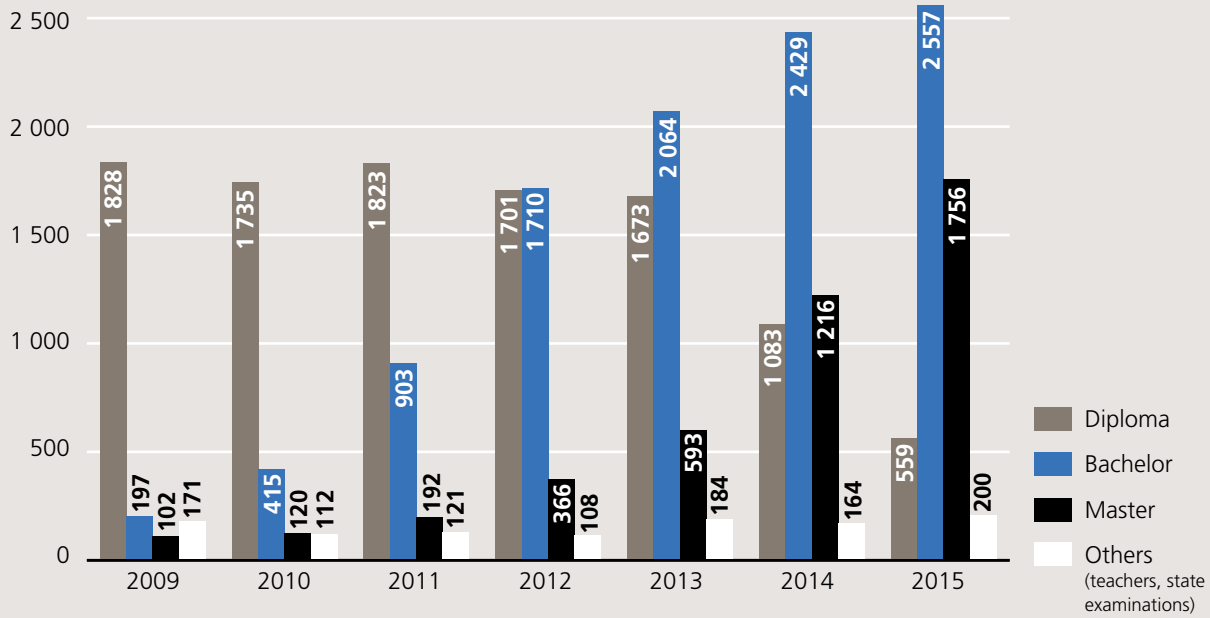
Origin of Students in the 2015/16 Winter Semester



Region	Students
Karlsruhe city and district	4 232
Karlsruhe Regional Council district	3 993
Rest of Baden-Württemberg	6 842
Baden-Württemberg in total	15 067
Rhineland-Palatinate	1 606
Bavaria	1 041
North Rhine-Westphalia	978
Hesse	848
Lower Saxony	415
Other federal states	863
Germany without Baden-Württemberg	5 751
Asia	2 234
Europe	1 281
Africa	495
America	359
Australia	9
Abroad	4 378
KIT in total	**25 196**

STUDENTS

Number of Graduates



Doctorates Completed in the Different Subject Groups

Subject group	2010	2011	2012	2013	2014	2015
Engineering Sciences	178	175	182	213	234	297*
Mathematics, Natural Sciences	161	188	191	202	239	169*
Law, Economics, and Social Sciences	42	51	56	41	54	51
Humanities**	9	3	3	3	11	9
Sports	0	4	2	3	0	3
Arts	0	0	0	2	1	0
Total	**390**	**421**	**434**	**464**	**539**	**529**

* From 2015, Informatics – so far allocated to Natural Sciences – is allocated to Engineering Sciences.
** From 2015, the subject group of Linguistics and Cultural Sciences is renamed Humanities.

Study Programs in the Area of Engineering Sciences

Subject (program)	Bachelor	Master (consecutive)	Teacher	Master (cont. education)	Double degree
Altbauinstandsetzung				●	
Architektur	●	●			*German-French Double Master (École Nationale Supérieure d'Architecture de Strasbourg, France)*
Bauingenieurwesen	●	●			*Master specialized in Water and the Environment (Università degli Studi di Trento, Italy)*
Bioingenieurwesen	●	●			
Chemieingenieurwesen/Verfahrenstechnik	●	●			
Electronic Systems Engineering and Management				● (HECTOR School)	
Elektrotechnik und Informationstechnik	●	●			*German-French Double Degrees B.Sc. and M.Sc. (Institut National Polytechnique Grenoble, France); MERIT (Universitat Politècnica de Catalunya, Spain; Politecnico de Torino, Italy; Université Catholique de Louvain, Belgium; KTH Royal Institute of Technology, Stockholm, Sweden)*
Energietechnik		●			
Energy Engineering and Management				● (HECTOR School)	
Energy Technologies (ENTECH)		●			*ENTECH (Université Catholique de Louvain, Belgium; KTH Royal Institute of Technology, Stockholm, Sweden; Universitat Politècnica de Catalunya, Spain)*
Financial Engineering				● (HECTOR School)	
Funktionaler und Konstruktiver Ingenieurbau – Engineering Structures		●			
Geodäsie und Geoinformatik	●	●			*German-French Double Degrees B.Sc. and M.Sc. (Institut National des Sciences Appliquées Strasbourg, France; Double Master (Università degli Studi di Trento, Italy)*
Green Mobility Engineering				● (HECTOR School)	

STUDENTS

Subject (program)	Bachelor	Master (consecutive)	Teacher	Master (cont. education)	Double degree
Informatik	●	●			*Double Master Informatics (Institut National Polytechnique Grenoble, France; Double Master Cryptography (Université de Rennes, France)*
Informationswirtschaft	●	●			
Ingenieurpädagogik			●		
Management of Product Development				● (HECTOR School)	
Maschinenbau	●	●			*German-French Bachelor's and Master's Program (Art et Métiers ParisTech, France) German-French Bachelor's and Master's Program (Institut National des Sciences Appliquées Lyon, France) German-French Bachelor's and Master's Program (École Polytechnique Paris, Palaiseau, France) German-French Double Master (Institut National Polytechnique Grenoble, France) German-Bulgarian Double Degree (TU Sofia, Bulgaria) Dual Master's Program (Korea Advanced Institute of Science and Technology, Korea) Double Master Vehicle / Production Technology (CDHK, Tongji University, China) Dual Master's Program (Instituto Tecnológico de Buenos Aires, Argentina)*
Materialwissenschaft und Werkstofftechnik	●	●			
Mechatronik und Informationstechnik	●	●			
Mobilität und Infrastruktur		●			
Optics and Photonics		●			*Double Master's Program (Université Paul Cezanne, Aix-Marseille, France; Barcelona Universities, Spain)*
Production and Operations Management				● (HECTOR School)	

Subject (program)	Bachelor	Master (consecutive)	Teacher	Master (cont. education)	Double degree
Regionalwissenschaft		●			German-Chilean Dual Master's Program (Universidad de Concepción, Chile)
Resources Engineering		●			
Service Management and Engineering				● (HECTOR School)	

Study Programs in the Area of Arts, Art Science

Subject (program)	Bachelor	Master (consecutive)	Teacher	Master (cont. education)	Double degree
Kunstgeschichte	●	●			

