

RUHR-UNIVERSITÄT BOCHUM

RUB

# CREATING KNOWLEDGE NETWORKS





## CONTENT

MESSAGE FROM THE RECTOR	05
RUHR-UNIVERSITÄT AT A GLANCE	06
GLOBAL ENGAGEMENT	08
RESEARCH	10
TEACHING	14
TRANSFER	18
CULTURE	20
CITY OF CITIES	22



## MESSAGE FROM THE RECTOR

Ruhr-Universität was founded in 1965 as the first academic institution in the north-western industrial region of Germany. Today, we are at the centre of one of Europe's largest science hubs and offer academic education, innovative research and transfer activities far beyond the region's borders. With 43.000 students, among them almost 6.000 from 130 different countries, we are not only a large but truly international university; offering all fields and disciplines of science – humanities, natural science, engineering and life science on the undergraduate, graduate and professional level.

The dedication, diligence and innovative mindset of our staff established focal research areas on a world-class level. Research on IT-security and Solvation Science are just two of our most visible fields of research excellence. We believe in the interdisciplinary character of scientific progress and are firmly committed to fostering early career researchers by providing the best infrastructure and mentoring opportunities. Science is driven by individual curiosity and requires open exchange among researchers on all levels and across borders.

I invite you to take a closer look at Ruhr-Universität in this booklet and welcome you as a future partner in Creating Knowledge Networks throughout the world!

*Axel Schölmerich*

Axel Schölmerich  
Rector



## RUHR-UNIVERSITÄT AT A GLANCE » LOOKING FORWARDS

Ruhr-Universität Bochum is a place for innovative research and learning for life. How do we find science-based solutions to the global challenges of our time? How do we help young adults grow into curious, independent and insightful individuals? How do we shape the dialogue between science and society and facilitate the transfer between theory and practice? To answer these questions, Ruhr-Universität breaks the boundaries between subjects, transcends physical distance and works across generations.

With 20 faculties and more than 43,000 students in some 190 courses of study, Ruhr-Universität is one of the ten largest universities in Germany. As a comprehensive university, it unites the arts, humanities, social sciences, natural sciences, engineering and medicine. Its scope is unique in Germany: according to the Funding Atlas 2015 of the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation), research at Ruhr-Universität is the most wide-ranging of any university in Germany. Its strong tradition of research, outstanding international networks and innovative educational style make Ruhr-Universität a sought-after cooperation partner and an attractive place of study for young people from all over the world.

As the first new university founded in the Federal Republic of Germany, Ruhr-Universität rang in a new age of knowledge in

1965. Its architectural design reflected its mission: it placed education in a new context and laid the foundation for Bochum's development into a leading city of education and science.

In 2007 Ruhr-Universität Bochum joined forces with the neighbouring universities in Dortmund and Duisburg-Essen to form the Ruhr-Universität Alliance, one of the largest and most productive scientific associations in Germany. The strategic merger offers researchers diverse opportunities for cooperation and gives students the option to attend courses at the neighbouring universities. Liaison offices in New York, Moscow and São Paulo promote international cooperation and student and scholarly exchanges.

The dynamic development of Ruhr-Universität requires space. With an extensive development plan, the university is working towards meeting its future goals. The main campus in the south of Bochum will retain its central facilities, such as the well-stocked university library and distinctive central auditorium. New sites for teaching, learning and research in the city centre have been added during the course of a recent expansion, bringing scholarship and the interested public closer together. And as a third location, Ruhr-Universität is currently converting a former industrial site into an innovative centre for science, technology and business.



## GLOBAL ENGAGEMENT » KNOWLEDGE CREATES NETWORKS

Ruhr-Universität unites people from all over the world, creating global knowledge networks. The common objective is to broaden knowledge through research and teaching and thus work towards a better future. The principles guiding Ruhr-Universität in its quest for internationalisation, therefore, are the following:

**HUMANE »** We consider social responsibility to be an integral part of our scientific duty, both locally and globally.

**ACCOMPLISHED »** We are committed to excellence, which we strive for in scientific research as well as all other areas of the university.

