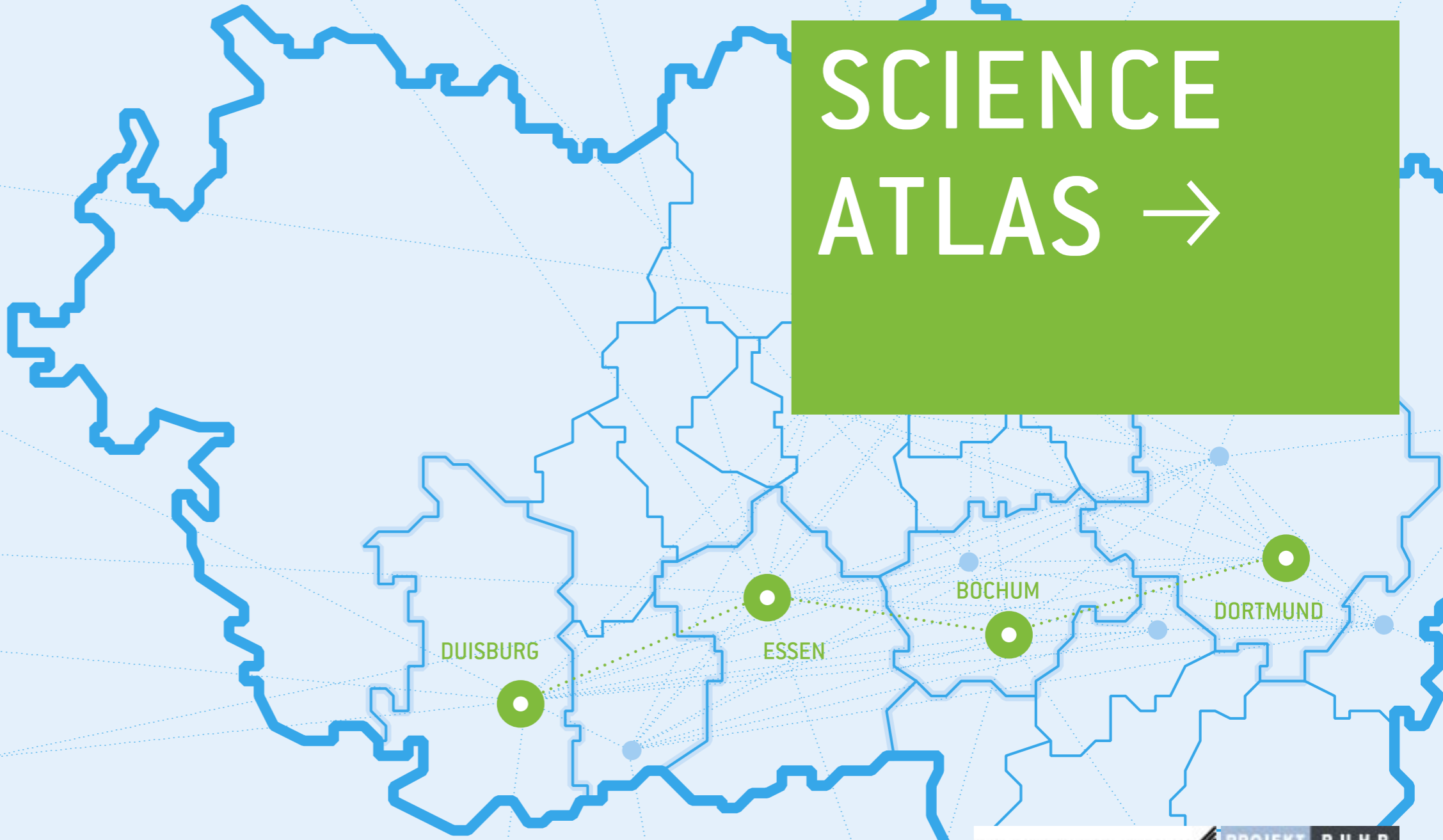


SCIENCE ATLAS →



PROJECT PARTNERS →



Fachhochschule Dortmund
University of Applied Sciences



UNIVERSITÄT DUISBURG
ESSEN



Stadt Bochum



ESSEN

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The *Ruhr Metropolis* has been in a state of constant change since the sixties and now possesses a concentration of research institutes, universities and non-university institutions, the like of which is hard to find anywhere else in Germany.

This publication – the Science Atlas for the cities of Bochum, Dortmund, Duisburg and Essen – on the one hand provides the reader with a comprehensive overview of research focuses in the region, and on the other, supplies a qualitative analysis of the scientific landscape. It is very impressive to see the numerous well-established networks together with the national and international collaborations in the specialist fields listed here. The creative process required to produce such a publication is clear evidence of the common commitment and team spirit of all those involved. Protagonists from all four university cities have undertaken this first attempt to present the diversity of this scientific landscape. The initiative was based on a broad spectrum of collaborations between scientific establishments in the four cities – with the three state universities in the forefront, which are not only connected to each other by joint research projects and courses but have also formed a joint academic exchange office in New York. The fact that this “Atlas” could be created in collaboration with the universities of applied science in the four cities, is a sign of the efforts and increased cooperation among the scientific establishments, which will lead to even more synergies and should be given all possible support.

Of course, the networks already extend well beyond the city borders. The whole Ruhr Region offers a quantity and quality of scientific institutions which would go beyond the scope of this presentation, but everyone interested in science can get an overview of the scientific activities in the region with this “Science Atlas”.

I have great respect for the scientific skills at work in the participating cities and for the large number of eager, hardworking students in the region. That is why I accepted the visiting-professorship at the Universität Duisburg-Essen with such great pleasure. You can find out more about the great diversity of the scientific landscape in the Ruhr Region in this Science Atlas.

A handwritten signature in blue ink that reads "Robert Huber".

*Prof. Dr. Dr. h.c. mult. Robert Huber FMRS
Nobel Prize for Chemistry 1988*

The Ruhr megaplex is a polycentric agglomeration with 5.3 million people from 140 different countries. It forms the thriving center of North Rhine Westphalia at the heart of Europe. Since the sixties the Ruhr Metropolis has developed into one of the most intense scientific landscapes in Europe. Whether one begins a foray along the river Ruhr from the west in Duisburg, from the East in Dortmund or from the middle in Bochum – the region demonstrates how it draws on its rich resources. It is a creative pool of ideas with a multicultural background for research and development. Because of its closeness to the people and its intensive links with companies, science has become an integral part of society.

The region boasts one of the most concentrated scientific networks in Germany with five universities, eight universities of applied sciences, a university of art, four Fraunhofer, four Leibniz and three Max-Planck institutes as well as numerous other non-university research institutions. Scientists from the region's research institutions are today among the best in Germany and indeed the world. Innovative developments in nano and plasmatechnology, energy production and logistics, characterize the current research profile of the region, as do the modern information technologies and life-sciences. Comprehensive research into the economic and societal change processes also show us the roots of the Ruhr scientific region.

Numerous collaborations and centers of excellence in different fields of research link the institutions seamlessly with each other while international cooperation projects and transfer within the worldwide research community are the order of the day. Internal solidarity and openness to the outside world influence the special potential for the future development of this region.

In the immediate vicinity of the universities and universities of applied science, more than 30 technology, innovation and founders' centers as well as over 100 educational, research and development establishments form a hub for transfer between science and the business world. The region's scientists and companies work hand in hand towards achieving joint successes.

This special constellation will continue to contribute to positioning the Ruhr Metropolis as a significant source of innovation in the face of global competition.

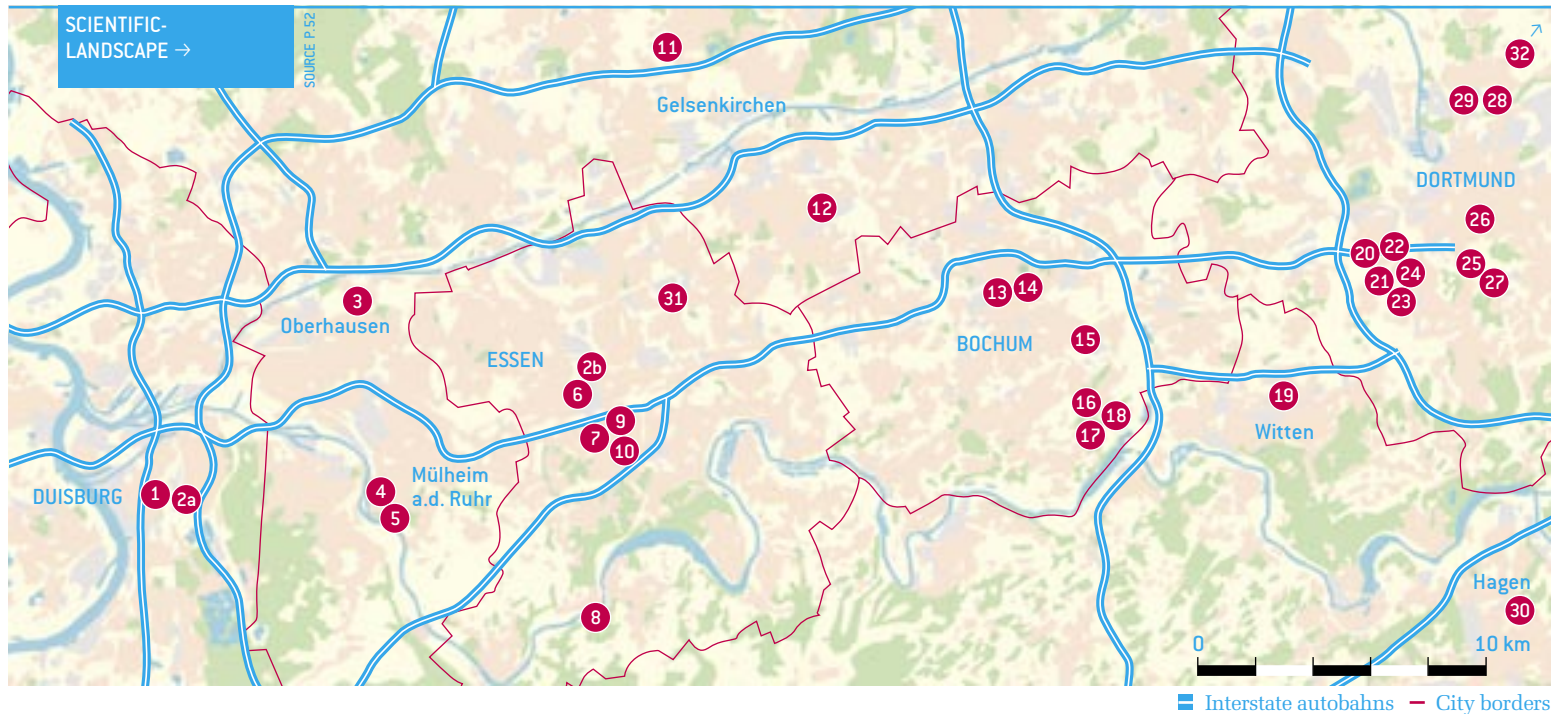
THE RUHR METROPOLIS →



THE RUHR METROPOLIS AT A GLANCE WS 2004/05 →

Population	5.3 million
Universities	5
Universities of Applied Science	8
Art Academies	1
Professors*	2,012
Scientific staff*	9,379
Students	150,001
First semester students	19,587
Foreign students	20,564
Graduates	14,060
School pupils	400,258
Fraunhofer-Institutes	4
Leibniz-Institutes	4
Max-Planck-Institutes	3

* at universities



1_Fraunhofer-Institute for Microelectronic Circuits and Systems (IMS) 2a_Universität Duisburg-Essen (Uni DUE), Campus Duisburg 2b_Universität Duisburg-Essen (Uni DUE), Campus Essen 3_Fraunhofer-Institute for Environmental, Safety & Energy Technology (UMSICHT) 4_Max-Planck-Institute for Bio Anorganic Chemistry 5_Max-Planck-Institute for Coal Research 6_Foundation Center for Studies on Turkey (ZfT) 7_Institute for Advanced Study in the Humanities NRW (KWI) 8_Folkwang Hochschule 9_FOM–Fachhochschule für Oekonomie & Management, University of Applied Sciences 10_Rhenish-Westphalian Institute of Economic Research e.V. (RWI) 11_Fachhochschule Gelsenkirchen (FH GE), University of Applied Sciences 12_Fachhochschule für Öffentliche Verwaltung (FH öV NRW), University of Applied Sciences 13_German Mining Museum Bochum 14_Technische Fachhochschule Georg Agricola zu Bochum (TFH), University of Applied Sciences 15_Evangelische Fachhochschule Rheinland-Westfalen-Lippe (EFH), University of Applied Sciences 16_Institute of Applied Innovation Research e.V. (IAI) 17_Ruhr Universität Bochum (RUB) 18_Fachhochschule Bochum (FH BO), University of Applied Sciences 19_Universität Witten/Herdecke 20_Fraunhofer-Institute of Software & Systems Technology (ISST) 21_Max-Planck-Institute of Molecular Physiology (MPI) 22_Fraunhofer-Institute for Material Flow & Logistics (IML) 23_Universität Dortmund (Uni DO) 24_International School of Management (ISM) 25_Institute of Working Environment & Human Factors at the Uni Dortmund (IfADo) 26_Fachhochschule Dortmund (FH DO), University of Applied Sciences 27_Institute for Analytical Sciences (ISAS) 28_Institute for Regional and Urban Development & Civil Engineering of the State of NRW (ILS) 29_Sozialforschungsstelle (Labor Research Institute) Dortmund 30_FernUniversität (Open University) in Hagen 31_Zollverein School of Management and Design 32_SRH University of Applied Sciences Hamm