Study Programs in the Area of Mathematics, Natural Sciences

Subject (program)	Bachelor	Master (consecutive)	Teacher	Master (cont. education)	Double degree
Angewandte Geowissenschaften	●	●			
Biologie	●	●	●		
Chemie	●	●	●		
Chemische Biologie	●	●			
Geographie			●		
Geoökologie	●	●			
Geophysik	●	●			
Lebensmittelchemie	●	●			

STUDENTS

Subject (program)	Bachelor	Master (consecutive)	Teacher	Master (cont. education)	Double degree
Mathematik	●	●	●		*German-French Bachelor's and Master's Program (École Polytechnique Paris, France)*
Meteorologie	●	●			
Naturwissenschaft und Technik			●		
Physik	●	●	●		*German-French Double Master (UFR de Physique of the Université Joseph Fourier Grenoble, France) German-French Double Master (École Polytechnique Paris, France)*
Technomathematik		●			
Wirtschaftsmathematik		●			

Study Programs in the Areas of Law, Economics, and Social Sciences

Subject (program)	Bachelor	Master (consecutive)	Teacher	Master (cont. education)	Double degree
Technische Volkswirtschaftslehre	●	●			
Wirtschaftsingenieurwesen	●	●			*German-French Double Degrees B.Sc. and M.Sc. (Institut National Polytechnique Grenoble, France) Double Master (Linköpings Universitet, Sweden)*
Personalentwicklung – Berufs- und Betriebspädagogik				●	
Pädagogik	●	●			

Study Programs in the Area of Sports

Subject (program)	Bachelor	Master (consecutive)	Teacher	Master (cont. education)	Double degree
Sport			●		
Sportwissenschaften	●	●			

Study Programs in the Area of the Humanities

Subject (program)	Bachelor	Master (consecutive)	Teacher	Master (cont. education)	Double degree
Germanistik / Deutsch	●	●	●		
Europäische Kultur und Ideen-geschichte (European Studies)	●	●			
Wissenschaft, Medien und Kommunikation	●	●			

RESEARCH

Coordinated Research Programs

DFG Clusters of Excellence, DFG Collaborative Research Centers/ Transregio Projects, and DFG Research Units with KIT Being the Coordinating University

Year	Number		
	Clusters of Excellence	Collaborative Research Centers/ Transregio Projects	Research Units
2013	1	0	11
2014	1	0	9
2015	0	2	8

DFG Collaborative Research Centers /Transregio Projects and DFG Research Units with KIT Participation

Year	Number	
	Collaborative Research Centers/ Transregio Projects	Research Units
2013	6	12
2014	6	12
2015	5	16

Coordinated Research Programs

Collaborative Research Centers at KIT with KIT Being the Coordinating University

Number	Title	Spokespersons	Duration
SFB 1173/1	Wave Phenomena: Analysis and Numerics	Professor Dr. Marlis Hochbruck, Institute for Applied and Numerical Mathematics, Division V	2015 – 2019
SFB 1176/1	Molekulare Strukturierung weicher Materie	Professor Dr. Christopher Barner-Kowollik, Institute for Chemical Technology and Polymer Chemistry, Division I	2016 – 2019

The typical budget approved for a Collaborative Research Center / Transregio Project is about EUR 1 to 3 million per year of duration. The duration refers to the complete project. Partial projects at KIT may deviate.

DFG-funded Research Units of KIT with KIT Being the Coordinating University

Number	Title	Spokespersons	Duration
FOR 1136	Modellierung von geotechnischen Herstellungsvorgängen mit ganzheitlicher Erfassung des Spannungs-Verformungs-Verhaltens im Boden (GeoTech)	Professor Dr. Theodoros Triantafyllidis, Institute of Soil Mechanics and Rock Mechanics	2009 – 2015
FOR 1334	Determinants of Polarized Growth and Development in Filamentous Fungi	Professor Dr. Reinhard Fischer, Institute for Applied Biosciences, KIT (Spokesperson) Dr. Meritxell Riquelme, (Ensenada, Mexico) (Spokesperson)	2010 – 2016
FOR 1447	Physicochemical-based Models for the Prediction of safety-relevant Ignition Processes	Professor Dr. Ulrich Maas, Institute of Technical Thermodynamics	2010 – 2016
FOR 1546	Rechnergestützte kooperative Trassenplanung in mehrskaligen 3-D-Stadt- und Bauwerksmodellen	Professor Dr. Martin Breunig, Geodetic Institute	2011 – 2017
FOR 1548	Geometry and Physics of Spatial Random Systems	Professor Dr. Günter Last, Institute of Stochastics	2011 – 2017
FOR 1598	From Catchments as Organised Systems to Models based on Dynamic Functional Units – CAOS	Professor Dr. Erwin Zehe, Institute for Water and River Basin Management	2011 – 2017
FOR 1650	Dislocation based Plasticity	Professor Dr. Peter Gumbsch, Institute for Applied Materials	2011 – 2017
FOR 2383	Erfassung und Steuerung dynamischer lokaler Prozesszustände in Mikroreaktoren mittels neuer in-situ-Sensorik	Professor Dr. Roland Dittmeyer, Institute for Micro Process Engineering	2016 – 2019

The typical budget approved for a DFG-funded research unit is about EUR 0.4 to 1.5 million per year of duration. The duration refers to the complete project. Partial projects at KIT may deviate.

Collaborative Research Centers with KIT Participation

Number	Title	Spokespersons/ KIT participation	Duration
SFB TRR 88	Kooperative Effekte in homo- und heterometallischen Komplexen (3MET)	Professor Dr. Gereon Niedner-Schatteburg, TU Kaiserslautern (Spokesperson) Professor Dr. Manfred Kappes, Institute of Physical Chemistry and Institute of Nanotechnology, KIT	2011 – 2018
SFB TRR 89	Invasives Rechnen (InvasIC)	Professor Dr. Jürgen Teich, Friedrich-Alexander-Universität Erlangen-Nürnberg (Spokesperson) Professor Dr. Jörg Henkel, Institute of Computer Engineering, KIT	2010 – 2018

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RESEARCH

➔ Collaborative Research Centers with KIT Participation

Number	Title	Spokespersons/ KIT participation	Duration
SFB TRR 125	Cognition-Guided Surgery Wissens- und modellbasierte Chirurgie	Professor Dr. Markus W. Büchler, Medizinische Fakultät Heidelberg (Spokesperson) Professor Dr. Rüdiger Dillmann, Institute for Anthropomatics and Robotics, KIT	2012 – 2016
SFB TRR 150/1	Turbulent chemisch reagierende Mehrphasenströmungen in Wandnähe	Professor Dr. Johannes Janicka, Fachgebiet Energie- und Kraftwerkstechnik, TU Darmstadt (Spokesperson) Professor Dr. Olaf Deutschmann, Institute for Chemical Technology and Polymer Chemistry, KIT	2015 – 2018
SFB TRR 165/1	Waves to Weather: Wellen, Wolken, Wetter	Professor Dr. George C. Craig, Meteorologisches Institut, LMU München (Spokesperson) Professor Dr. Volkmar Wirth, Institut für Physik der Atmosphäre, JGU Mainz (Spokesperson) Professor Dr. Peter Knippertz, Institute for Meteorology and Climate Research, KIT	2015 – 2019

The typical budget approved for a Collaborative Resaerch Center / Transregio amounts to EUR 1 to 2.6 million per year of duration. The duration refers to the complete project. Partial projects of KIT may deviate.