**OPEN TO THE WORLD »** We are linked to an international network – in both our teaching and research – and welcome students and scientists from all over the world.

People from 130 countries study, research and teach on Ruhr-Universität's campus: it is home to more than 5,000 international students, some 700 international PhD students and several hundred international academics. What is more, some 600 incoming and a similar number of outgoing students each year take advantage of the wide variety of exchange and scholarship programmes available here. The university as a whole supports 45 international partnerships in research, study, teaching and the transfer of knowledge. At the faculty and institute level, more than 300 cooperation agreements for specific projects have been concluded with partners in 62 countries.

### EDUCATION WITHOUT BORDERS

Ruhr-Universität is part of a number of transnational education projects. As a member of the **Utrecht Network**, a network

of 32 universities from 27 countries, Ruhr-Universität contributes actively to designing international curricula and preparing staff for their changing responsibilities in a globalized world. Ruhr-Universität is also a member of the **Global Campus of Human Rights**, the largest worldwide university network in education and research into human rights and democracy. Moreover, it promotes the exchange of knowledge with China as an active partner in the **Chinesisch-Deutsches Hochschulkolleg** (Chinese-German University College for Postgraduate Studies – CDHK) at Tongji University in Shanghai. In the **South African German Centre for Development Research**, it offers courses for managers in development cooperation. And as a partner of the **Vietnamese German University (VGU)** in Vietnam, it trains talented students in engineering courses and awards them a degree from Ruhr-Universität.

### SOUGHT-AFTER HOST

Ruhr-Universität's global engagement extends far beyond its national borders, as proven by its excellent placement in the Top 15 of the **Humboldt rankings**. This ranking indicates which German universities are chosen by prominent international scientists for their guest residencies.

Researchers from all over the world who come to work at Ruhr-Universität benefit from the comprehensive services of the **Welcome Centre**. Here they can find information and advice for their time at Ruhr-Universität, including assistance in finding housing or tips for things to do in their leisure time.