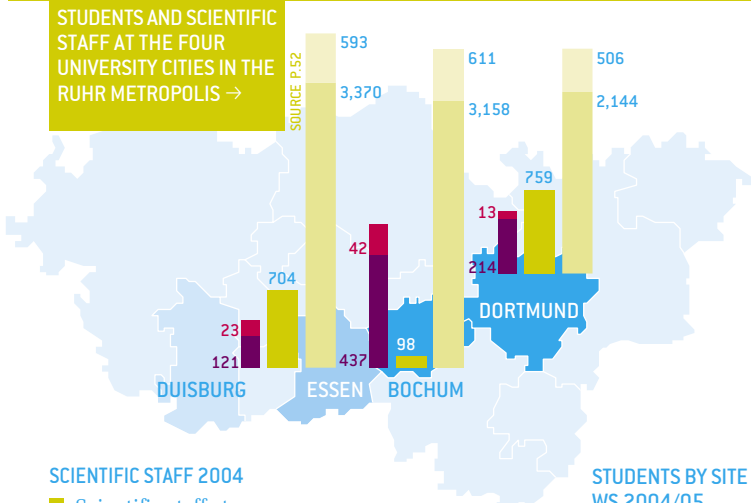
SCIENCE BREEDS ... MASTERMINDS

With 11,500 members of staff, the scientific establishments of the four university cities in the Ruhr Metropolis are not only important employers in their own right, they also educate highly qualified employees for businesses, scientific and public institutions. In the year 2004, over 10,000 students graduated from the universities with a scientific qualification, an additional 772 received doctorates and 78 were awarded professorships.

In the winter semester of 2004/2005, 107,700 students were matriculated at the universities in the four university cities with just over 15,700 of them studying in the first semester.

By switching the study programs to Bachelor and Masters qualifications, the universities are proactively following their aim of gaining worldwide recognition for their courses. This puts them at the cutting edge in NRW.

STUDENTS AND SCIENTIFIC STAFF AT THE FOUR UNIVERSITY CITIES IN THE RUHR METROPOLIS →

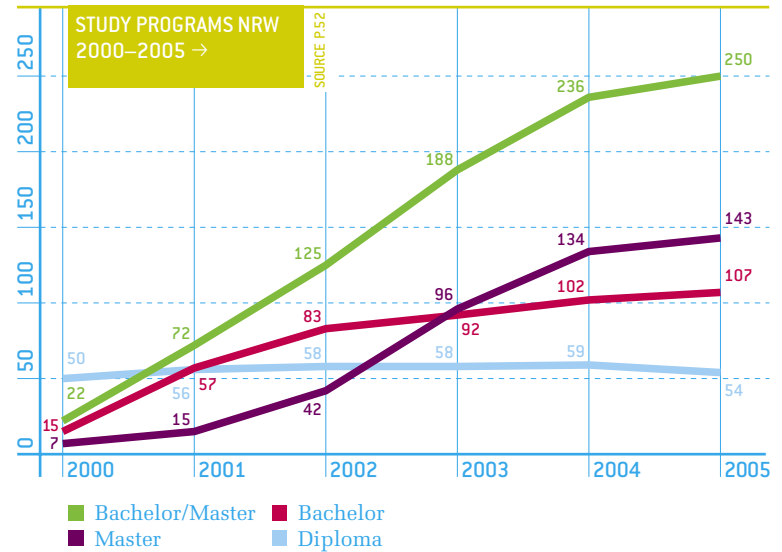


SCIENTIFIC STAFF 2004

- Scientific staff at non-university research institutes
- University professors
- Scientific staff
- Post-doctoral university teaching qualifications 2004
- Doctorates conferred 2004

STUDENTS BY SITE WS 2004/05

- > 30,000
- 20,000–29,999
- 10,000–19,999
- < 10,000



STUDENTS WS 2004/05 →

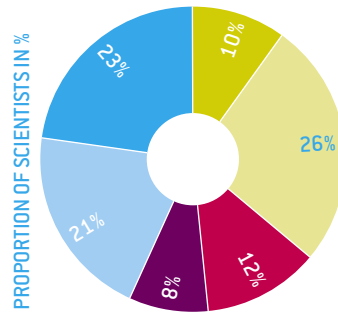
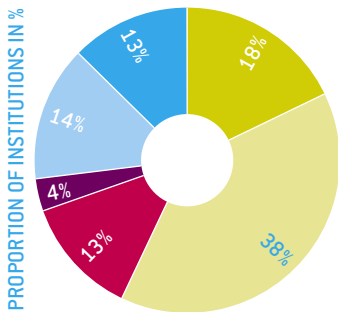
Evangelische Fachhochschule Rheinland-Westfalen-Lippe, Bochum	
University of Applied Sciences	2,004
Fachhochschule Bochum, University of Applied Sciences	4,624
Fachhochschule Dortmund, University of Applied Sciences	8,722
FOM–Fachhochschule für Oekonomie & Management, Essen	
University of Applied Sciences	4,091
Folkwang Hochschule, Essen, Duisburg, Bochum, Dortmund	962
International School of Management, Dortmund	651
Technische Fachhochschule Georg Agricola zu Bochum	
University of Applied Sciences	1,285
Ruhr-Universität Bochum	30,781
Universität Dortmund	21,272
Universität Duisburg-Essen	33,277

Economics, law and social sciences are studied by a third of all students and so play a dominant role at the universities in the Ruhr Metropolis. This is followed by languages and cultural studies with 25% of all those studying. Every fourth student aims to graduate in a scientific, mathematic, IT or engineering subject. Outside the universities, technical fields of research prevail, with many of them originating in the steel and coal industries. The research is strongly future-oriented: e.g. microtechnology, new materials or energy and environmental technologies. Structures complementing the Ruhr Metropolis' economy are also to be found in the arts and economic sciences with structural change in the economy and society as another key focus for many research institutes.

NON-UNIVERSITY RESEARCH BY FUTURE SECTOR →

SOURCE P. 52

2,000 Scientific staff in 57 R&D institutions*



- Energy and environmental technology
- Social and economic change
- Life sciences
- Logistics and transport
- New materials and innovative production
- New media, IT & communications technologies, microtechnology

OPINION →

Prof. Dr. Eric Frère (41)
FOM – Fachhochschule für Oekonomie & Management, Essen
University of Applied Sciences

KEY ACTIVITIES →

His work is particularly focused on the fields of corporate finance and asset management. Parallel to his professorship in business studies at the FOM for financial management and entrepreneurship, Professor Frère is also Dean for international courses and has been an independent consultant in the fields of financing, turnaround and strategic management for over 10 years.

THE RUHR METROPOLIS →

The development of the whole country also depends decisively upon the future development of the Ruhr economic region. There are more people living and working between Dortmund and Köln than in Berlin, Hamburg and Munich put together. The FOM contributes to shaping this future too, by offering young people a wide variety of academic opportunities outside work. Promoting entrepreneurial thinking in this region is of great significance.

OPINION →

Prof. Dr. Theresia Degener, LL.M. (44)
Evangelische Fachhochschule Rheinland-Westfalen-Lippe, Bochum
University of Applied Sciences

KEY ACTIVITIES →

International human rights and discrimination law with a focus on disability rights and law
Advisor to the Federal German Government at the Ad Hoc Committee for a new Convention on the Rights of People with Disabilities at the United Nations in New York

HONORS →

2005 German Federal Cross of Merit 2003 2. Prize awarded by the readers' survey Courage 2003 for commitment to equality and unhindered participation for disabled people in the European Year of People with Disabilities 2003 (awarded by Partizip- and Kabinet-Nachrichten) 2003 Easy Language Prize awarded by the network People First Deutschland

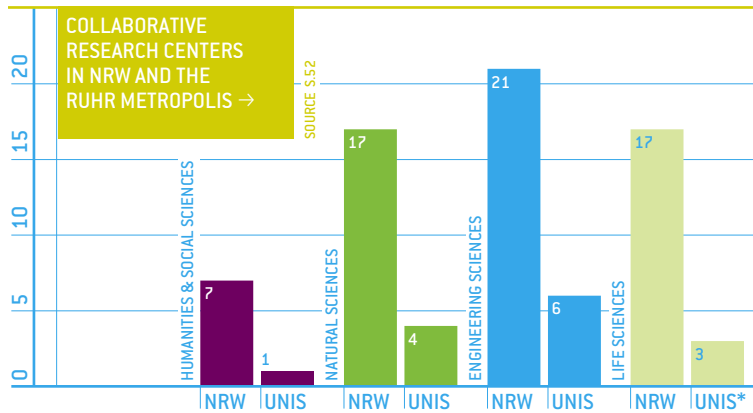
THE RUHR METROPOLIS →

Scientists with international interests who are concerned with ethical and sustainable globalisation come together in the Science Region Ruhr.

*At university institutes, Max-Planck-Institutes, Fraunhofer-Institutes, Leibniz-Institutes, State Institutes, other larger research institutions

Collaborative Research Centers (SFB), research training groups and research units provide up-and-coming scientists with the best conditions for active research. In addition to the 14 SFBs which play a leading role at the universities in the Ruhr Metropolis, the universities are also involved in two further SFBs in humanities and social sciences and one in life sciences. They also participate in three Transregios, including one where they have the role as spokesperson. Whereas engineering sciences dominate the SFBs, it is the natural sciences which hold sway in the 15 postgraduate programs for encouraging and developing PhD students.

The ten research units funded by the German Research Foundation (DFG) are represented in all four scientific areas to an equal degree. Another central pillar for the promotion of the new generation is represented by the non-university research institutes. Synergies are used optimally in collaboration projects and joint graduate schools in the fields of economics and life sciences. The universities and universities of applied science offer a wide spectrum of supplementary, postgraduate and further education courses which complement the first degree courses according to the principles of life-long learning.



*Universities of Bochum, Dortmund, Duisburg-Essen

DFG-SUPPORTED (SFB & TRANSREGIOS) SPECIAL RESEARCH FIELDS IN THE RUHR METROPOLIS UNIVERSITIES →

Engineering Sciences

- Design and management of complex technical processes and systems with computational intelligence methods (SFB)
- Shape Memory Technology: basics, construction, manufacturing (SFB)
- Lifespan-oriented design concepts considering damage and deterioration aspects (SFB)
- Modeling large networks in logistics (SFB)
- Nano-particles at the vapor phase: formation, structure, properties (SFB)
- Rheology of the earth – from surface crust to the subduction zone (SFB)
- Integration of forming, separating and joining for the manufacture of light supporting structures (Transregio)

Natural Sciences

- Energy dissipation on surfaces (SFB)
- Magnetic hetero-layers: Structure and electronic transport (SFB)
- Metal-substrate-interaction in heterogeneous catalysis (SFB)
- Universal behaviour of plasmas in a non-equilibrium state: heating, transport and structural formation (SFB)

Life Sciences

- GTP- and ATP-dependant membrane processes (SFB)
- Molecular biology of complex performance in botanical systems (SFB)
- Neuronal mechanisms of sight/neurovision (SFB)

Humanities and Social-Sciences

- Complexity reduction in multivariate data-structures (SFB)

*University in charge or acting spokesperson

SCIENCE CREATES ... THE COMPETITIVE EDGE

Almost 10,000 scientists in the Ruhr Metropolis leave their mark on the local economy too. The vast majority carry out research at the universities and around 2000 scientists are employed at the large non-university research and development institutions and about the same number in industry. The number of patent applications is a good mirror for the innovative potential of a region. 1,600 patent applications were filed in NRW in the year 2000 by establishments from the Ruhr Region. Patentable ideas do not only come from the companies, a third of all patent applications are sent in by free-lance inventors or private people and academic institutions.