DFG-funded Research Units with KIT Participation

Number	Title	Spokespersons/ KIT participation	Duration
FOR 1036	Mechanisms, functions and evolution of Wnt-signaling pathways	Professor Dr. Michael Boutros, Deutsches Krebsforschungszentrum Heidelberg (Spokesperson) Professor Dr. Doris Wedlich, Dr. Dietmar Gradl, Zoological Institute, Cell and Developmental Biology, KIT	2008 – 2015
FOR 1095	Stratospheric Change and its Role for Climate Prediction (SHARP)	Professor Dr. Ulrike Langematz, Freie Universität Berlin (Spokesperson) Dr. Gabriele Stiller, Dr. Martin Sinnhuber, Institute for Meteorology and Climate Research, KIT	2009 – 2015

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➔ DFG-funded Research Units with KIT Participation

Number	Title	Spokespersons/ KIT participation	Duration
FOR 1246	Kilimanjaro ecosystems under global change	Professor Dr. Ingolf Steffan-Dewenter, Universität Würzburg (Spokesperson) Dr. Ralf Kiese, Institute for Meteorology and Climate Research, KIT	2010 – 2016
FOR 1279	„Protein-based Photoswitches“ as optogenetic tools	Professor Dr. Peter Hegemann, Humboldt-Universität zu Berlin (Spokesperson) Professor Dr. Marcus Elstner, Institute of Physical Chemistry, KIT	2010 – 2016
FOR 1321	Single-Port-Technologie für gastroenterologische und viszeralchirurgische endoskopische Interventionen	Professor Dr. Alexander Meining, Technische Universität München (Spokesperson) Professor Dr. Heinz Wörn, Institute for Anthropomatics and Robotics, KIT	2011 – 2015
FOR 1451	Exploring mechanisms underlying the relationship between biodiversity and ecosystem functioning	Professor Dr. Wolfgang W. Weisser, Technische Universität München (Spokesperson) Professor Dr. Wolfgang Wilcke, Institute of Geography and Geoecology, KIT	2010 – 2016
FOR 1498	Alkali-Kieselsäure-Reaktionen in Betonbauteilen bei gleichzeitiger zyklischer Beanspruchung und externer Alkalizufuhr	Professor Dr. Rolf Breitenbücher, Ruhr-Universität Bochum (Spokesperson) Professor Dr. Harald S. Müller, Institute of Concrete Structures and Building Materials, KIT	2011 – 2018
FOR 1525	INUIT – Ice Nuclei research UnIT	Professor Dr. Joachim Curtius, Universität Frankfurt am Main (Spokesperson) Dr. Ottmar Möhler, Professor Dr. Corinna Hoose, Institute for Meteorology and Climate Research, KIT	2011 – 2017
FOR 1701	Introducing Non-Flooded Crops in Rice-Dominated Landscapes: Impact on Carbon, Nitrogen and Water Cycles (ICON)	Professor Dr. Volkmar Wolters, Universität Gießen (Spokesperson) Dr. Ralf Kiese, Professor Dr. Klaus Butterbach-Bahl, Institute for Meteorology and Climate Research, KIT	2011 – 2017
FOR 1756	Functional dynamics of cell contacts in cellular assemblies and migratory cells	Professor Dr. Jörg Großhans, Zentrum Biochemie und Molekulare Zellbiologie, Universitätsmedizin Göttingen (Spokesperson) Dr. Jubin Kashef, Dr. Clemens Franz, Zoological Institute, KIT	2011 – 2017

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RESEARCH

➔ DFG-funded Research Units with KIT Participation

Number	Title	Spokespersons/ KIT participation	Duration
FOR 1993	Multifunktionale Stoff- und Energiewandlung	Professor Dr. Burak Atakan, Universität Duisburg-Essen (Spokesperson) Professor Dr. Olaf Deutschmann, Institute for Chemical Technology and Polymer Chemistry, KIT Professor Dr. Ulrich Maas, Dr. Robert Schießl, Institute of Technical Thermodynamics, KIT	2013 – 2016
FOR 2063	The Epistemology of the Large Hadron Collider	Professor Dr. Gregor Schiemann, Interdisziplinäres Zentrum für Wissenschafts- und Technikforschung, Bergische Universität Wuppertal (Spokesperson) Professor Dr. Rafaela Hillerbrand, Institute of Philosophy, KIT	2016 – 2019
FOR 2083	Integrierte Planung im öffentlichen Verkehr	Professor Dr. Anita Schöbel, Institut für Numerische und Angewandte Mathematik, Georg-August-Universität Göttingen (Spokesperson) Professor Dr. Dorothea Wagner, Institute of Theoretical Informatics, KIT	2015 – 2018
FOR 2290	Understanding Intramembrane Proteolysis	Professor Dr. Dieter Langosch, Wissenschaftszentrum Weihenstephan, Lehrstuhl für Chemie der Biopolymere, Technische Universität München (Spokesperson) Professor Dr. Burkhard Luy, Institute of Organic Chemistry, KIT	2015 – 2018
FOR 2325	Interactions at the Neurovascular Interface	Professor Dr. Ralf H. Adams, Max-Planck-Institut für molekulare Biomedizin, Münster (Spokesperson) Professor Dr. Ferdinand le Noble, Zoological Institute, KIT	2016 – 2019
FOR 2337	Denitrification in Agricultural Soils: Integrated Control and Modelling at Various Scales (DASIM)	Professor Dr. Christoph Müller, Institut für Pflanzenökologie, Justus-Liebig-Universität Gießen (Spokesperson) Professor Dr. Klaus Butterbach-Bahl, Institute for Meteorology and Climate Research, KIT	2015 – 2018

The typical budget granted for a DFG-funded research unit is about EUR 0.4 to 1.5 million per year of duration. The duration refers to the complete project. Partial projects of KIT may deviate.

Young Investigators Groups

ERC Grants

Name, institute, division	Title of project	Duration [YYYY-MM]	Funding granted*
Dr. Regina Hoffmann-Vogel, Physikalisches Institut, Division V	ERC Starting Grant NANOCONTACTS – Structural and electronic properties of nanoscale metallic contacts fabricated by thermally assisted electromigration	2010-01 – 2015-12	EUR 1 513 000
Dr. Matthias Schneider, Institute for Meteorology and Climate Research, Division IV	ERC Starting Grant MUSICA – Multi-platform remote sensing of isotopologues for investigating the cycle of atmospheric water	2011-02 – 2016-01	EUR 1 283 000
Professor Dr. Peter Knippertz, Institute for Meteorology and Climate Research, Division IV	ERC Starting Grant Desert Storms – Towards an Improved Representation of Meteorological Processes in Models of Mineral Dust Emission	2011-02 – 2016-01	EUR 1 283 000
Professor Dr. Alexander Nesterov-Müller, Institute of Microstructure Technology, Division III	ERC Starting Grant CombiPatterning – Combinatorial Patterning of Particles for High Density Peptide Arrays	2011-11 – 2016-10	EUR 1 494 600
Professor Dr. Christian Koos, Institute of Photonics and Quantum Electronics, Division III	ERC Starting Grant EnTeraPIC – Energy-Efficient Multi-Terabit/s Photonic Interconnects	2012-01 – 2016-12	EUR 1 498 800
Dr. Erin Koos, Institute for Mechanical Process Engineering and Mechanics, Division I	ERC Starting Grant Capillary suspensions: a novel route for versatile, cost efficient and environmentally friendly material design (CapS)	2013-11 – 2015-09	EUR 296 270
Dr. Pavel Levkin, Institute of Toxicology and Genetics, Division I	ERC Starting Grant DropCellArray – DropletMicroarrays: Ultra High-Throughput Screening of Cells in 3D Microenvironments	2014-02 – 2019-01	EUR 1 499 820

* The funding granted refers to the complete duration of the ERC Starting Grant at KIT.