## ACADEMIC FREEDOM WORLDWIDE

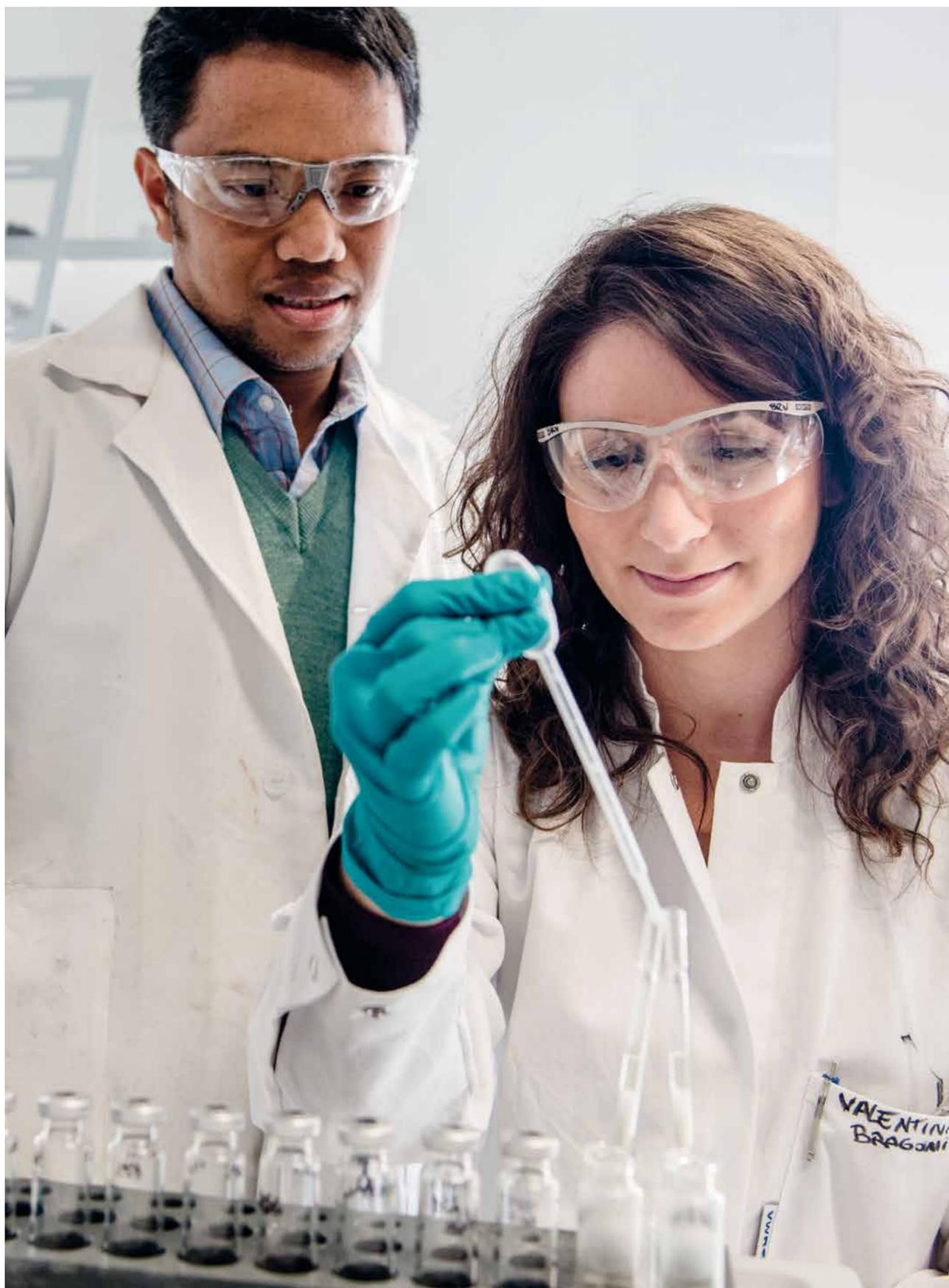
As a member of the international **Scholars at Risk Network**, Ruhr-Universität supports international academics who are threatened, persecuted or restricted in their

work on the grounds of their research and scientific ideas.

Ruhr-Universität also opens its doors to students who have had to flee their home countries. As one

of the first universities in Germany, Ruhr-Universität established a programme to guide young people who have fled their home countries successfully into university.





## RESEARCH » SCIENCE REQUIRES VISION

We have only one world to work with: research cooperation across national and disciplinary borders can address the urgent issues of our time by joining forces and sharing competencies. Ruhr-Universität has organised interdisciplinary cooperation into ten research departments. In addition, researchers at Ruhr-Universität have taken part in ambitious projects in a number of collaborative research centres funded by the DFG, both within the university and in cooperation with non-university institutions.

What is more, outstanding individual research at Ruhr-Universität is internationally recognised. In 2017, the European Research Council (ERC) funded 11 researchers as ERC grantees in a range of disciplines. This prestigious award is not only associated with high subsidies; it is also a mark of scientific excellence and proves that the winners are among the best in their field, world-wide.

### RESEARCH DEPARTMENTS

World-class research is organised at Ruhr-Universität in flexible, interdisciplinary **Research Departments (RDs)**. By networking among themselves and at regional, national and international levels, they form larger clusters that study overarching topics.

At the **Horst Görtz Institute for IT Security (HGI)**, more than 100 researchers from information technology, mathematics, the arts, social sciences and law work together to study the opportunities and risks of digitalisation. The HGI is internationally renowned as a leading research centre. It has Europe's largest training programme for IT security and is integrated into extensive academic and industrial networks.

In the **Solvation Science** RD, more than 200 chemists, biologists and physicists are decoding the role of solvents in chemical reactions. On that basis, new concepts can be developed for industry – such as for energy conversion and storage or for pharmaceutical research.

The **Neuroscience** RD researches brain functions with a multi-disciplinary strategy. It focuses on sensory systems, learning and memory, brain pathology and applied neuroscience.