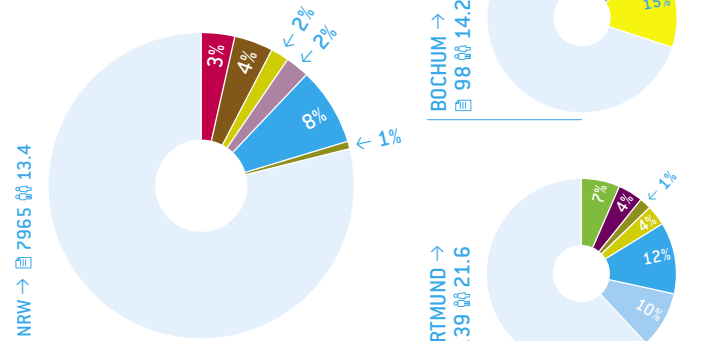
In addition to basic research, it is application-oriented research which encourages patent applications. External research funding is therefore becoming more and more important for non-university research institutions as well as for universities.

In universities, the proportion of external funds (not including medical institutions) stands at around 17 percent of expenditure with a fifth of it coming from industry. The universities of applied science have a lower average external funding rate of 5 percent, but businesses participate more, providing around 30 percent.

The non-university institutions also finance themselves with external funding to the high degree of 50 percent. Most of the funds come from the German Research Foundation, the European Union and German and European foundations.

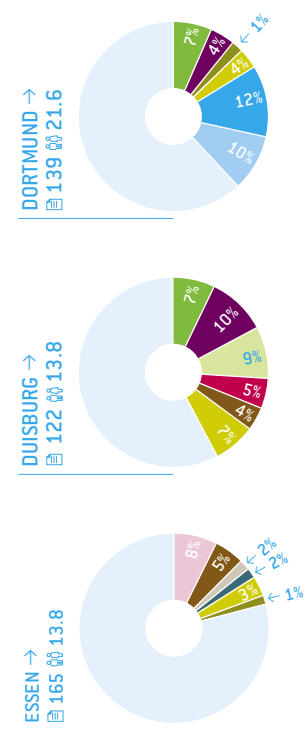
PATENT APPLICATIONS IN NRW AND THE FOUR UNIVERSITY CITIES IN THE RUHR METROPOLIS REGION →

SOURCE P.52



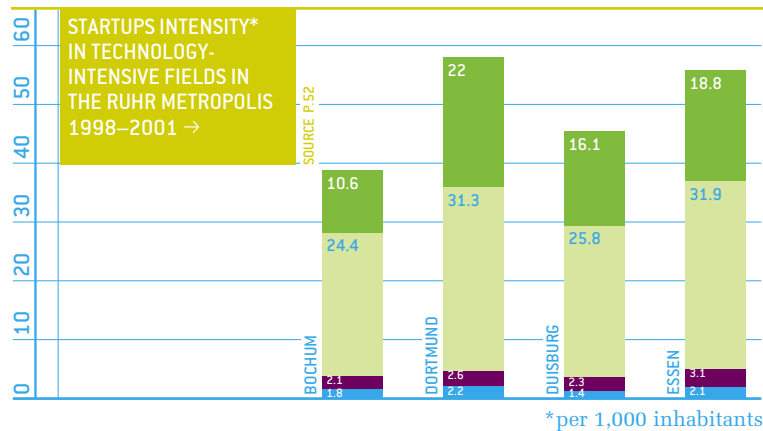
TECHNICAL FIELDS

- Textiles, flexible materials
- Fermentation, sugar, skins
- Grinding, compression, tools
- Dies, mineral oil industry, oils, fats
- Separating, mixing
- Metallurgy
- Civil engineering
- Measuring, testing, optics, photography
- Electronics, communications
- Materials handling, lifting, saddlery
- Metal processing, foundries, machine tools
- Organic macro-molecular connections
- Personal needs, household goods
- Nuclear physics
- Mining



- Percentage share of the six strongest above-average technical fields for patent applications in comparison to the federal average (1.4 to 10 times above the federal average)
- Other proportions of patents (according to location)
- Number of patent applications in 2000 (according to location)
- Patent applications per 100 R&D staff in the economy (according to region)

In the fields of applied research and transfer the universities of applied science traditionally have close links to the local economy. In most university courses, practical semesters or internships are organized for the final stages of the course. Over half of the final theses at universities of applied science are concerned with the real questions or problems which arise in a particular company. It is not only the universities of applied science that are interested in close cooperations – the companies also make use of this to ensure early access to new generations of staff. The knowledge from research and development is then put into practice in the economy. Their own research and development departments, start-up companies and the technology transfer from the universities generate the requirements for this. The Ruhr Metropolis offers a closely knit network of infrastructures which supports the exchange between science and economy. Nine technology transfer agencies focus on promoting the exchange between universities and businesses. Over 20 founder and technology centers offer young companies cost effective conditions for getting started in self-employment. Numerous foundations and specialist sector networks give the startups the opportunity to exchange ideas with specialists and to form new contacts.



OPINION →

Prof. Dr. rer. nat. Reinhard Schaeffer (55)
Technische Fachhochschule Georg Agricola zu Bochum, University of Applied Sciences

KEY ACTIVITIES →

Stone and earth, opencast mining technology, processing and refinement/application-oriented systems analysis in the fields of mineral raw materials and construction materials. The stone and earth industry is a significant factor in the region as a supplier of raw materials. Research and development work leads to operations and approaches to raw-material-specific solutions which support the companies in national and international competition.

THE RUHR METROPOLIS →

The field of raw materials and geo-engineering is of great significance here as the technical and economic development of the stone and earth industry requires interactive and interdisciplinary handling of various themes – and between universities as well.

OPINION →

Dr.-Ing. Ulrike Reutter (44)
Institute of Urban & Regional Development and Civil Engineering of the Federal State of North Rhine Westphalia (ILS NRW)

KEY ACTIVITIES →

Integrative approaches to the design of sustainable transport systems and housing structures, housing and mobility, demographic development, mobility of children and young people.

HONORS →

_1996 Dissertation prize from the Universität Dortmund

THE RUHR METROPOLIS →

Demographic development and continuing structural change are changing the cities and The Ruhr Metropolis with a multitude of impacts and chances for the people living here. The ILS NRW, as a practice-oriented research institute, also contributes to shaping this process in interdisciplinary teams and networks together with the local region-oriented universities and research institutions and the cities in the region.

- Information & communications technology: Software, hardware and consulting
- Technology-intensive service providers
- High quality technology in the manufacturing trade
- Leading edge technology in the manufacturing industry

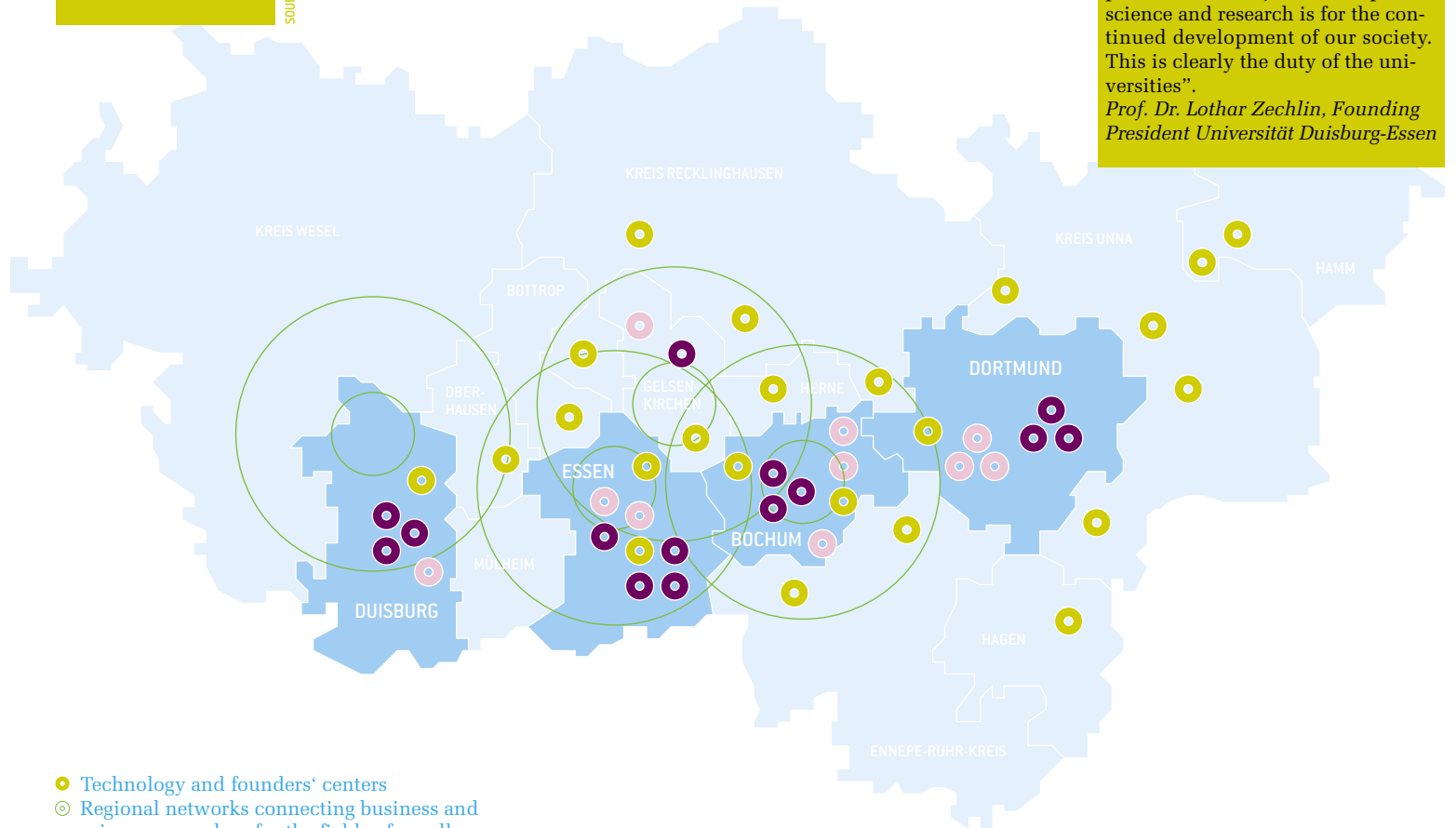
INFRASTRUCTURE FOR TRANSFER BETWEEN BUSINESSES & UNIVERSITIES & FOUNDERS →

SOURCE P.52

OPINION →

“The dialog between the universities and the public is of enormous importance to show just how important science and research is for the continued development of our society. This is clearly the duty of the universities”.

Prof. Dr. Lothar Zechlin, Founding President Universität Duisburg-Essen



- Technology and founders' centers
- ⊙ Regional networks connecting business and science exemplary for the fields of excellence
- Founders' networks
- Transfer points at the universities

SCIENCE CREATES... WORLDS OF EXPERIENCE

Science is opening itself up to society and exploring new ways to reach its audience. Many institutes of higher education hope to broaden their appeal in the form of events such as open days, university festivals or scientific demonstrations in town centers. Keeping the emphasis on lively exchange, their departments are firmly committed to making science tangible for kids and young people.

The “Kids’ Universities”, an innovative channel through which to welcome young people to the world of science, are geared towards 12th grade kids. Specially designated lessons in natural sciences and engineering present the children with the opportunity to gain their first university course certificates whilst they are still at school.

Under the Kids’ Universities and the University Taster scheme, the institutions open their doors to a young audience. Hands-on activities in the university labs allow young people to perform scientific and engineering experiments under the guidance of scientists. In parallel to this, children can take part in work experience schemes. These are available either in the form of two- to four-week internships at companies or as half-day events for small groups supplementary to normal school lessons.

The studium generale comprises a series of interdisciplinary lectures given by the universities’ scientists with the purpose of making new knowledge accessible and comprehensible to the general population, and anyone from the region who is interested is invited to attend the events.

A number of non-university research institutes are also involved in promoting dialog between science and society, as illustrated, for instance, by the research institutes participating in the “ExtraS-schicht 2005 – A Night of Industrial Heritage” or “Duisburger Akzenten”, an annual culture festival that attracts visitors from beyond the region, with a tradition of integrating science into the program. Through a whole range of exhibitions and research work of their own, over 30 local museums attempt to reflect science in cultural heritage and regional cultural awareness.

OPINION →

Prof. Dietrich Hahne (44)
Folkwang Hochschule

KEY ACTIVITIES →

Composition and visualization, transmedial composition, video, surround stage and media.