RESEARCH

Emmy Noether Junior Research Groups

Name, institute, division	Title of group	Duration [YYYY-MM]
Dr. André Butz, Institute for Meteorology and Climate Research, Division IV	Emmy Noether Junior Research Group Remote Sensing of Greenhouse Gases for Carbon Cycle Modelling (RemoteC)	2011-05 – 2016-04
Professor Dr. Wolfram Pernice, Institute of Nanotechnology, Division V	Emmy Noether Junior Research Group Integrated quantum optics and opto-mechanics	2011-10 – 2015-09
Dr. Christian Greiner, Institute for Applied Materials, Division III	Emmy Noether Junior Research Group Size effects and microstructure evolution in textured metal surfaces during reciprocating sliding	2012-10 – 2017-09
Dr. Benjamin Flavel, Institute of Nanotechnology, Division V	Emmy Noether Junior Research Group Kohlenstoffnanoröhren, Solarzellen und Sensoren	2013-06 – 2016-05
Dr. Lars Pastewka, Institute for Applied Materials, Division III	Emmy Noether Junior Research Group Korrelation von Reibung und Verschleiß amorpher Materialien	2015-01 – 2019-02

Average annual budget of an Emmy Noether Group: EUR 200 000 – 300 000.

Helmholtz Young Investigators Groups

Name, institute, division	Title of group	Duration [YYYY-MM]
Dr. Pavel Levkin, Institute of Toxicology and Genetics, Division I	Helmholtz Young Investigators Group Functional and Stimuli-Responsive Polymer Materials	2010-01 – 2015-12
Dr. Svetoslav Stankov, Institute of Photon Science and Synchrotron Radiation, Division V	Helmholtz Young Investigators Group Interplay between structure and lattice dynamics in epitaxial rare earth nanostructures	2010-05 – 2018-12
Dr. Miriam Sinnhuber, Institute for Meteorology and Climate Research, Division IV	Helmholtz Young Investigators Group Solar variability, climate, and the role of the mesosphere / lower thermosphere	2010-09 – 2017-08
Dr. Ralf Matthias Ulrich, Institute for Nuclear Physics, Division V	Helmholtz Young Investigators Group Interpretation of Ultra-High Energy Cosmic Ray Data Using LHC Measurements	2011-04 – 2016-03
Dr. Alexander Schug, Steinbuch Centre for Computing, Division II	Helmholtz Young Investigators Group Multi-scale Simulations of Regulatory RNAs and Two-Component signal Transduction	2011-04 – 2018-08

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➔ Helmholtz Young Investigators Groups

Name, institute, division	Title of group	Duration [YYYY-MM]
Professor Dr. Corinna Hoose, Institute for Meteorology and Climate Research, Division IV	Helmholtz Young Investigators Group Aerosol effects on cloud ice, precipitation and climate	2010-04 – 2015-03
Dr. Francesco Grilli, Institute for Technical Physics, Division III	Helmholtz Young Investigators Group AC Losses in High-Temperature Superconductors	2010-05 – 2015-04
Dr. Roswitha Zeis, Helmholtz Institute Ulm, Division I	Helmholtz Young Investigators Group Investigation of Overpotentials in High Temperature Proton Exchange Membrane Fuel Cells	2010-05 – 2019-04
Dr. Tonya Vitova, Institute for Nuclear Waste Disposal, Division III	Helmholtz Young Investigators Group Advanced synchrotron-based systematic investigations of actinide (An) and lanthanide (Ln) systems to understand and predict their reactivity	2011-07 – 2017-10
Dr. Frank Weber, Institute of Solid State Physics, Division V	Helmholtz Young Investigators Group Competing Phases in Superconducting Materials	2012-01 – 2016-12
Dr. Matthias Mauder, Institute for Meteorology and Climate Research, Division IV	Helmholtz Young Investigators Group Capturing All Relevant Scales of Biosphere-Atmosphere Exchange – The Enigmatic Energy Balance Closure Problem	2012-02 – 2017-01
Dr. Damian Cupid, Institute for Applied Materials, Division III	Helmholtz Young Investigators Group Integrated Computational Materials Engineering (ICME) of Electrochemical Storage Systems	2014-04 – 2019-03
Dr. Kathrin Valerius, Institute for Nuclear Physics, Division V	Helmholtz Young Investigators Group Analysis of KATRIN data to measure the neutrino mass and search for new physics	2014-07 – 2019-06

The annual budget is at least EUR 250 000. Of this, the Helmholtz Association funds EUR 125 000, the remainder is financed by KIT.

(Shared) Research Group

Name, institute, division	Title of group	Duration [YYYY-MM]
Junior professor Dr. Gregor Betz, Institute of Philosophy, Division II	Junior Professorship Shared Research Group (SRG) Limits and Objectivity of Scientific Foreknowledge: The Case of Energy Outlooks (LOBSTER)	2010-10 – 2015-09

The typical annual budget is EUR 200 000 plus a non-recurrent investment allowance of up to EUR 50 000.

RESEARCH

Young Investigators Groups

Name, institute, division	Title of group	Duration [YYYY-MM]
Dr. Iris Gebauer, Institute of Experimental Nuclear Physics, Division V	Cosmic Ray Transport Models for Dark Matter Searches with AMS-02	2011-07 – 2015-06
Junior Professor Dr. Thorsten Stein, Institute of Sports and Sports Science, Division II	Computational motor control and learning	2011-07 – 2015-06
Dr. Torsten Walther, Institute of Organic Chemistry, Division I	Structure determination of the protein translocase Tat	2011-07 – 2015-06
Dr. Lars Bauer, Institute of Computer Engineering, Division II	Methods and Architectures for emerging dynamically reconfigurable systems	2011-07 – 2015-11
Dr. Felix Fritzen, Institute of Engineering Mechanics, Division III	Computergestützte Materialmodellierung	2012-03 – 2015-02
Dr. Christoph Gladisch, Institute of Theoretical Informatics, Division II	Techniken der Programmverifikation zum Aufdecken von Fehlern	2012-03 – 2015-02
Dr. Tobias Jochum, Institute of Toxicology and Genetics, Division I	Structure and toxicity of pathologic protein-aggregation in neurodegenerative diseases	2012-03 – 2015-02
Dr. Katrin Schulz, Institute for Applied Materials, Division III	Kontinuumsformulierung versetzungsbasierter Kristallplastizität	2012-03 – 2015-02
Dr. Peter Orth, Institute for Theoretical Condensed Matter Physics, Division V	Many-body physics of graphene in strong coherent optical fields	2012-03 – 2015-04
Dr. Emmanuel Müller, Institute for Program Structures and Data Organization, Division II	Outlier Mining in Heterogeneous Data Spaces	2012-03 – 2015-06
Dr. Monika Stelling, Institute of Applied Geosciences, Division IV	Anthropogene Einflüsse auf Stoffumsatzprozesse in der Kritischen Zone – Selen als essentieller Nährstoff und toxischer Schadstoff	2012-03 – 2016-02
Dr. Luise Kärger, Institute of Vehicle System Technology, Division III	Gewichtsoptimierte Fahrzeugstrukturen durch maßgeschneiderte Hochleistungsfaserverbunde (supported by the Vector Foundation)	2014-07 – 2018-06

The annual budget typically amounts to EUR 80 000, another scientific staff position, plus a non-recurrent investment allowance of up to EUR 50 000.