In the **Materials** RD, researchers seek to design innovative materials with previously unused property profiles. The intended fields of application are varied: turbines for aviation, battery cells, innovative drive systems or fuel cells.

With its concept of excellent collaborative as well as individual research, Ruhr-Universität is one of the highest performing universities in Germany. Under the Excellence Initiative, a national competition to promote world-class research, it achieved notable success with its university-wide Research School and the RESOLV excellence cluster (Ruhr Explores Solvation). The objective of the cluster is to develop solvation research as a new research discipline and provide the community with valuable knowledge for future applications.

Another seminal research topic of Ruhr-Universität is IT security. In the age of smartphones, networked vehicles and big data, it is extremely relevant to society. How can we protect ourselves against IT attacks? Scientists with a technical focus are cooperating across disciplines with researchers from the arts, humanities and social sciences to study the relationship between human behaviour and IT security.

The **Plasmas with Complex Interactions** RD is dedicated to a key technology of the 21st century and research far beyond the traditional limits of plasma research.

The **CERES (Centre for Religious Studies)** RD researches the self-reinforcing nature of religion across 20 disciplines in the arts, humanities and social sciences.

How do proteins function? Researchers in the **Protein** RD investigate the structure of proteins in detail and their interactions in networks within cells.

How can tunnel construction be safer, more efficient and more economical? How can geothermal energy be used to conserve the environment? To solve these and other subterranean questions, scientists from eight disciplines work together in the **Subsurface Modelling and Engineering** RD.

To prevent greenhouse gas carbon dioxide (CO<sub>2</sub>) from being released, the team at the **Closed Carbon Cycle Economy** RD researches ways to achieve closed carbon cycles.

The **Interfacial Systems Chemistry** RD researches the interaction between individual molecules or atoms. The objective is to develop a microscopic understanding of chemical complexity.

## RESEARCH » PROMOTING YOUNG TALENT STEP BY STEP

Ruhr-Universität supports researchers at all stages of their academic careers. With junior research groups as well as graduate schools, it creates the best possible conditions from the outset for young people to work independently, develop individually and build up productive networks.

With its multi-award-winning Research School, unique in Germany, Ruhr-Universität sets quality standards across faculties in supporting its PhD students. In the Research School plus, international networking is promoted among PhD students and young post-docs through a range of programmes. The Research Academy Ruhr, as part of the Ruhr-Universität Alliance,

offers an extensive support system to young researchers in the Ruhr Metropolis. This is one of the best performing and largest platforms of its kind in all of Germany, a model of how to promote regional talent that is unique in the country and has an outstanding international reputation.

To attract and retain the best young talent, Ruhr-Universität has developed Tenure Track Programmes designed for junior professors, as well as post-docs and junior research group leader positions. It offers attractive development opportunities to those with outstanding achievements, particularly those who are well suited to independent research and teaching.