HONORS →

1988 Folkwang Prize (Composition) 1990 Composition Prize in the Na-tional University Competition 1995 Prize Composition Competition Symphony Orchestra Villingen-Schwenningen 1989–91 Postgraduate Scholarship Folkwang Hochschule 1992–94 Scholarship NRW Art Foundation 1992–94 Support from the NRW Film Foundation 2002 Working scholarship from the state of NRW

THE RUHR METROPOLIS →

Proximity to the arts (composition, electronic composition, visualization, instrumental music, choreography, dance, acting, etc.) at the Folkwang Hochschule provides an extremely creative climate that benefits artistic research projects and development schemes. By opening the Zollverein School at the international culture and design location of the world heritage site, Zeche Zollverein, the school has underlined its new approach of linking classical management with creative processes to encourage innovative management styles and company strategies.

FOCUS →

The *Folkwang Hochschule*, divided between four campuses in Essen, Duisburg, Dortmund and Bochum, is a place of artistic learning and scientific research. With around 1,000 students in the fields of music, theater and dance, it is one of the largest schools of art in Germany. A foreign student ratio of 40 per cent testifies to its international reputation.

In its numerous collaborations with cultural establishments in the Ruhr Metropolis, the Folkwang School helps to shape the cultural life of the region. Some 300 events each year help to fund the school’s artistic work in the region.

The *Zollverein School of Management and Design* in Essen is the only teaching and research institute of its kind in Europe, combining management and design skills in an entirely new way. Research takes a problem- and project-orientated approach at the interface between society, technology and industry. Through its involvement in restructuring the world heritage site of Zeche Zollverein to an international center of design and culture, it makes an active contribution to making science tangible for the public in the form of art and design.

SCIENCE OPENS... DOORS TO THE WORLD

International exchange programs in research, teaching and courses of study are all as much a part of university life as cross-border cooperation in research projects. International university partnerships are most common in the European Union, Eastern Europe and North America, whilst their popularity is also growing in Asia, particularly through new contacts with China. In late 2004, the universities of Bochum, Dortmund and Duisburg-Essen opened an exchange agency in New York called ConRuhr. The agency has been set up specifically to promote partnerships between North America and the Ruhr Metropolis, not only to initiate joint projects but also to provide information about the different university courses available.

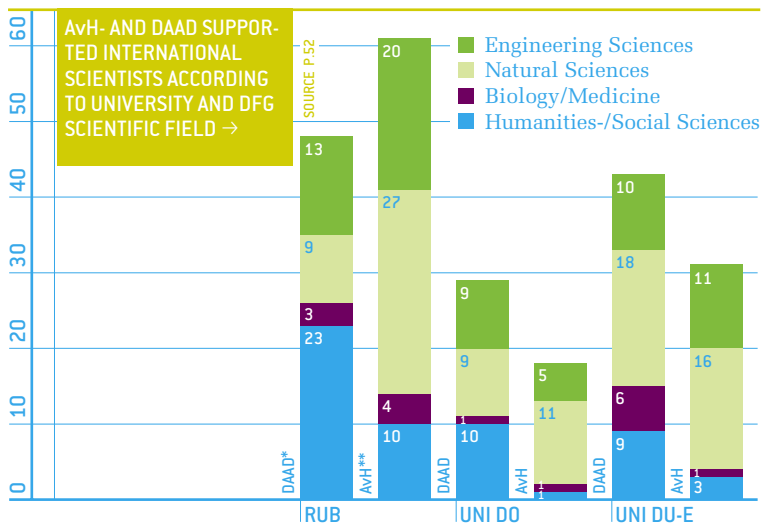
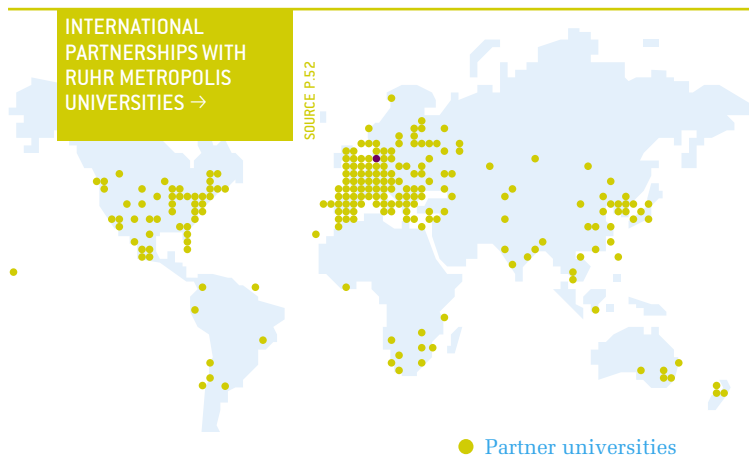
The FOM–Fachhochschule für Oekonomie und Management, University of Applied Sciences runs two campuses with its own scientists in Beijing and Shandong. The Center for Plasma Science and Technology (CPST) at the Ruhr-Universität Bochum works with research centers in Japan, France, Ireland, Korea, the Netherlands and Germany to advance plasmatechnology for the production of high-tech products. This network places an emphasis on promoting overseas experience among students.

GRADUATE SCHOOLS →

[Graduate School of Chemistry and Biochemistry](#) _Ruhr-Universität Bochum
[Graduate School of Production Engineering & Logistics](#) _Universität Dortmund
[International Graduate School of Neurosciences](#) _Ruhr-Universität Bochum
[International Graduate School of Mathematics](#) _Universität Duisburg-Essen
[International Max Planck Research School in Chemical Biology](#) _Association between Max-Planck-Institute of Molecular Physiology and the Universities of Bochum and Dortmund

[International Max Planck Research School for Surface & Interface Engineering in Advanced Materials \(SUR Mat\)](#) _Association between Ruhr-Universität Bochum, the Max Planck-Institute for Iron Research and for Coal Research and three Chinese Universities

[Ruhr Graduate School in Economics \(RGS Econ\)](#) _Association between the RWI Essen and the Universities of Bochum, Dortmund, Duisburg-Essen



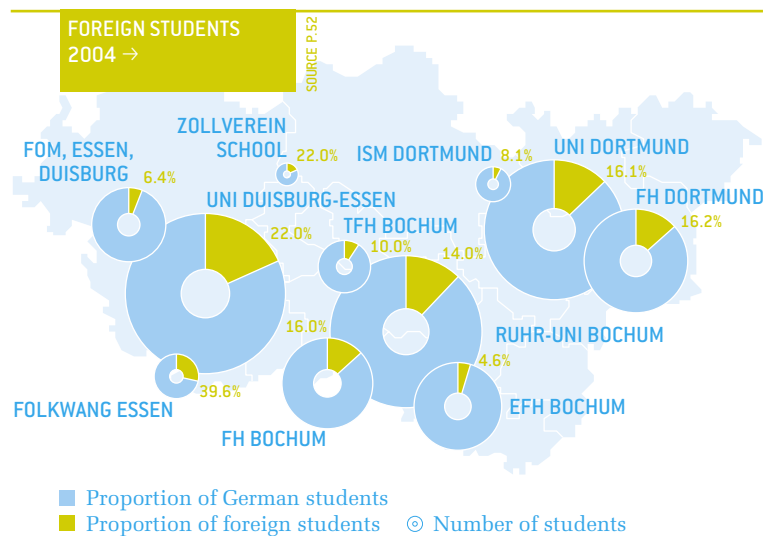
*Deutscher Akademischer Austauschdienst 2000 & 2001
 **Alexander von Humboldt Stiftung 1997–2001

In bi-national and international courses of study, it is obligatory to study abroad. The Ruhr universities offer a wide range of such courses, especially in Engineering and Economic Sciences, however History and Medicine are also available as German-French courses. The partner institutes for these courses are usually in Europe, mainly France, England, the Netherlands and Spain. However, the programs also extend beyond Europe with partnerships in Brazil, India, Japan and the USA – for instance in the field of Computational Engineering.

The introduction of English-language masters degree courses has contributed to the universities promoting internationally oriented training and research. Examples of this are the courses in Automation and Robotics at the Universität Dortmund or Water Science at the Universität Duisburg-Essen. All together, at the three Ruhr universities, there are already 42 English-language training and degree courses on offer.

The universities in Bochum, Dortmund, Duisburg and Essen are involved in a number of European and international networks:

- Circles of Support – Network for the Integration of People with a Handicap
- CLR – European Network of Construction Labour Research
- ECIU – European Consortium of Innovative Universities
- European Project Management Network
- Network of Communication and Applied Signal Processing
- NOHA – Network of Humanitarian Assistance
- REM – Research and Education in Mechatronics
- SPRING – Spatial Planning for Regions in Growing Economies
- Utrecht Network – Network of 31 universities in the EU and EFTA
- WTA – World Technopolis Association



UNIVERSITIES	FOREIGN STUDENTS TOTAL	FOREIGN STUDENTS %	
Germany	246,334	12.5	
NRW	62,337	13.4	
Evangelische Fachhochschule Rheinland-Westfalen-Lippe, Bochum	University of Applied Sciences	92	4.6
Fachhochschule Bochum, University of Applied Sciences	736	16.0	
Fachhochschule Dortmund, University of Applied Sciences	1,399	16.2	
FOM – Fachhochschule für Oekonomie & Management, Essen	University of Applied Sciences	263	6.4
Folkwang Hochschule, Essen	368	39.6	
International School of Management, Dortmund	57	8.1	
Ruhr-Universität Bochum	4,460	14.0	
Technische Fachhochschule Georg Agricola zu Bochum	University of Applied Sciences	136	10.0
Universität Dortmund	3,492	16.1	
Universität Duisburg-Essen	7,286	22.0	
Zollverein School of Management and Design	8	22.0	

SCIENCE CREATES... OPPORTUNITIES

Universities are the training grounds for up-and-coming scientists. With almost 500 courses of study on offer, the four university cities in the Ruhr Metropolis have a broad range for students to choose from. The universities themselves offer the largest and most varied selection, with approximately 400 courses. The public and private universities of applied science concentrate mainly on Engineering and Economic Sciences.

The Evangelische Fachhochschule Rheinland-Westfalen-Lippe, University of Applied Sciences in Bochum, the Folkwang Hochschule in Essen and the Technische Fachhochschule Georg Agricola, University of Applied Sciences in Bochum are three smaller institutes of higher education in the Ruhr Metropolis specializing in the fields of social welfare/parish education, art/theater/music and technology. The number of students in languages, cultural sciences and in art, art studies and the arts is slightly above average.

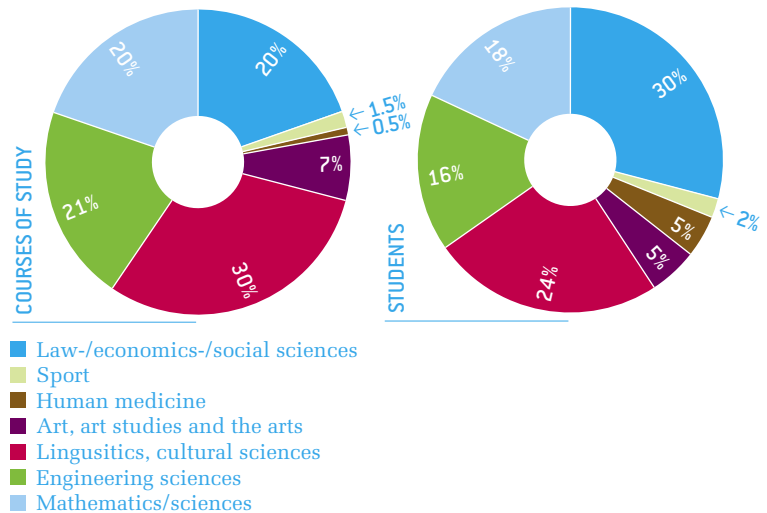
Languages are the most dominant subject group, at almost 50 per cent. The subjects available in the Ruhr Metropolis mainly cover the classical European languages, with East Asian Philology being a special hallmark. A third of the students in the four Ruhr universities study Law, Economics and Social Sciences.

Economic sciences are the largest subject area and cover the classical fields of Business Administration and Economics, but also less well-known fields such as Industrial Engineering or Commercial Law. Internationally orientated courses such as International Business are also becoming increasingly popular. This specialist subject is supported by the Landesspracheninstitut (state institute for languages) in Bochum, which teaches Chinese, Japanese, Arabic and Russian, besides developing its own teaching material.

Educational Science and Special Needs Education are the second major area. Along with History, Psychology, Theology and Philosophy, courses are available in Communication and Media Sciences, Journalism and Cultural Sciences.