Other Junior Research Groups and Funding Measures

Name, institute, division	Title of group	Duration [YYYY-MM]	Funding
Junior Professor Dr. Marten Hillebrand, Institute for Economic Policy Research, Division II	Juniorprofessur für Volkswirtschaftstheorie	2008-10 – 2015-10	W 1 professorship
Junior Professor Dr. Henning Meyerhenke, Institute of Theoretical Informatics, Division II	Juniorprofessur Forschungsgruppe Paralleles Rechnen	2009-04 – 2015-03	W 1 professorship
Junior Professor Dr. Claudia Kirch, Institute of Stochastics, Division V	Juniorprofessur für Mathematische Statistik (endowed professorship)	2009-09 – 2015-08	W 1 professorship
Dr. Patrick Jochem, Institute for Industrial Production, Division II	Transport und Energie	2009-10 – 2020-07	BMWi and others
Junior Professor Dr. Milada Margarete Mühlleitner, Institute for Theoretical Physics, Division V	Juniorprofessur für Theoretische Physik	2009-12 – 2015-08	W 1 professorship
Junior Professor Dr. Dennis Hofheinz, Institute of Theoretical Informatics, Division II	Juniorprofessur für Theoretical Computer Science	2009-12 – 2015-11	W 1 professorship
Junior Professor Dr. Gabriela Weitze-Schmithüsen, Institute for Algebra and Geometry, Division V	Juniorprofessur (Carl Zeiss Foundation) für Geometrische Gruppentheorie	2010-05 – 2016-05	W 1 professorship
Dr. Marcel Schweiker, Building Science Group, Division II	KIT-Nachwuchsgruppe	Marie Curie Actions: 2011-03 – 2015-01 Baden-Württemberg Foundation: 2012-04 – 2014-08	Marie Curie – International Reintegration Grant (IRG) of the EU; Elite program for post-docs of the Baden-Württemberg Foundation
Dr. Stefanie Speidel, Institute for Anthropomatics and Robotics, Division II	Behagliche und energieeffiziente Arbeitsplätze	2011-03 – 2016-02	Group Head position
Dr. Michael Hirtz, Institute of Nanotechnology, Division V	Dip-Pen Nanolithography and Related Techniques	2011-03 – 2020-12	Basic budget by institute, DFG, and others
Dr. Cornelia Lee-Thedieck, Institute of Functional Interfaces, Division I	BioInterfaces Stammzellen-Material-Wechselwirkung	2012-03 – 2017-09	BMBF young scientist

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RESEARCH

➔ Other Junior Research Groups and Funding Measures

Name, institute, division	Title of group	Duration [YYYY-MM]	Funding
Dr. Frank Schröder, Institute for Nuclear Physics, Division V	Measurements of Gamma Rays and Charged Cosmic Rays in the Tunka-Valley in Siberia	2012-04 – 2015-03	Helmholtz Russia Joint Research Group HRJRG-303
Dr. Alexander Colsman, Light Technology Institute, Division III	Tandem-Architekturen für effiziente Organische Solarzellen	2012-06 – 2016-05	BMBF young scientist
Junior Professor Dr. Anne Koziolek, Institute for Program Structures and Data Organization, Division II	Juniorprofessur für Softwaretechnik	2013-02 – 2017-01	W 1 professorship
Dr. Guillaume Delaittre, Institute of Toxicology and Gentics, Division I	Biohybrid Nanoarrays for Biotechnological and Biomedical Applications	2013-03 – 2017-12	BMBF young scientist
Junior Professor Dr. Katharina Schratz, Institute for Applied and Numerical Mathematics, Division V	Juniorprofessur für Wissenschaftliches Rechnen	2013-09 – 2017-08	W 1 professorship
Junior Professor Dr. Jens Rottmann-Matthes, Institute for Analysis, Division V	Juniorprofessur für Zeitabhängige partielle Differentialgleichungen	2013-09 – 2017-09	W 1 professorship
Dr. Steven Peters, wbk Institute of Production Science, Division III	Production Technology Management	2014-04 – 2016-01	Industry Fellowship with Daimler AG; elite program, for post-docs of the Baden-Württemberg Foundation
Dr. Achim Rettinger, Institute of Applied Informatics and Formal Description Methods, Division II	Adaptive Data Analytics	2014-06 – 2017-01	BMBF und 7th EU Framework Programme
Junior Professor Dr. Susanne Lackner, Engler-Bunte Institute, Division I	Juniorprofessur für Technologien urbaner Stoffstromnutzungen	2014-09 – 2015-07	W 1 professorship
Junior Professor Dr. Petra Schwer, Institute for Algebra and Geometry, Division V	Juniorprofessur für Metrische Geometrie	2014-10 – 2018-09	W 1 professorship
Dr. Gerardo Hernandez-Sosa, Light Technology Institute, AG InnovationLab (Heidelberg), Division III	BIOLicht – Gedruckte biologisch abbaubare organische lichtemittierende Bauteile	2014-11 – 2018-10	Junior Research Group of the BMBF NanoMatFutur competition for young scientists
Dr. Andreas Haupt, Institute for Sociology, Media, and Cultural Sciences, Division II	Economic Inequality and Labor Markets	2015-01 – 2017-02	Elite program for post-docs of the Baden-Württemberg Foundation; DFG

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➔ Other Junior Research Groups and Funding Measures

Name, institute, division	Title of group	Duration [YYYY-MM]	Funding
Junior Professor Dr. Boris Neubert, Institute for Visualization and Data Analysis, Division II	Juniorprofessur	2015-04 – 2019-03	W 1 professorship
Dr. Christian Brandl, Institute for Applied Materials, Division III	Computergestützte Nanomechanik von Materialien	2015-05 – 2018-04	DFG and others
Junior Professor Dr. Andreas Ch. Braun, Institute of Regional Science, Division IV	Margarete von Wrangell-Habilitationsstipendium	2015-05 – 2019-05	W 1 professorship

Graduate Schools Funded by the DFG or Helmholtz Association

Graduate school	Funded by	Expired/ approved	Funding granted [1]
Karlsruhe School of Optics & Photonics (KSOP)	DFG		About EUR 15 million
Karlsruher Schule für Elementarteilchen- und Astroteilchenphysik: Wissenschaft und Technologie (KSETA)	DFG		About EUR 7.4 million
BioInterfaces International Graduate School (BIF-IGS)	HGF		About EUR 0.9 million
Graduiertenschule für Klima und Umwelt (GRACE)	HGF		About EUR 2.7 million

[1] Sum of all funding periods approved of at the time of approval.