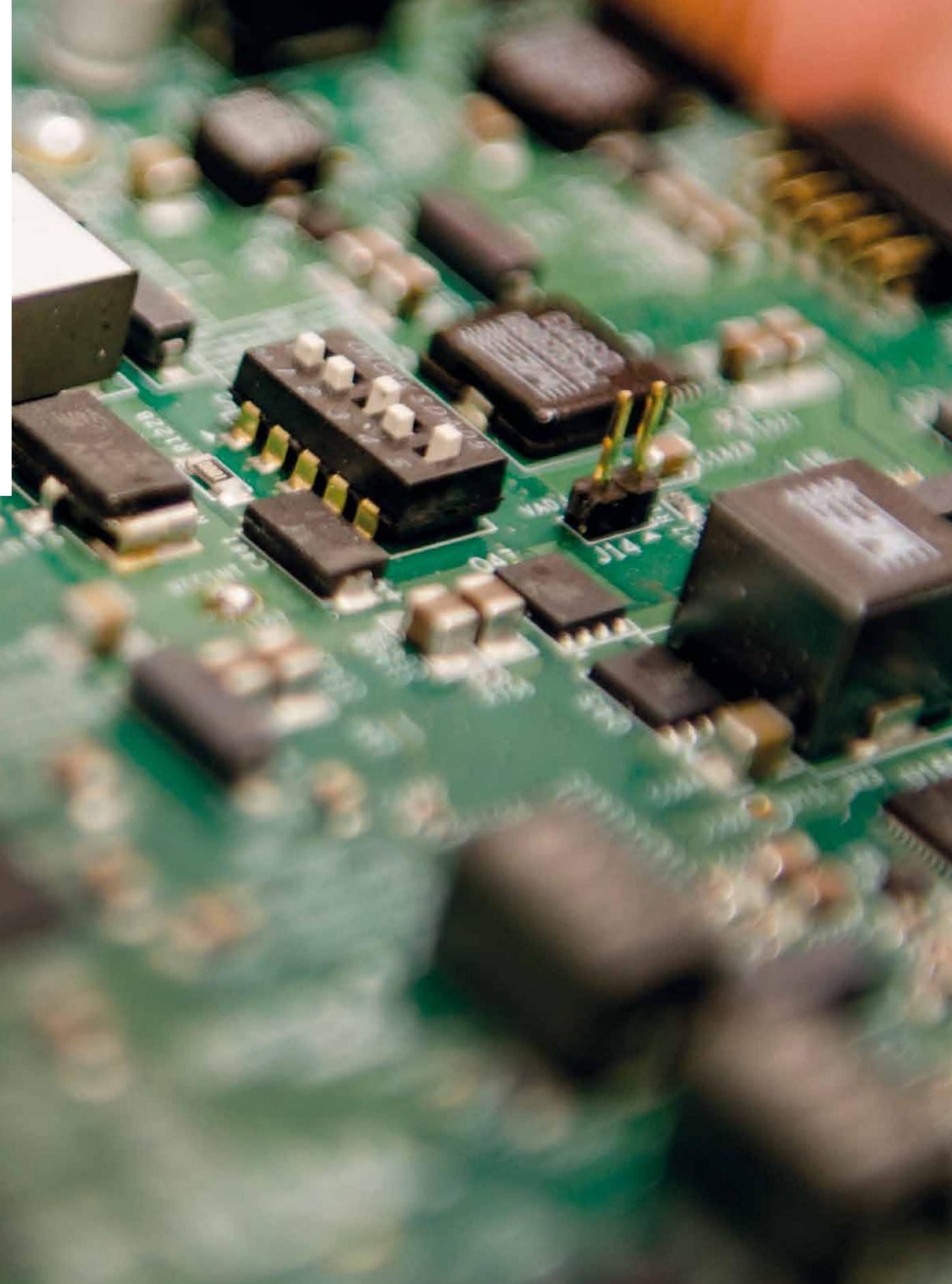
## MORE ROOM FOR RESEARCH

Four new research facilities at Ruhr-Universität Bochum reflect the growing significance of its emphasis on interdisciplinary research. In the new buildings, Ruhr-Universität scientists, partners and guests, often from different disciplines, will enjoy ideal conditions for shared research and dialogue.

The **Centre for Molecular Spectroscopy and Simulation of Solvent-controlled Processes (ZEMOS)** is the new building for solvation science. It assembles under one roof the expertise and technology of this rapidly de-

veloping research field and is the home of the excellence cluster RESOLV. The **Centre for Interface-Dominated High Performance Materials (ZGH)** is currently under construction. Here, scientists will study materials under extreme conditions, examining material interfaces and the combination of structure and function in innovative materials. The construction should further promote the interdisciplinary Materials Research Department, already on its way to the top of international ranks. The **Research Centre for Molecular Protein**

**Diagnostics (ProDi)** is located on the neighbouring Health Campus. Here, the scientists carry out medical research, or more accurately, study possibilities to diagnose diseases such as cancer and Alzheimer's at earlier stages. The fourth research centre of Ruhr-Universität, the **Centre for the Engineering of Smart Product Service Systems (ZESS)** is being built on a newly developed site that is going to accommodate an innovative science, technology and business start-up district.