COURSES & STUDENTS BY SUBJECT AREA →

SOURCE P. 52



- Law-/economics-/social sciences
- Sport
- Human medicine
- Art, art studies and the arts
- Linguistics, cultural sciences
- Engineering sciences
- Mathematics/sciences

Mathematical and scientific research and teaching form one of the major pillars of the universities in Bochum, Dortmund, Duisburg and Essen. Well over 200 chairs and working groups in Biology, Chemistry, Geography, Computer Science, Mathematics, Statistics and Physics conduct fundamental research. A figure of 20,000 students and 440 graduates in the winter semester proves that the natural sciences attract great interest.

Universities and universities of applied science provide equal contributions to research and training in the engineering sciences. The courses on offer cover the classical technical and design areas such as Electrical Engineering, Mechanical Engineering, Process Engineering, Architecture and Civil Engineering. In Dortmund, which has the largest faculty of this kind in Germany, engineers in Urban and Regional Planning are also trained.

30 courses of study in classical subjects such as Theater, Art, Music and Design, as well as theoretical training in Dramatics, Film and the Arts have attracted some 6,000 students hoping to turn their passion for art, music or theater into a profession.

The Ruhr Metropolis offers up-and-coming medics a broad range of training and specialization options with a central and a peripheral university hospital in Essen and Bochum. Health Economics and Gerontology are two new subjects which can be studied in addition to Medicine.

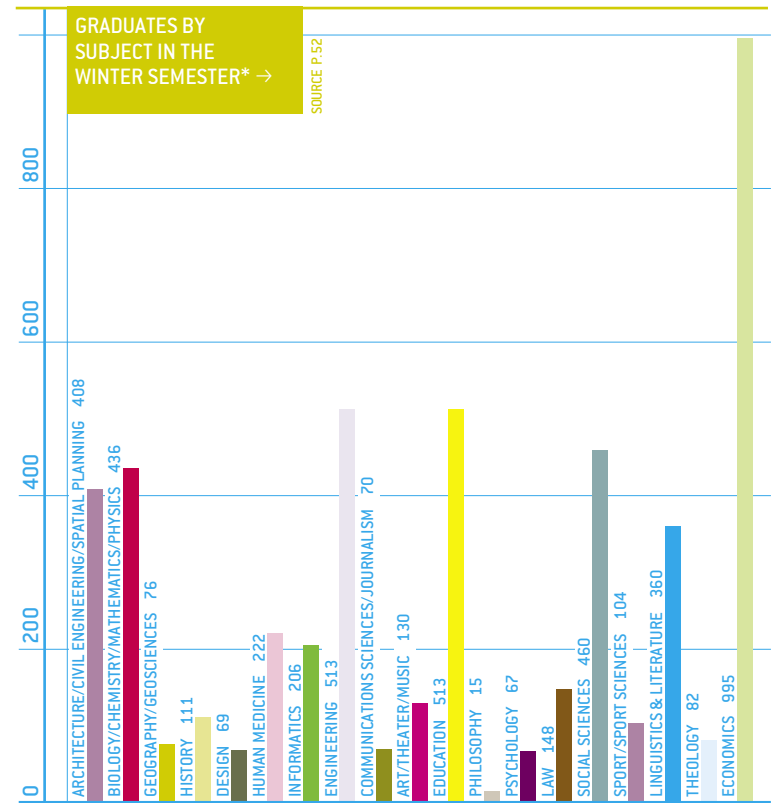
All students can benefit from the excellent infrastructure for sporting activities, but especially those studying Sport and Sport Science.

With around 10,000 graduates in 2004, the universities are the main training establishment for these subjects in the Ruhr Metropolis. 15 per cent of the graduates work towards teaching qualifications, which is approximately 50 per cent more than the German average. The universities therefore make a significant contribution to the training of future teachers.

At the same time, Empirical Education Research is a major field at all universities. In postgraduate courses, special research areas and central scientific institutes, researchers explore aspects of learning, teaching, training and didactics.

A further interdisciplinary subject is Gender Studies, which has found its way into research and teaching in different subjects at the universities through specific chairs, courses or institutes.

The “Mentoring-hoch3” scheme promotes the qualification of PhD students. Experienced professors and mentors provide support and advice to the next generation of scientists in the planning of their scientific career.



*Universities WS 2003/04, Universities of Applied Science WS 2004/05

INDUSTRIAL TECHNOLOGIES & NEW MATERIALS

Industrial progress places growing demands on material properties which must be fulfilled through technological innovation and the development of new materials. However, the advance of industrial technologies and new materials is no longer the exclusive domain of engineering sciences and chemistry: the traditional boundaries in research disciplines are becoming less distinct.

Nanotechnology is one such cross-sectoral technology. Thanks to nanotechnology, the component parts of matter and life can be explored and modified with ever increasing precision. The most widespread to date are nanomaterials. Nano-scale particles are used in the semiconductor and cosmetics industries.

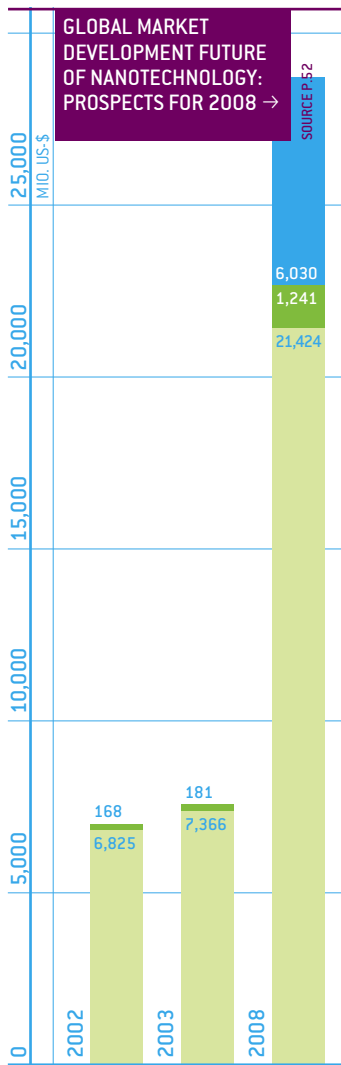
The Ruhr Metropolis has a strong tradition in materials science and engineering. The development of intelligent and new substances is one of four core research areas in this field.

→ The development and application of new substances and materials is becoming increasingly common in fields such as environmental, energy and medical technology.

→ Semiconductor and optoelectronics, in addition to robotics, depend on the miniaturization of products and processes. Based on microscopically small, precise components and circuits, micro-system technology creates novel systems that are capable of fulfilling many tasks more effectively and cheaply than their conventional, larger “role models”.

→ At the forefront of nanotechnology and nanosciences, are the production and characterization of nano-scaled objects and structures with tailor-made optical, electronic, magnetic and mechanical properties.

→ Plasma research opens up new avenues of application, particularly in temperature- and moisture-sensitive materials such as wood, paper and textiles. The potential uses range from a practically unlimited source of energy and light, through state-of-the-art circuitry, to chemical and physical resources for microelectronics.



OPINION →

Dr. Dirk Janasek (35)
ISAS – Institute for Analytical Sciences, Dortmund and Berlin

KEY ACTIVITIES →

Miniaturized separation techniques for the online analysis and preparation of samples. Miniaturization makes it possible to separate and determine volumes of liquid mixtures in the nanoliter range within milliseconds.

HONORS →

Postdoc Scholarship from the German Academy of Sciences “Leopoldina”

THE RUHR METROPOLIS →

The region has evolved in recent years into a hub for microsystems technology. This constellation enables a creative and fruitful exchange between fundamental research, applied research and industry. Along with the renowned excellence in spectroscopy at the ISAS and the institute’s involvement in training students at the University of Dortmund, it was this factor that really motivated me to relocate in Dortmund.

■ Nanosystems
 ■ Nano-tools
 ■ Nano-materials

RESEARCH FOCUSES AT THE UNIVERSITIES →

UNIVERSITY →	DEPT./FACULTY →	FIELDS OF RESEARCH →
FACHHOCHSCHULE BOCHUM UNIVERSITY OF APPLIED SCIENCES	<ul style="list-style-type: none"> _Dept. of Electrotechnology & IT _Dept. of Mechatronics & Mechanical Engineering 	<ul style="list-style-type: none"> _Automation & Safety Engineering _Laser Technology _Micro-Electronics _Microtechnology _Robotics _Production Engineering _Optical Technologies _Robotics
FACHHOCHSCHULE DORTMUND UNIVERSITY OF APPLIED SCIENCES	<ul style="list-style-type: none"> _Dept. of Information- & Electrotechnology _Dept. of Mechanical Engineering _Dept. of Architecture 	<ul style="list-style-type: none"> _Micro-Electronics _Microsensors _Microtechnology _Automotive (Vehicle Construction & Engine Development) _Simulation _Automation _Engineering _Surface & Materials Technology _Building Physics
TECHNISCHE FACHHOCHSCHULE GEORG AGRICOLA ZU BOCHUM UNIVERSITY OF APPLIED SCIENCES	<ul style="list-style-type: none"> _Dept. of Electro- & Information Technology _Dept. of Mechanical & Process Engineering 	<ul style="list-style-type: none"> _Microprocessor Technology _Autonomous-Behavior Robotics _Process Automation _Heterogeneous Systems _Forming Technology _Materials & Production Technology
RUHR-UNIVERSITÄT BOCHUM	<ul style="list-style-type: none"> _Faculty of Civil Engineering _Faculty of Chemistry _Faculty of Electro & Information Technology _Faculty of Mechanical Engineering _Faculty of Physics & Astronomy 	<ul style="list-style-type: none"> _Functional Materials & Intelligent Materials _High Performance Materials _Materials Theory _Composite Materials _Materials Chemistry _Nanomaterials _Surface Chemistry _Polymer Chemistry _Nanoelectronics _Optoelectrical Components & Materials _Optical Technologies _Plasma Technology _Sensors _Automation- & Production Engineering _Semi-conductor technology _High Performance Materials _Microtechnology _Materials Technology _Nanoengineering _Nanostructuring _Optical Technologies _Plasma Physics
UNIVERSITÄT DORTMUND	<ul style="list-style-type: none"> _Dept. of Bio & Chemical Engineering _Dept. of Chemistry _Faculty of Electrotechnology & Information Technology _Faculty of Mechanical Engineering _Dept. of Physics 	<ul style="list-style-type: none"> _Mechanical Process Engineering _Nanotechnology _Materials & Corrosion _Chemical Process Engineering _Nanomaterials _Industrial Robotics _Microfluidics _Microstructure Technology _Microtechnology _Nanotechnology _Optical Microstructure Technology _Production Engineering _Robotics _Quality-, Measurement- & Control Technology _Materials Technology _Nanostructures _Quantum Physics _Robotics
UNIVERSITÄT DUISBURG-ESSEN	<ul style="list-style-type: none"> _Dept. of Building Science _Dept. of Chemistry _Faculty of Engineering Science _Dept. of Art & Design _Dept. of Physics 	<ul style="list-style-type: none"> _Building Physics _Materials Science _Membrane Research _Molecular & Polymer Spectroscopy _Surface Chemistry _Polymer Chemistry _Applied Materials Technology _Microelectronics _Microtechnology _Metallurgy _Nanoelectronics _Nanotechnology _Nanooptics _Optoelectronics _Industrial Design _Microtechnology _Spintronics _Plasma Physics _Optical Sensors

CENTRAL INSTITUTIONS AT THE UNIVERSITIES →		
UNIVERSITY →	TYPE OF INSTITUTION →	RESEARCH SUBJECTS →
FACHHOCHSCHULE BOCHUM UNIVERSITY OF APPLIED SCIENCES	_ Central scientific institution	_ Mechatronics _ Automationsystems
FACHHOCHSCHULE DORTMUND UNIVERSITY OF APPLIED SCIENCES	_ Central scientific institution	_ Microsensors
TECHNISCHE FACHHOCHSCHULE GEORG AGRICOLA ZU BOCHUM UNIVERSITY OF APPLIED SCIENCES	_ Central institute	_ Materials _ Product Development & Production
RUHR-UNIVERSITÄT BOCHUM	_ Centre of Excellence _ DFG Priority Program _ Graduate School _ Research Training Group _ Collaborative Research Center	_ Nanoscience _ Plasmascience _ Anorganic Materials _ Organic Field Effect Transistors _ Materials and their Surfaces _ Optically Active Materials _ Plasma-Physics _ Shape Memory Technology _ Heterogeneous Catalysis _ Hetero-layer structures/ Magnetic Field Sensors _ PlasmaPhysics
UNIVERSITÄT DORTMUND	_ DFG-Research Unit _ DFG-Transregio _ Graduate School _ Research Training Group _ Collaborative Research Center _ Central scientific institution (Research school)	_ Process Optimization/Free-Formed Surfaces, Electro-Magnetic Sheet-Metal Forming _ Sheet-Metal Forming _ Production Technology _ Elementary Particle Physics _ Material-Properties of Microstructures Systems _ Computational Intelligence _ Robotics _ Microtechnology/Nano-structures _ Modeling/Simulation _ Molecular Polymer Research
UNIVERSITÄT DUISBURG-ESSEN	_ Research Training Group _ Collaborative Research Center _ Central scientific institution	_ Heterogeneous Systems _ Sensors _ Nanotronics _ Energy Dissipation _ Hetero-layer-systems _ Mesoscopical Systems & Gas-Phase Nano-Particles _ Automation Engineering/Robotics

FOCUS →

Microtechnology

Microsystem technology has great future and growth potential. The major challenge for the near future is to translate these technologies into production techniques that can be applied in industry. Several establishments in Dortmund have made it their purpose to actively support this transfer from research to industry. Because, besides the university and non-university establishments concerned with structures and the development of new systems, there are almost 30 companies located in the city, that currently employ some 1.660 highly qualified staff and which value the specialized local infrastructure, such as IVAM, an international association of companies and institutes that promotes the use of microstructure technologies, the MST.factory in Dortmund, the Center for Microstructure Technology and the Center for Assembly and Interconnection Technologies.