Research Training Groups Funded by the DFG or Helmholtz Association

Research training group	Funded by	Expired/ approved	Funding granted [1]
Analysis, Simulation und Design nanotechnologischer Prozesse: Mathematik photonischer Kristalle	DFG	Expired in 2015	About EUR 5.7 million
Prozessketten in der Fertigung: Wechselwirkung, Modellbildung und Bewertung von Prozesszonen	DFG		About EUR 13 million
Elementarteilchenphysik bei höchster Energie und höchster Präzision	DFG		About EUR 7.4 million
Molekulare Architekturen für die fluoreszente Bildgebung von Zellen	DFG	Approved in 2015	About EUR 4.3 million
Integrierte Entwicklung kontinuierlich-diskontinuierlich langfaserverstärkter Polymerstrukturen	DFG	Approved in 2015	About EUR 6 million
Energiezustandsdaten – Informatikmethoden zur Erfassung, Analyse und Nutzung	DFG	Start: May 2016	About EUR 4.9 million
Energy Related Catalysis	HGF		About EUR 1.8 million

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➔ Research Training Groups Funded by the DFG or Helmholtz Association

Research training group	Funded by	Expired/ approved	Funding granted [1]
Helmholtz International Research School for Teratronics	HGF		About EUR 1.8 million
Mechanisms and Interactions of Climate Change in Mountain Regions MICMoR	HGF		About EUR 1.8 million
Energy Scenarios – Construction, Assessment and Impact	HGF		About EUR 1.7 million
IMD – Helmholtz Research School on "Integrated Materials Development for Novel High-temperature Alloys"	HGF		About EUR 1.2 million

[1] Sum of all funding periods approved of at the time of approval.

INNOVATION

Innovation Characteristics

Year	Invention disclosures	Priority-establishing patent applications	Property rights (existing)	Royalties [million euros]	New companies (spinoffs)	Participation in spinoffs
2011	147	59	1 914	2.30	17 (5)	6
2012	131	72	1 853	2.29	18 (4)	7
2013	129	52	1 874	2.18	25 (7)	6
2014	133	77	1 884	2.16	33 (7)	6
2015	119	59	1 902	2.04	18 (8)	6

Establishment of New Companies in 2015

Spinoffs
cubuslab GmbH
MAPT UG
Eyezag GbR
Keypoint Visual Management GmbH
300MICRONS GmbH
emmtrix Technologies GmbH
Gestalt Systems GmbH
IneraTec – Innovative Reactor Technology GbR

Startups
store2be GmbH
SHNUPS UG
enCourage Labs UG
JointWatchR GbR
South End Digital UG
CASHLINK GbR
betabots Hölldorfer & Stober GbR
Optonaut Limited
LehrWerk FJ UG
PowMio UG

AWARDS

External Awards

(see separate chapter of this Annual Report from page 92)

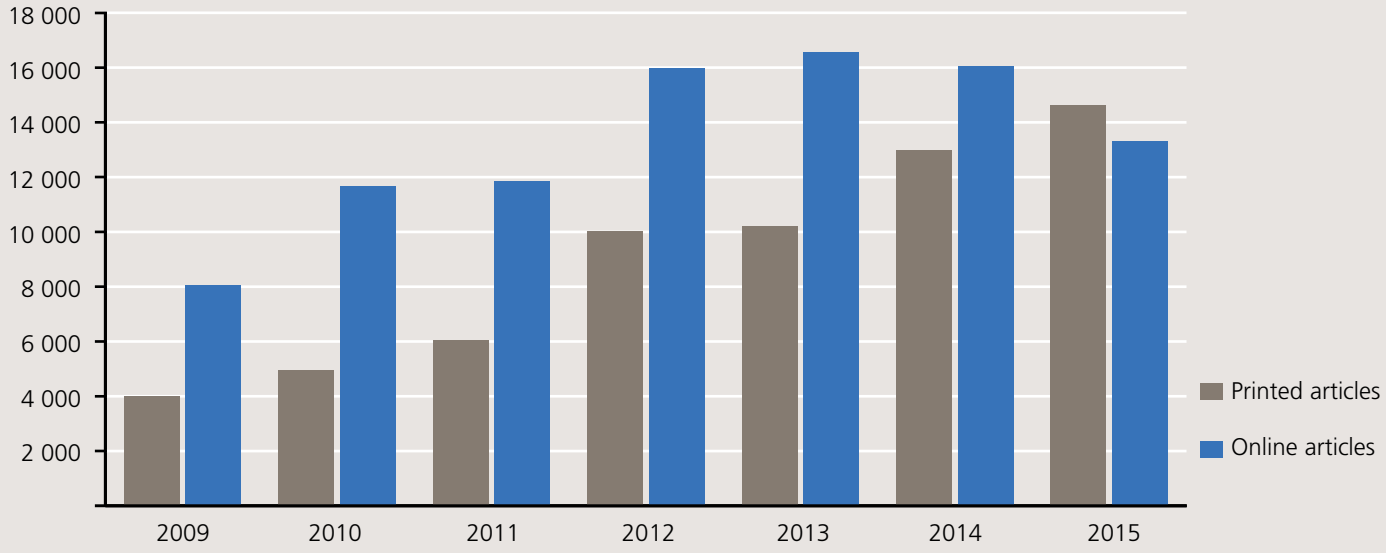
KIT Department Teaching Awards

KIT Department	Proposed award winners
Architecture	Overall performance in teaching Professor Dr. Barbara Engel
Civil Engineering, Geo- and Environmental Sciences	Course "Innerstädtische Verkehrsanlagen" of the master's programs "Bauingenieurwesen" and "Mobilität und Infrastruktur" Institute of Highway and Railroad Engineering
Chemistry and Biosciences	Overall performance in teaching Professor Dr. Peter Nick
Chemical and Process Engineering	Excellent teaching Professor Dr. Thomas Wetzel
Electrical Engineering and Information Technology	Conception and development of the lecture "Mechatronische Systeme und Produkte" Professor Dr. Sören Hohmann and Professor Dr. Sven Matthiesen as well as Julian Ludwig and Sebastian Schmidt
Humanities and Social Sciences	Courses in the program of "Europäische Kultur und Ideengeschichte" (EUKLID) Professor Dr. Renate Dürr
Informatics	Excellent teaching in the program of informatics and in particular in the course "Grundbegriffe der Informatik" Dr. Thomas Worsch
Mechanical Engineering	Conception of the course "Projekt Mikrofertigung: Entwicklung und Fertigung eines Mikrosystems" Philipp Hoppen
Mathematics	Lectures and exercises "Inverse Probleme und Integralgleichungen" Dr. Tilo Arens, Oleksandr Bondarenko, Dr. Frank Hettlich, and Thomas Rösch
Physics	Excellent teaching, in particular in the area of "Theoretische Physik" Professor Dr. Jörg Schmalian
Economics and Management	Overall performance in teaching Professor Dr. Martin Klarmann

MEDIA/PUBLICATIONS

Development of Visibility in the Media

	2009	2010	2011	2012	2013	2014	2015
Printed articles	4 010	4 962	6 054	10 024	10 207	12 968	14 609
Online articles	8 064	11 651	11 829	15 990	16 562	16 046	13 309



Publications

	2013	2014	2015
Publications in total, irrespective of the year of publication	12 122	11 052	11 156
Publications in the Year of Publication			
Publications of researchers of KIT	8 093	7 986	6 597
of these, books and proceedings	1 290	843	893
of these, articles in proceedings	2 094	1 831	829
of these, articles in journals	2 440	2 996	2 386