## TEACHING BUILDS BRIDGES

**Studienbrücke Germany** is a programme started by Ruhr-Universität and by now extended to include the other two partners in the Ruhr-Universität Alliance. In cooperation with the Goethe Institute and the German Academic Exchange Service (DAAD), it offers Eastern European and Central Asian school pupils with excellent German and technical knowledge the opportunity to begin studying STEM subjects at the universities of the Ruhr-Universität Alliance immediately after they finish school.

## INTEGRATIVE LEARNING

Combining practical experience with scholarship and science opens new horizons for learners. Ruhr-Universität offers integrative learning experiences in many places: in the **Alfried Krupp Laboratory for Pupils** with its humanities and sciences branches, young people learn, even before starting their studies, what it means to approach an assignment from a research perspective, how to conduct experiments and how to interpret their results. Hands-on projects make

it easier to step into the world of scholarship and science.

This also applies to Bachelor's and Master's students who, together with interested professors, are encouraged by the funding line **Student-Initiated Courses** to suggest new course formats. A student jury selects promising courses, the applicants are given the necessary funds, design and try out the course. This has produced a number of innovative classes that enrich the standard curriculum.

## TEACHING » INNOVATIVE AND RESEARCH-ORIENTED

Ruhr-Universität is an attractive place to study because it offers a broad range of subjects, numerous possibilities to combine majors and a transdisciplinary core programme of courses. In 2010, teachers and students worked together to develop the university's **Teaching and Learning Mission and Vision** that features a strong commitment to research-oriented teaching and learning throughout all stages of the student career.

Ruhr-Universität promotes **research-oriented teaching, joint teaching** formats and continuous **curriculum development** to reflect the most modern developments in educational science. For more than a decade, **digitalisation** has been tested and implemented step by step to complement face-to-face teaching, allow for more spatial and temporal flexibility, enable networking among students and diversify teaching methods. Over the last eight years, Ruhr-Universität won a total of **28 million euros** of government funding in a nation-wide competition for teaching projects.

The **Centre for Learning and Teaching** has a decisive role in the promotion of teaching and learning. A writing centre, an e-learning section and an academic development division offer wide-ranging support to teachers and students. A systematic university-level teaching qualification programme for professors, support in academic writing for students and advice on all questions regarding digitalisation and e-learning are among its professional services.

A refined system of **quality management** helps to monitor and support teaching and learning. Student evaluations, the feedback of Ruhr-Universität's graduates and international students as well as the teachers' input are taken into consideration for further improvement.



## CULTURAL LABORATORY MAX KADE HALL

Intercultural encounters require space. This space is supplied by the nearby glass cube of the **Max Kade Hall**, which is run by the AKAFÖ, food and housing supplier for students and important partner of Ruhr-Universität. It has been a meeting point for people from different nations since 2013. It offers a language café and a colourful programme of events. The New York Max Kade Foundation generously supported the construction of the cultural lab.

## TEACHING » TRANSCENDING BORDERS

The **Professional School of Education** trains and educates prospective school teachers in more than 20 subjects. Projects in educational research are carried out and doctoral students are offered a variety of interdisciplinary and professional development courses. The school has a particularly strong reputation for its networking activities – with the researchers on campus, with the regional schoolteachers and with the regional and transregional school administrations. It works also closely together with Ruhr-Universität's **Alfried Krupp Laboratory for Pupils**, where an interest in the newest insights of science and the humanities is sparked in the students of tomorrow.

Ruhr-Universität offers ten **study programmes** taught exclusively **in English**. This facilitates access for international students and prepares German-speaking students for a global academic and job market. Ruhr-Universität maintains **joint and double degree programmes** with a number of universities around the world to promote international exchange and allow students to broaden their horizons.

The **International Office** is the perfect place to go to if international students need help settling in and mastering the organisational challenges of a stay in a foreign country. It is much more than just a place to sort out where banking can be done and how to go about extending one's visa. It offers a variety of social activities to meet with fellow students, tour the vicinity, travel to interesting places or improve one's language skills.