FURTHER INFORMATION →

www.microtechnik-dortmund.de
www.mst-factory.com
www.tzdo.de

RESEARCH & DEVELOPMENT AT NON-UNIVERSITY INSTITUTIONS →

INSTITUTION →	FIELD OF RESEARCH →
DEUTSCHES BERGBAUMUSEUM (DBM), BOCHUM GERMAN MINING MUSEUM	_Archaeology of Mining & Metallurgy _Archeometallurgy _Mining Technology _Information Systems _Protection of Historical Monuments/Materials Science
DEUTSCHES TEXTILFORSCHUNGSZENTRUM NORD-WEST E.V. (DTNW), KREFELD GERMAN TEXTILES RESEARCH CENTER	_Electro-Chemistry _Textile Fibers _Process Enginee- ring for Textile Finishing
DORTMUNDER INITIATIVE ZUR RECHNERINTEGRIERTEN FERTIGUNG (RIF) E.V., DORTMUND INITIATIVE FOR COMPUTER INTEGRATED MANUFACTURING	_Autonomous Systems _Microtechnology _Robotics
EMSCHER-LIPPE-INSTITUT FÜR AUTOMATISIERUNGSTECHNIK & QUALITÄTSSICHERUNG GMBH (ELIAS), HERNE INSTITUTE FOR AUTOMATION ENGINEERING & QUALITY ASSURANCE	_Automation
FRAUNHOFER INSTITUTE FOR MICROELECTRONIC CIRCUITS & SYSTEMS (IMS) DUISBURG	_Image Sensors _Embedded Systems _Manufacturing & Process Development _Microtechnology _Sensor- Networks _Transponders
FRAUNHOFER INSTITUTE FOR ENVIRONMENTAL, SAFETY & ENERGY TECHNOLOGY (UMSICHT), OBERHAUSEN	_Process Technology _Membrane Technology _Special Materials
HAUS DER TECHNIK E.V. (HDT), ESSEN HOUSE OF TECHNOLOGY	_Corrosion _Metallurgy _Materials Science
INSTITUT FÜR MOBIL- & SATELLITENFUNKTECHNIK GMBH (IMST), KAMP-LINTFORT INSTITUTE FOR MOBILE & SATELLITE RADIO TECHNOLOGY	_Micro-Electronics
INSTITUTE FOR ANALYTICAL SCIENCES (ISAS), DORTMUND	_Material Analytics _Miniaturisation _Spectroscopy
MAX-PLANCK-INSTITUT FÜR KOHLENFORSCHUNG, MÜLHEIM MAX-PLANCK-INSTITUTE FOR COAL RESEARCH	_Homogenous and Heterogenous Catalysis & Theoretical Chemistry _Organic & Metallorganic Chemistry _ Chemical Change
NANOTECHNOLOGIE-VERBUND NRW E.V., HAGEN NANOTECHNOLOGY ASSOCIATION NRW	_Procedures _Tools & Product Development in Nanotechnology
SALZGITTER MANNESMANN FORSCHUNG GMBH, DUISBURG CENTRAL RESEARCH COMPANY FOR SALZGITTER GROUP	_Engineering Technology _Metallurgy & Materials- Development _Systems Technology
SCHWEISSTECHNISCHE LEHR- & VERSUCHSANSTALT (SLV), DUISBURG WELDING TECHNOLOGY TRAINING, EDUCATION & RESEARCH INSTITUTE	_Metallurgy _Microtechnology _Process Engineering _ Materials Technology

FOCUS →

Plasma Technology

Plasmas, i.e. partially ionized materials, have a variety of technical applications, e.g. in microelectronics, automobile production, light engineering and packaging technology. Plasma technology already yields major innovations in a number of industrial fields. It is considered a cross-sectoral and key technology of the 21st century. Its significance for the development of new process techniques and, consequently, for future economic development is huge. Furthermore, plasma-aided processes are generally highly ecological. Progress in plasma technology is very closely linked with progress in fundamental research into plasma physics.

In North Rhine Westphalia, plasma research is coordinated under the auspices of the APP, a working group for plasma physics based at the Ruhr-Universität Bochum.

The Center for Plasma Science and Technology (CPST), a center of excellence and one of the largest university research units in the field of plasma technology, is also located in Bochum.

FURTHER INFORMATION →

www.rub.de/app
www.rub.de/cpst

ENERGY

A growing demand around the world for energy, the eventual depletion of our natural resources, growing ecological awareness and the partial liberalization of the energy and electricity markets are leading to massive restructuring processes around the globe. The power industry faces the challenge of meeting the increasing needs for energy ecologically, safely and economically.

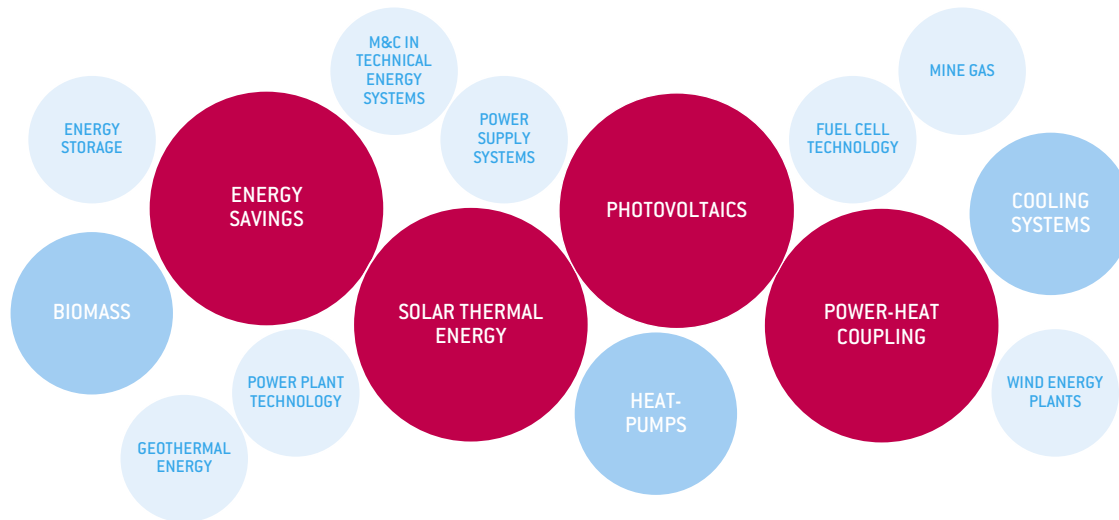
In research, the solution lies not only in the search for alternative energy sources, but also in increasing efficiency in the construction of plant and power stations, as well as in the generation, conversion, storage and transport of energy, and rational energy use.

IMPORTANT TOPICS FOR ENERGY COMPANIES IN THE RUHR METROPOLIS →

SOURCE P.52

NUMBER OF COMPANIES ACTIVE IN THIS SEGMENT

- > 50
- > 30
- > 10



FOCUS →

Applied Energy System Technology

Applied Energy System Technology is a cooperation project by the Universities of Applied Sciences in Bochum and Gelsenkirchen. The aim of the project is to develop system technology to supply electricity, heat and cold in ways which are both ecologically sound and which make more efficient use of raw materials. Experts hope to develop decentralized systems suitable for immediate application that allow the users an ecological energy supply with a more efficient use of raw materials. One of the first joint projects is concerned with the use of geothermal energy in the Ruhr Metropolis. The university duet is soon to become a trio, when it will be joined by Fachhochschule Dortmund, University of Applied Sciences in its pursuit of research into energy technology.

CONTACT →

Prof. Dr. Rolf Bracke
 rolf.bracke@fh-bochum.de
 Prof. Dr. Michael Brodmann
 michael.brodmann@fh-gelsenkirchen.de

*Measurement & Control Engineering

The Ruhr Metropolis is undoubtedly Germany's energy capital. With its abundance of fossil fuels and an extensive communications infrastructure, it was inevitable that energy-intensive industries would settle in the region. Skills in the domain of renewable energy, new energy sources and rational energy usage have become additional contributing factors. Expertise in this field of research can be categorized into five areas.

→ As coal-fired energy production continues to increase worldwide, so does the need for efficient and low-emission power station technologies in order to reduce pollution and CO₂ emissions. New, high-temperature-resistant materials will significantly improve efficiency in energy production.

→ Rising prices and the eventual depletion of fossil fuels make renewable energy sources, such as sun, wind and water, increasingly attractive alternatives. Solar energy plays a central role in research conducted in the region. By means of photovoltaics it can be converted into electricity, through solar thermal energy into useable heat.

→ Further renewable energy sources are to be found below our very feet. Research in the opportunities offered by mine gas extraction and geothermal energy is of major importance.

→ Yet another source of energy with future potential is hydrogen. Using fuel cells to obtain electricity and water from this abundant storage medium is a technology already being put into practice at the Centre for Fuel Cell Technology (ZBT) in Duisburg, where researchers are currently exploring ways to optimize extraction and storage for eventual wide-spread use.

→ Energy management opens new opportunities for saving energy, increasing efficiency and decentralizing energy systems. With a growing proportion of our energy coming from inconstant sources, such as wind energy, supply and usage management will become increasingly significant.

OPINION →

Prof. Dr. Rolf Bracke (43)
GeothermieZentrumBochum (GZB)
The Ruhr Institute for applied energy system technology at the Fachhochschule Bochum and Fachhochschule Gelsenkirchen, Universities of Applied Sciences

KEY ACTIVITIES →

Integration of geothermal energy systems in urban infrastructures.

THE RUHR METROPOLIS →

From coal mining to geothermal energy ... with high technology from North Rhine Westphalia!
The Ruhr Metropolis is one of the most energy-rich regions in Europe and is a world market leader in the field of mining technology, making it the most suitable location for the scientific and technological advance of geothermal energy extraction as a major sustainable energy source of the future. Expertise in mining, drilling, energy technology, plant construction, material and geosciences are combined at the GZB. The inter-university research network institute is taking part in the German Research Foundation's initiative to establish a German centre for geoscientific drilling.

FOCUS →

Energy Research Ruhr GmbH

In 2003, the Universities of Bochum, Dortmund and Duisburg-Essen joined forces with Projekt Ruhr GmbH, the network "Initiativkreis Ruhrgebiet" and the Griepentrog Foundation for Innovation to set up the country's first energy research association, Energyforschungsverbund Ruhr GmbH (ef.Ruhr, Gelsenkirchen), in which 40 professors work together to consolidate their experience in this field.

The involvement of Initiativkreis Ruhrgebiet ensures close cooperation between institutes of higher education and industry, leading to joint projects in public-private partnership. ef.Ruhr, for example, has close ties with E.ON Ruhrgas AG, Gelsenwasser AG, RWE Energy, RWE Powers AG, STEAG AG and MAN Turbo AG.

Just one way in which ef.Ruhr supports the faculties and companies involved is by providing funds and project management. It is also hoped that this interdisciplinary collaboration will lead to more efficient use of existing research facilities, as well as helping to identify priority areas in research.