RANKINGS

National Rankings

		2011	2012	2013	2014	2015
Wirtschaftswoche	Electrical Engineering	2	2	2	2	4
	Informatics	1	1	1	1	5
	Mechanical Engineering	2	2	3	1	4
	Natural Sciences	3	3	5	8	–
	Business Engineering	2	2	2	1	3

International Rankings

		2011	2012	2013	2014	2015
National Taiwan University Ranking	International – Overall	199	217	185	190	192
	International – Natural Sciences	52	55	51	52	49
	International – Engineering Sciences	45	57	61	79	58
	National – Overall	16	18	14	18	18
	National – Natural Sciences	1	1	1	1	1
	National – Engineering Sciences	1	1	1	1	1
QS World University Rankings	International – Overall	147	141	116	127	93
	International – Natural Sciences	–	–	34	34	34
	International – Engineering Sciences & IT	–	–	33	47	62
	National – Overall	8	8	6	5	4
Times Higher Education	International – Overall	196	151	154	165	138
	International – Engineering Sciences & IT	–	–	52	56	48
	National – Overall	–	8	9	11	14
Academic Ranking of World Universities	International – Overall	301-400	201-302	201-300	201-301	201-300
	International – Natural Sciences	76-100	51-75	51-75	76-100	76-100
	National – Overall	24-32	15-24	15-23	14-22	14-21

MISCELLANEOUS

Child Care Places

	Child care places in total	Kita KinderUni-versum	Kita nanos!	Kita Räuberkiste	Kita Schloss-geister
2013	150	50	50	40	10
2014	205	105	50	40	10
2015	215	115	50	40	10

MISCELLANEOUS

Sustainability

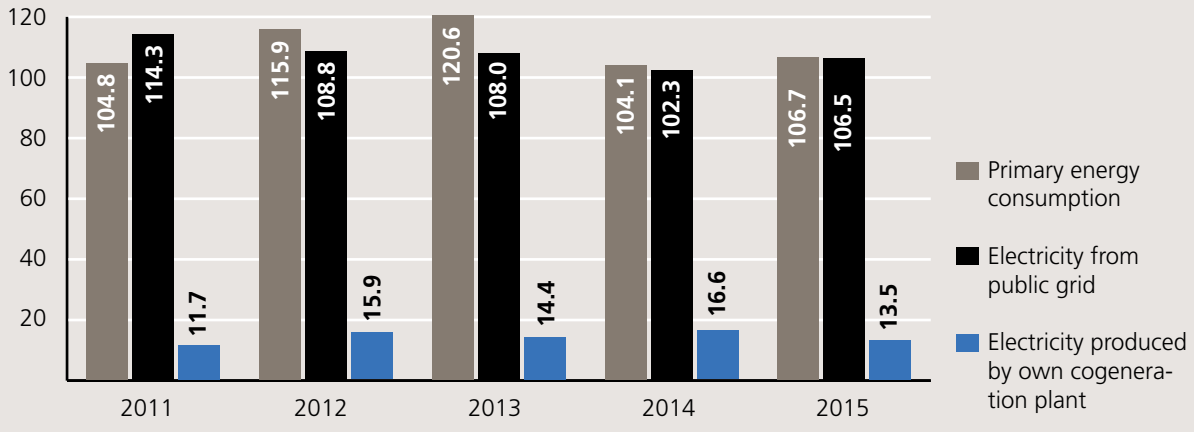
CO_2 Emissions 2011 – 2015

	2011	2012	2013	2014	2015
Heating plant CO_2 [t/a]	12 867	13 393	14 939	11 091	12 540
Cogeneration plant CO_2 [t/a]	8 200	5 292	6 714	7 604	6 293
Total CO_2 [t/a]	21 067	18 685	21 650	18 695	18 833
Allocated CO_2 certificates [t/a]	24 359	24 359	13 968	12 501*	9 688*

* Due to excessive, not needed CO_2 certificates, no further CO_2 certificates had to be purchased.

Primary Energy Consumption 2011 – 2015

Type of energy	2011	2012	2013	2014	2015
Primary energy consumption [GWh]	104.8	115.9	120.6	104.1	106.7
Electricity from the public grid [GWh]	114.3	108.8	108	102.3	106.5
Electricity produced by own cogeneration plant [GWh]	11.7	15.9	14.4	16.6	13.5
Electricity produced by own photovoltaics facilities [GWh]	–	–	–	–	1.0
Heat produced (district heating power plant + cogeneration plant [GWh]	72.5	84.7	84.1	65.9	71.4
Heat, weather-adjusted [GWh]	81.4	84.7	79.3	80.3	74.4



MISCELLANEOUS

Supply and Waste Management Services 2013 – 2015

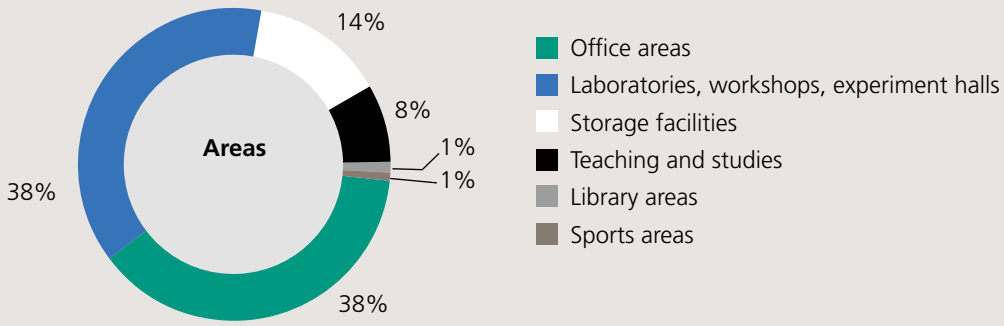
	2013		2014		2015	
Type of service	**CN**	**CS***	**CN**	**CS***	**CN**	**CS***
Electricity supply [GWh]	122	55	119	52	121	53
Heat supply [GWh]	84	49.9	66	39	71	43
Weather-adjusted [GWh]	79.3	47.1	80	48	74	45
Water supply [m³]	119 226	217 000	125 827	232 473	161 503	236 948
Compressed air generation [million m³]	19	–	13	–	14	–
Sewage disposal [m³]	83 358	–	87 827	–	110 849	–
Waste disposal [t]	6 939	8 382	6 111	2 137	15 022	890

CN = Campus North CS = Campus South
* The data for Campus East and Campus West are included in Campus South.