The best places to study German as a foreign language and a variety of other languages are the **Zentrum für Fremdsprachen** (Foreign Language Centre) and the **Landesspracheninstitut** (Bochum University Institute of Intensive Language Training), where experienced teachers offer training in more than 15 foreign languages in weekly classes or in intensive, often personalized small-group settings.

## TRANSFER » IMPLEMENTING INNOVATION

Ruhr-Universität pursues a third core academic mission that actively influences society: **transfer**. Knowledge is not an end in itself. It can connect people and ideas, spark debates, reveal perspectives and bring about change. That is why Ruhr-Universität promotes the transfer of knowledge in a variety of ways.

Tapping into new markets with smart ideas requires a sound strategy and the right contacts. Ruhr-Universität supports this process with a transfer concept that starts with advising company founders and extends to patenting and licensing ideas, inventions and products. A new and innovative place for the transfer of knowledge and technologies at Ruhr-Universität is the **WORLDFACTORY**. Here, the focus is on transferring research questions and results into practical applications, developing creative solutions for business scenarios and operational practise and tying teaching and research more closely to solving practical challenges.

The **Technology Campus**, a newly developed extension of Ruhr-Universität, boasts ideal conditions for an exchange between science and business, theory and practice, because scientific facilities and industrial companies are located right next to one another. Here, Ruhr-Universität is building a Research Centre for the Engineering of Smart Product Service Systems (ZESS) that focuses on the interaction between people, technology and organisation in the future-oriented field of Industry 4.0.

Ruhr-Universität also seeks dialogue with the public. Research fascinates people, with or without academic training, if it is presented in an exciting and comprehensible way. In **Blue Square** in the centre of Bochum, scientists regularly interact with members of the public. The biological consequences of climate change, digitalisation in the working world, populism – these and many other current topics are raised and discussed here in a new kind of dialogue format.

### TRIP TO THE LEARNING FACTORY

How does production work in a medium-sized company? A glimpse into industrial practice helps to understand the processes better. Ruhr-Universität's **Learning and Research Factory** makes this possible: here, students in engineering and the social sciences experience the entire production process – from technology to factory organisation to personnel deployment. This special factory combines theory, simulation and role play in a real production context. It is one of the building blocks of the **WORLDFACTORY**.



## CULTURE » RUHR-UNIVERSITÄT AS A PLACE TO LIVE

The campus of Ruhr-Universität Bochum is a microcosm that thrives on the interplay of research and recreation, nature and culture. Here, students and members of Ruhr-Universität, just as members of the public, can find so many programmes, events and exhibitions that it can be difficult to decide what to do or visit next.

In Bochum as well as the rest of the Ruhr district, the **cultural diversity** of the people living here has shaped the community's way of thinking. A cosmopolitan outlook and willingness to experiment provide fertile ground for a multi-faceted cultural scene. Europe's densest theatre landscape, renowned concert halls, museums as well as a wide variety of gastronomic delights offer treats for every taste.

One unique feature of the Ruhr district is the **Route of Industrial Culture**. It connects all the former industrial plants that have been converted into exciting cultural venues. One example is the Centenary Hall in Bochum: today the former machine room for furnace blowers hosts a renowned theatre festival, the **Ruhr-triennale**. Even nature lovers can find what their hearts desire in and around Bochum: the Ruhr Valley cycle route combines natural and cultural experiences on a 240-kilometre tour from the source of the Ruhr to the point where it flows into the Rhine.