CONTACT →

Jürgen Beigel
info@ef-ruhr.de

RESEARCH FOCUSES AT THE UNIVERSITIES →		
UNIVERSITY →	DEPT./FACULTY →	FIELD OF RESEARCH →
FACHHOCHSCHULE BOCHUM UNIVERSITY OF APPLIED SCIENCES	_Dept. of Civil Engineering	_Future Energys, in particular Geothermal Energy
FACHHOCHSCHULE DORTMUND UNIVERSITY OF APPLIED SCIENCES	_Dept. of Information & Electrotechnology _Dept. of Mechanical Engineering	_Energy and Environmental Technology (Drives, Automation, Energy Supply Building Systems Technology) _Photovoltaics _Energy-Related Systems Optimization _Wind Energy _Energy Distribution
TECHNISCHE FACHHOCHSCHULE GEORG AGRICOLA ZU BOCHUM UNIVERSITY OF APPLIED SCIENCES	_Dept. of Electro- & Information Technology _Dept. of Geo-Engineering & Mining _Dept. of Mechanical & Process Engineering	_High Voltage Technology & Power Electronics _Geoscientific Environmental Aspects of Energy Production _Biogene Energy _Fuel Cells _Energy Management _Geothermal Power _Wind, Water, Solar Energy
RUHR-UNIVERSITÄT BOCHUM	_Faculty of Civil Engineering _Faculty of Chemistry _Faculty of Electro- & Information Technology _Faculty of Geosciences _Faculty of Mechanical Engineering	_Wind Energy Storage _Hydrogen _Fuel Cells _Decentral Energy Supply Systems _Energy Systems Technology _Regenerative Energy Sources _Wind Energy _Energy Storage (Heat) _Geothermal Technology _Fuel Cells _Energy Management _Powerstation Processes _Combined Heat & Cooling Coupling _Hydrogen _Wind Energy
UNIVERSITÄT DORTMUND	_Faculty of Civil Engineering _Dept. of Bio- & Chemical Engineering _Faculty of Electrotechnology & Information Technology _Faculty of Mechanical Engineering	_Energy Management in Buildings _Solar Energy _Fuel Refinement _Energy Process Technology _CO ₂ -Fuel Cells _CO ₂ -Seperation & Dumping _Energy Management _Energy Distribution _Mine Gas Utilization _Virtual Power Plant _Wind, Water, Solar Energy _Biomass _Combined Heat & Power Plant _Fuel Cells _Power Plant Processes _Hydrogen
UNIVERSITÄT DUISBURG-ESSEN	_Dept. of Building Science _Faculty of Engineering Sciences _Dept. of Art & Design _Dept. of Economic Science _Mercator School of Management, _Dept. of Business Studies	_Biomass _Biogas _Biomass _Fuel Cells _Innovative Coal Exploitation _Power Plant Technology & Processes _Solar, Wind Energy _Hydrogen _Industrial Design _Energy Markets _Contracting & Energy Services _Efficient & Cost Effective Energy Supply

CENTRAL INSTITUTIONS AT THE UNIVERSITIES →

UNIVERSITY →	TYPE OF INSTITUTION →	FIELD OF RESEARCH →
FACHHOCHSCHULE BOCHUM UNIVERSITY OF APPLIED SCIENCES	_ Central scientific institution	_ Geothermal/Future Energy
RUHR-UNIVERSITÄT BOCHUM	_ Central scientific institution	_ Energy Law

RESEARCH AND DEVELOPMENT AT NON-UNIVERSITY INSTITUTIONS →

INSTITUTION →	FIELD OF RESEARCH →
DEUTSCHE MONTAN TECHNOLOGIE GMBH (DMT), ESSEN GERMAN COAL & STEEL TECHNOLOGY	_ Geothermal Heat Production _ Mine Gas Utilization _ Offshore Wind Power Plants
EF. RUHR GMBH, GELSENKIRCHEN	_ Network for Energy Research in the Ruhr Region
FRAUNHOFER INSTITUTE FOR ENVIRONMENT, SAFETY & ENERGY TECHNOLOGY (UMSICHT), OBERHAUSEN	_ Energy Systems _ Energy Technology _ Energy Economics & Management
GASWÄRME-INSTITUT (GWI), ESSEN GAS-HEAT INSTITUTE	_ Biogas _ Biomass _ Combined Heat & Power Stations _ Heat-Power Coupling _ Thermal Natural Gas Utilization
HAUS DER TECHNIK E.V. (HDT), ESSEN HOUSE OF TECHNOLOGY	_ Energy Efficiency _ Energy Technology _ Energy Economics
INSTITUT FÜR ENERGIE- & UMWELTECHNOLOGIE E.V. (IUTA), DUISBURG INSTITUTE OF ENERGY & ENVIRONMENTAL TECHNOLOGY	_ Energy Technology _ Energy Economics _ Industrial Energy Concepts
INSTITUT FÜR ENERGIESYSTEME & RATIONELLE ENERGIEVERWENDUNG (ENERGIEINSTITUT), GELSENKIRCHEN INSTITUTE FOR ENERGY SYSTEMS & RATIONAL ENERGY USE	_ Fossil & Regenerative Energy _ Energy Technology _ Energy Systems
LABOR & SERVICE CENTER AT THE FRAUNHOFER-INSTITUTE OF SOLAR ENERGY SYSTEMS (FH ISE), GELSENKIRCHEN	_ Solar Cells
RHEINISCH-WESTFÄLISCHES INSTITUT FÜR WIRTSCHAFTSFORSCHUNG (RWI), ESSEN RHENISH-WESTPHALIAN INSTITUTE FOR ECONOMIC RESEARCH	_ Environmental-, Resources- & Energy Management
ZENTRUM FÜR BRENNSTOFFZELLENTÉCHNIK (ZBT), DUISBURG INSTITUTE FOR FUEL CELLS TECHNOLOGY	_ Fuel Cells- & Systems Technology _ Gas Process Technology _ Hydrogen

LOGISTICS & TRANSPORT

Globalization has led to the spread of worldwide networked value-added processes and a rapid increase in international trade-offs. What continues to present a challenge is the ability to control the flow of commodities and goods as reliably and economically as possible.

With over 3,000 companies employing some 58,000 workers, the logistics industry is a major economic factor in the Ruhr Metropolis. The central logistics centers are Duisburg and Dortmund with their ports, logistics parks and logistics experts, shippers and freight companies.

Fundamental and application-oriented research is carried out at more than ten engineering and business administration faculties in the universities, as well as at the Fraunhofer Institute for Material Flow and Logistics. Science and industry are closely linked.

Three fields of research form the cornerstones of the research skills:

→ Process-oriented logistics research concentrates on the optimization of in-house and inter-company flows of goods. Supply chain management, the development of industry-specific logistics concepts, and the planning, control, organization and monitoring of logistics systems are the primary aspects.

→ e-Logistics deals with the linking of logistical processes to electronic trade. Electronic business, electronic procurement and standardization are just some of the core themes.

→ The field of transport systems and transport telematics looks at the interplay between different modes of transport (air, water, road, rail) and the use of telematic applications. The emphasis is on the design of intermodal transport chains and the development of integrated information systems in transport logistics. Another subject of research is the exploration of alternative transport infrastructures to relieve roads in conurbations.

OPINION →

Dr.-Ing. Thorsten Schmidt (39)
Fraunhofer Institute for Material Flow and Logistics, Dortmund

KEY ACTIVITIES →

Dr. Schmidt explores and develops solutions for intralogistics. His study group is a leading think tank for the development and implementation of innovative system solutions to optimize logistics systems. Successful developments include warehouse and transport systems, picking robots, and sorting and distribution facilities. Through courses held in Germany and abroad he passes on his knowledge of planning and technology to up-and-coming scientists.

THE RUHR METROPOLIS →

The Ruhr Metropolis is not only a science region, but also a logistics hub. From its humble beginnings as home of the Fraunhofer IML, Dortmund has evolved into a leading centre for logistics. Here, creative brains enjoy an ideal environment to develop technical logistics in interdisciplinary teams, paving the way for efficient logistics processes.

OPINION →

Arnt-Phillip Hein (26)
Universität Dortmund

KEY ACTIVITIES →

Modelling and simulation of international transport chains and optimization of container consolidation strategies.

HONORS →

2002 Dr.-Jürgen-Ulderup-scholarship for studies at Stanford University (USA) 2004 Postgraduate scholarship at the North Rhine Westphalia Graduate School of Production Engineering and Logistics 2005 Admission into the German National Academic Foundation's PhD grant scheme

THE RUHR METROPOLIS →

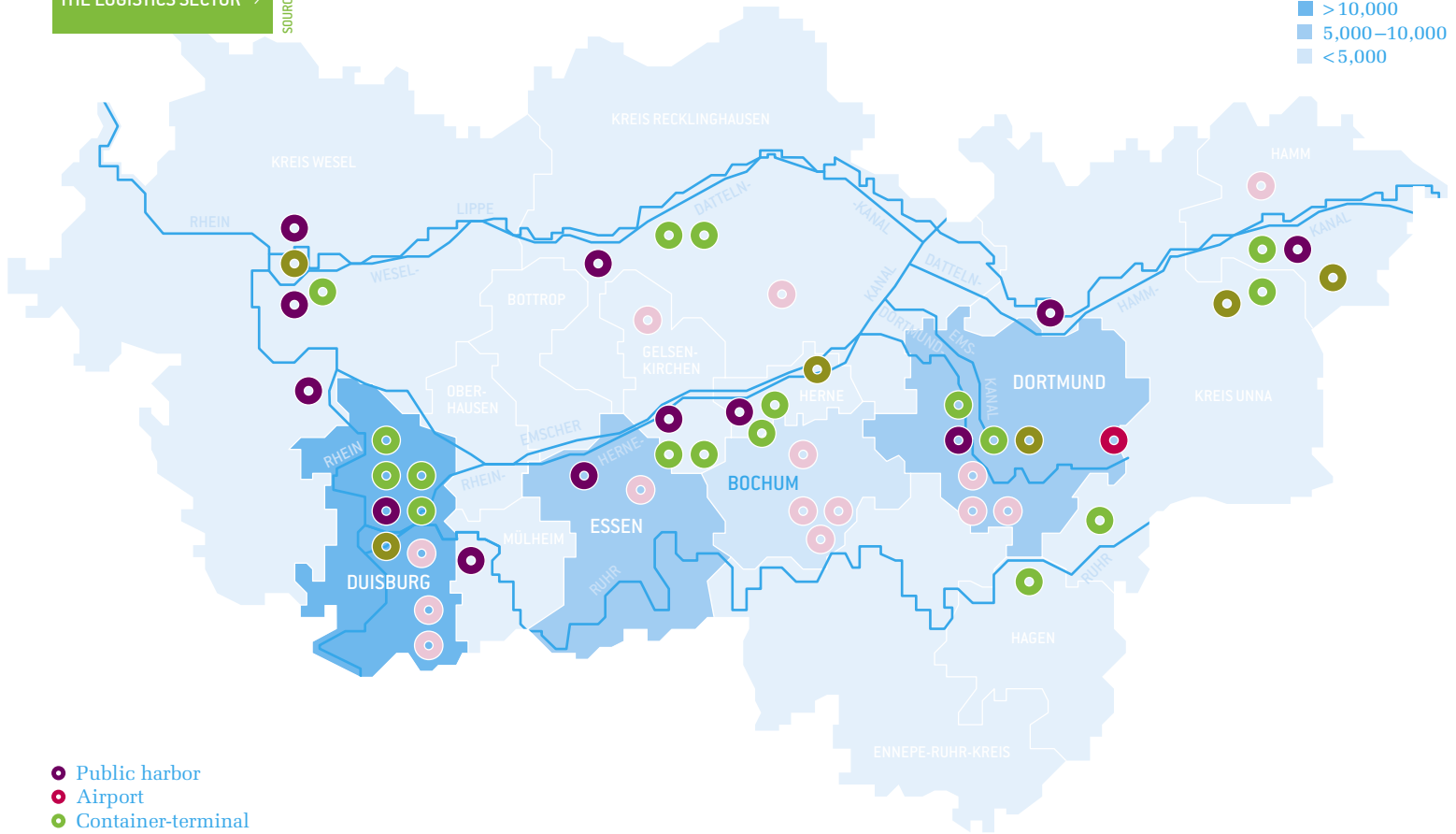
The Graduate School of Production Engineering and Logistics at the Universität Dortmund in conjunction with the Fraunhofer IML has already established itself as a centre of excellence in the field of logistics. The combination of the degree course in Logistics at the university with applied research at the Fraunhofer Institute and the companies located in Dortmund ensures a close exchange between theory and practice. This collaboration secures Dortmund long-term perspectives as a centre of research and clear advantages in international competition.