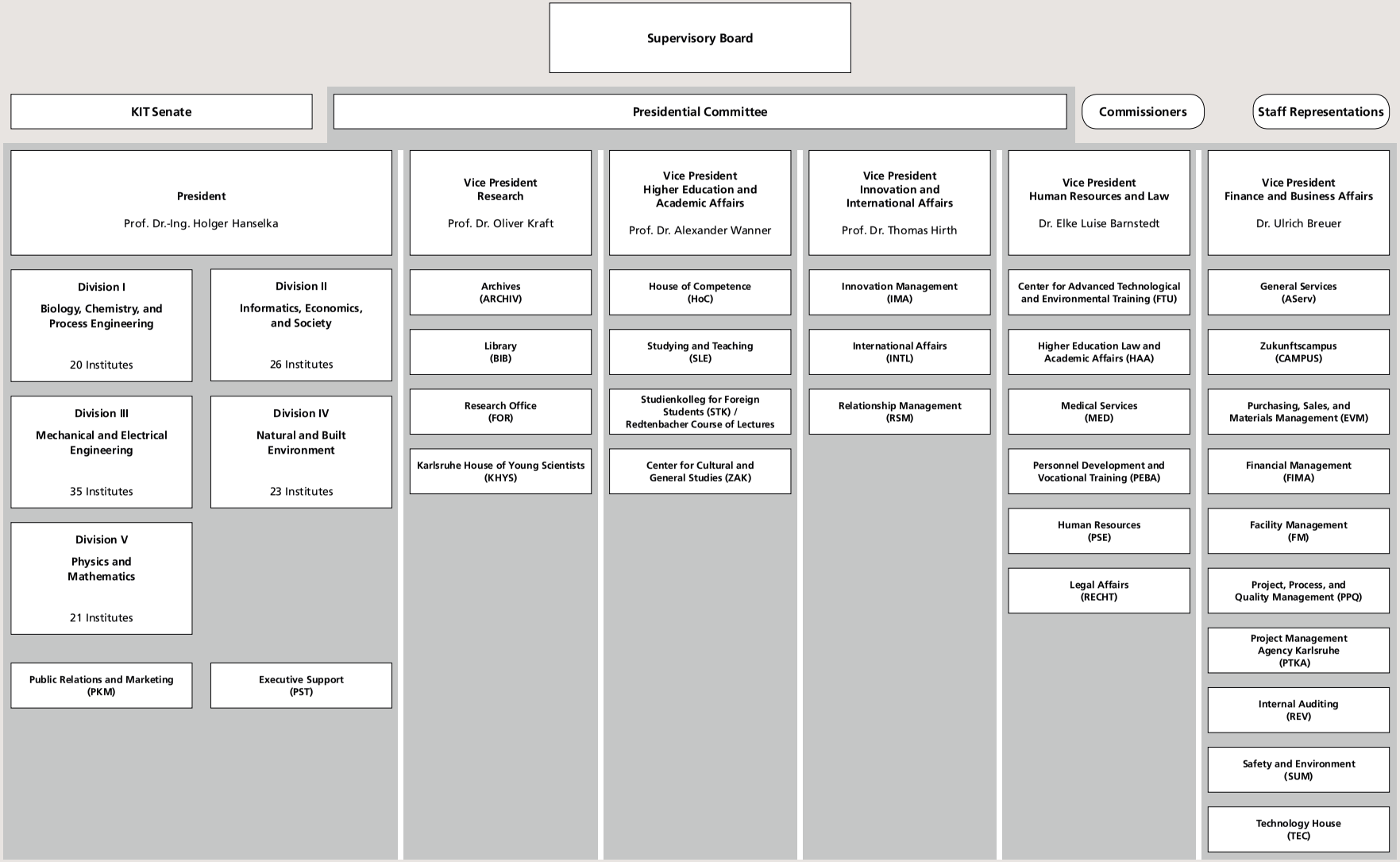
Areas

Type of area [m²]	**KIT in total**	**Campus South***	**Campus North****
Office areas (including conference rooms, rooms for copiers and servers)	164 584	106 002	58 582
Laboratories, workshops, experiment halls	164 891	85 744	79 147
Storage and similar facilities	57 677	33 656	24 021
Teaching and studies (lecture halls, seminar rooms, practice rooms)	32 343	27 250	5 093
Library areas (central + decentralized libraries)	5 216	3 441	1 775
Sports areas	4 428	4 211	217
Total usable area	429 139	260 304	168 835
of this, rented areas		17 918	2 277

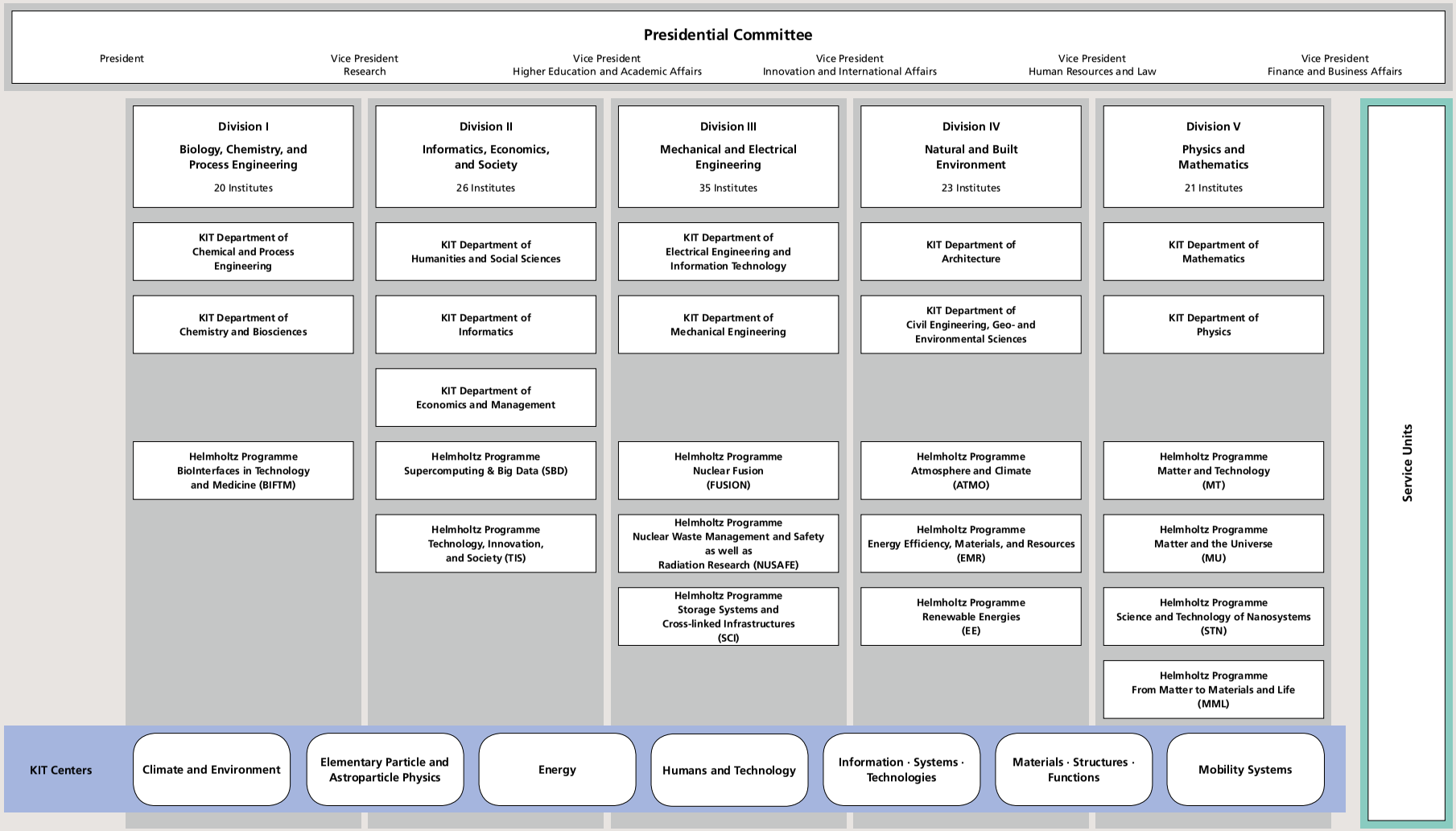
* including Campus East and Campus West ** incl. Campus Alpine



Organizational Structure



Science Organization



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