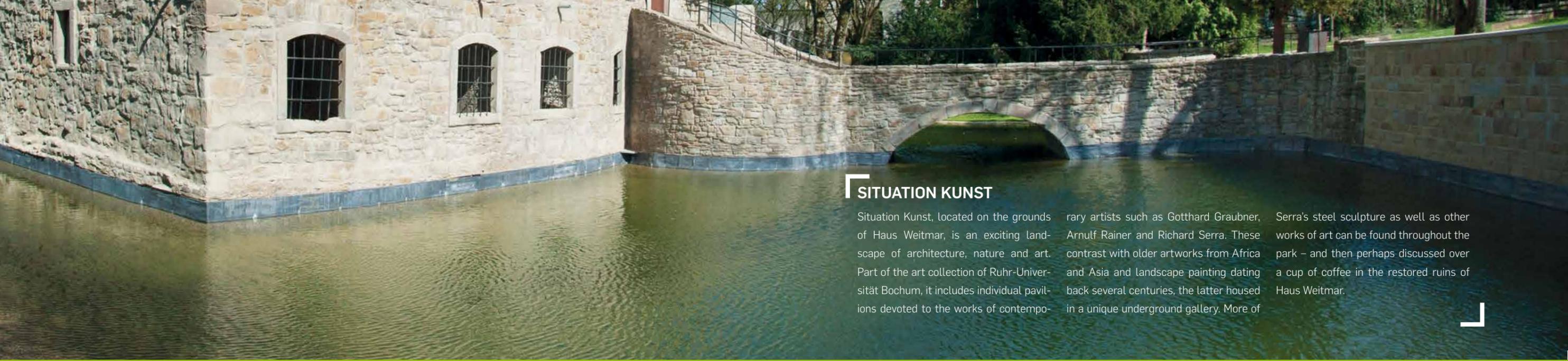
In the **art collections at Ruhr-Universität**, antique art meets significant contemporary works. The architectural art also makes it

possible to experience art without visiting a museum: the entire campus is an artistic landscape of works that prominent artists have created, sometimes specifically for Ruhr-Universität Bochum. In terms of its architecture, the campus is even regarded as a work of art itself.

The **Arts Centre** offers space to be creative – in intermedial art, music and theatre. Or you can just watch, listen and enjoy – performances on the studio stage, concerts given by the university choir, orchestra and various other music ensembles or exhibitions in the Arts Centre and around campus.

At the **Botanical Garden** you can learn about the flora of Asia, Europe and the Americas. Particularly in winter, a walk through the greenhouses provides a welcome respite and a chance to learn about tropical plants. The extensive **Chinese Garden** can provide a short break away from daily routine – a true homage to oriental garden design.

And finally, with more than 90 different sports on offer, Ruhr-Universität ensures that you can work your muscles as well as your mind. With its wide range of offerings, everyone can find something to help create a healthy work/life balance. The university is also dedicated to the support of competitive sports, and it assists athletes in making their competitive sports fit in with their learning schedules. That way, it produces not only world-class research but also Olympic winners.



### SITUATION KUNST

Situation Kunst, located on the grounds of Haus Weitmar, is an exciting landscape of architecture, nature and art. Part of the art collection of Ruhr-Universität Bochum, it includes individual pavilions devoted to the works of contempo-

rary artists such as Gotthard Graubner, Arnulf Rainer and Richard Serra. These contrast with older artworks from Africa and Asia and landscape painting dating back several centuries, the latter housed in a unique underground gallery. More of

Serra's steel sculpture as well as other works of art can be found throughout the park – and then perhaps discussed over a cup of coffee in the restored ruins of Haus Weitmar.



## CITY OF CITIES » EXPERIENCING DIVERSITY

Ruhr-Universität takes its name from the river Ruhr that flows along the southern edge of the Ruhr region and connects Bochum to the other large cities in the region. The city borders are also fluid, which is why outsiders perceive the Ruhr region as one large city with many faces: the City of Cities. Want to go on a pub crawl through the Bermuda Triangle in Bochum, or to a football match in Dortmund, or a ballet in Essen? No problem, you don't have to travel very far!

With 53 municipalities and more than five million inhabitants, including 260,000 students at a total of 22 colleges and universities, the Ruhr region is the largest conurbation in Germany and one of the largest urban areas in Europe. Whether they

live, work, study or just visit the area, people value the excellent transportation links provided by the extensive network of motorways, train services and air routes.

People from all over the world call the Ruhr region their home. One out of five residents of Bochum has non-German roots, because people have been moving to the Ruhr district to live and work for over 150 years. The city of Bochum owes its dynamic economic development to its positive attitude towards change: in addition to the healthcare sector, IT security, and production and creative industries, science has become a particularly important economic factor.





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