LOGISTICS INFRASTRUCTURE AND EMPLOYEES IN THE LOGISTICS SECTOR →

SOURCE P. 52

EMPLOYEES IN LOGISTICS

- > 10,000
- 5,000–10,000
- < 5,000



- Public harbor
- Airport
- Container-terminal
- Logistics-park, logistics-center
- Scientific institutions

— Canals (mostly navigable)

RESEARCH FOCUSES AT THE UNIVERSITIES →		
UNIVERSITY →	DEPARTMENT /FACULTY →	FIELD OF RESEARCH →
FACHHOCHSCHULE BOCHUM UNIVERSITY OF APPLIED SCIENCES	_Dept. of Civil Engineering _Dept. of Mechatronics & Mechanical Engineering	_Mobility & Transport Management _ Telematics _Traffic Control Systems _Factory Planning _Integrated Informa- tion Systems _RFID* Systems
FOM – FACHHOCHSCHULE OF OEKONOMIE & MANAGEMENT UNIVERSITY OF APPLIED SCIENCES FOR ECONOMICS & MANAGEMENT	_Dept. of Economic Science	_Supply Chain Management _Distribu- tion & Trade Logistics
TECHNISCHE FACHHOCHSCHULE GEORG AGRICOLA ZU BOCHUM UNIVERSITY OF APPLIED SCIENCES	_Dept. of Mechanical & Process Engineering	_Factory & Production Planning _ Logistics Systems
RUHR-UNIVERSITÄT BOCHUM	_Faculty of Civil Engineering _Faculty of Economic Sciences	_Traffic Simulation _Traffic Safety _Materials Flow _Production Manage- ment _Supply Chain Management
UNIVERSITÄT DORTMUND	_Faculty of Mechanical Engineering _Faculty of Urban and Regional Planning _Economic & Social Sciences Faculty	_Distributions & Trade Logistics _ Modeling of Distribution & Traffic Net- works _RFID* Systems _Service Net- works _Traffic Logistics _Traffic Control Systems _Traffic Planning & Traffic Simulation _ Traffic Networks _Production & Logistics Systems _ Supply Chain Management
UNIVERSITÄT DUISBURG-ESSEN	_Dept. of Building Science _Dept. of Biology & Geography _Faculty of Engineering Sciences _Dept. of Physics _Mercator School of Management, Dept. of Business Studies	_Traffic Flow _Traffic Systems _Track & Rail Traffic & Networks _Distribution Logistics _Maritime Trans- port Systems _Physics of Transport & Traffic _Procurement Management _Logistics Management _Supply Chain Management _Traffic & Transport- Management _Energy Markets

FOCUS →

Graduate School of Production Engineering & Logistics

The increasing dynamic behavior and networking of production throughout complete product life cycles has led to an enormous demand for research in the fields of design, development and implementation of dynamic process chains within production and logistics. The Graduate School of Production Engineering and Logistics founded by the Universität Dortmund has picked up on this theme. It pools and networks the core skills of the Universität Dortmund in the subject areas of production processes and process networks/process chains and forms the interdisciplinary link between different departments as well as between science and practice. The international alignment of the Graduate School provides new-generation scientists with the opportunity for interdisciplinary teamwork which in turn results in international knowledge transfer.

CONTACT →

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syrou@mb-uni-dortmund.de

*RFID = Radio Frequency Identification

CENTRAL INSTITUTIONS AT THE UNIVERSITIES →

UNIVERSITY →	TYPE OF INSTITUTION →	RESEARCH SUBJECTS →
UNIVERSITÄT DORTMUND	_ Graduate School _ Collaborative Research Center	_ Production Processes/Networks/ Process Chains _ Modeling of Large Networks in Logistics
UNIVERSITÄT DUISBURG-ESSEN	_ Central scientific institution	_ Transport/Logistics

RESEARCH & DEVELOPMENT AT NON-UNIVERSITY INSTITUTIONS →

INSTITUTION →	FIELD OF RESEARCH →
DORTMUNDER INITIATIVE ZUR RECHNERINTEGRIERTEN FERTIGUNG E.V., DORTMUND INITIATIVE FOR COMPUTER INTEGRATED MANUFACTURING	_ Development of Simulators _ Cross-Company Controlling & Logistics _ Visual Interactive Simulation
DST ENTWICKLUNGSZENTRUM FÜR SCHIFFSTECHNIK & TRANSPORTSYSTEME E.V., DUISBURG DST DEVELOPMENT CENTER FOR SHIPPING TECHNOLOGY & TRANSPORT SYSTEMS	_ Infrastructure Planning _ Transport Systems (particu- larly Transportation Integration for Inland and Coastal Shipping) _ Transport Security
eLOG CENTER, DORTMUND C/O FTK FORSCHUNGSINSTITUT FÜR TELEKOMMUNIKATION E.V. eLOG CENTER C/O RESEARCH INSTITUTE FOR TELECOMMUNICATIONS	_ eLogistics _ Telematics in Goods Transportation
FRAUNHOFER-INSTITUTE OF MATERIALS FLOW & LOGISTICS (IML), DORTMUND	_ Agent Systems _ Materials Flows Systems _ RFID Technology _ Company Logistics _ Transport Manage- ment & Simulation
RUHRFORSCHUNGSINSTITUT FÜR INNOVATIONS- & STRUKTURPOLITIK (RUFIS) E.V., BOCHUM RESEARCH INSTITUTE FOR INNOVATION & STRUCTURAL POLICY	_ Alternative Infrastructures _ Bottle Neck Analysis of Goods Traffic Transport Systems

FOCUS →

KARLos Rhein-Ruhr

Funded by the Federal Ministry of Education and Research, and under the auspices of the Center of Logistics and Transport (ZLV) at the Universität Duisburg-Essen, the project initiative – KARLos Rhein-Ruhr – was started in September 2005. Professional skills which can be counted towards logistics study courses in the Rhine-Ruhr Region are the main topic for this project consortium, which is made up of experienced representatives from science and industry.

How can knowledge attained during professional or practical education be recognised towards university courses? This is the central question being examined here.

The aim, on the one hand, is the empirical development of an evaluation instrument for categorizing qualifications attained as part of study courses and qualifications. On the other hand a procedure for permitting and counting these credits towards university degrees has to be worked out. The results are to be implemented in the form of a pilot phase at the beginning of 2007.

CONTACT →

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nadine-baumgarten@uni-duisburg.de

IT SCIENCES

Computer science has transformed the way we live and work for ever. It has accelerated economic, scientific and social change, changing organizational structures and the division of labour. The research sector is concerned with the development of application software and database systems, as well as working out solutions that will support the efficient design of in-house and inter-company processes.

Interdisciplinary research in IT sciences is closely connected with industry. With 20,000 people employed in the IT sector, representing almost three per cent of the total workforce, the Ruhr Metropolis is one percentage point above the average for North Rhine Westphalia.

Along with general themes such as security, the development of industry-specific solutions continues to gain significance. It is no surprise that the local IT industry works closely with researchers in this domain.

→ Process control revolves around modelling, simulation and the optimization of complex processes in a number of application areas, particularly in the fields of computer simulation, process engineering and production processes.

→ IT security deals with the safe transfer of data and information brokering. Main topics are cryptography, network and data security, and security in e-commerce.

→ Research in the field of e-learning concentrates on technical aspects, as well as didactic and methodological issues concerning the use of digital media in a variety of training contexts (schools, universities, colleges).

→ Medical informatics concerns the procurement of information in the health care system. Medical documentation, the uninterrupted support of clinical processes, quality management and health telematics networking are of particular relevance.

→ Increasingly complex processes in logistics require the integration of logistics systems. Computer-aided planning, control and organization, plus the use of transponder technology for wireless information transfer, offer new solutions.

OPINION →

Prof. Dr. Dr. med. habil.
Hans-Gerd Lipinski (57)
*Faculty of Computer Science,
Department of Medical Informatics
Fachhochschule Dortmund,
University of Applied Sciences*

KEY ACTIVITIES →

Spatial-temporal image analysis, haptic modelling and visualization of deformable micro- or macromorphological structures. The research team's goal is to construct virtual haptic systems for use as OP simulators or cell manipulators in biomedicine.

THE RUHR METROPOLIS →

The Ruhr Metropolis has a number of biomedical research institutes, providing excellent opportunities for interdisciplinary collaboration in joint research and cooperative PhD projects for medical informatics, offering the graduates of the masters course in Medical Informatics at Fachhochschule Dortmund, University of Applied Sciences an additional scientific qualification.

FOCUS →

Medical Informatics

An optimum provision of health care, without the need for repeated examinations or the prescription of incompatible medication is what every patient would like to see.

With computer-aided systems, this should soon become reality.

Prof. Dr. Peter Haas, Professor for Medical Informatics at Fachhochschule Dortmund, University of Applied Sciences, is working on quality improvement and cost transparency using computer systems.

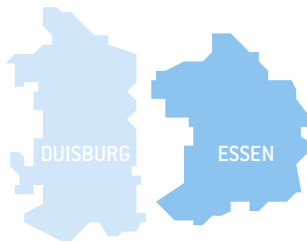
One of his projects looks at the introduction of electronic health cards. Behind the card is a huge information system that enables access to emergency data or medication notes. The patient's file could also be accessed, a further project that Haas is working on. Clinical documents of all types are administrated, allowing differentiated documentation of diagnoses, treatments and symptoms. The electronic patient file is already in use under the Mamma@kte.nrw programme, a project funded by the health department of the State of North Rhine Westphalia to improve the health care of breast cancer patients.

CONTACT →

Prof. Dr. Peter Haas
haas@fh-dortmund.de

EMPLOYEES IN THE IT SECTOR AND COURSES RELEVANT TO IT →

SOURCE P.52

**DUISBURG-ESSEN**

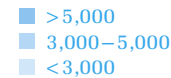
Courses of Study (with IT focus)

- Applied Informatics
- Applied Informatics/ Systems Engineering
- Applied Communications & Media Science (Informatics and New Media)
- Computer Linguistics
- Computer Engineering
- Computer Science & Communications Engineering
- Control & Information Systems
- Electrical & Electronic Engineering
- Electrotechnology & Information Technology
- Informatics (Minor Subject and Teaching Degree)
- Mathematics/Technomathematics/ Business Mathematics (Informatics)
- Mechanical Engineering (Computer Engineering, Computer Science)
- Business Informatics

**BOCHUM**

Courses of Study (with IT focus)

- Applied Informatics
- Civil Engineering (Construction Informatics)
- Computational Engineering
- Electrotechnology (Informatics, IT-Automation, Communication)
- Electro- & Information Technology (Computer & Software Technology, Information Technology)
- Geoinformatics
- IT-Automotive
- Linguistics (Computer Linguistics)
- Mechanical Engineering (Engineering-Informatics, Mechanical Engineering Informatics)
- Mathematics (Minor Subject Informatics)
- Mechatronics (Systems Technology)
- Media Science (Digital Media)
- Security in Information Technology
- Business (Company Information Management, E-Business)
- Economic Science (Business Informatics)

IT SECTOR EMPLOYEES**DORTMUND**

Courses of Study (with IT focus)

- Applied Informatics (Engineering Informatics)
- Automation & Robotics (Processautomation)
- Data Analysis & Management
- Data Sciences Informatics (Minor subject and teaching)
- Informatics
- Information Technology
- Media & Information Technology in Education, and Teaching Informatics
- Medical Informatics
- Business Informatics
- Mathematics/Business Mathematics
- Network Informatics
- Business Informatics
- Statistics
- Web- & Media Informatics
- IT-Professional & IT-Bachelor

FOCUS →

eurobits – European Competence Centre for IT Security

The European Competence Centre for IT Security (eurobits) was founded in 1999 as an important center for IT security in Europe. Links to the Ruhr-Universität Bochum mean new scientific knowledge flows directly into real practical applications. The aim of eurobits, in addition to international top level research on the university side, is to implement and commercialize know-how by means of spin-off companies and to pool the region's wide variety of scientific and business skills.

eurobits's partners include the Horst Görtz Institute with the chairs of Electro & Information Technology and Mathematics, the Institute of Security in eBusiness with seven chairs in Economic Science and three companies.

CONTACT →

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FOCUSES OF RESEARCH AT THE UNIVERSITIES →		
UNIVERSITY →	DEPT./FACULTY →	FIELD OF RESEARCH →
FACHHOCHSCHULE BOCHUM UNIVERSITY OF APPLIED SCIENCES	<ul style="list-style-type: none"> _ Dept. of Civil Engineering _ Dept. of Electrotechnology & Informatics _ Dept. of Mechatronics & Mechanical Engineering 	<ul style="list-style-type: none"> _ Virtual Realities in Civil Engineering _ IT Automotive _ Applied Informatics _ Wireless Technology _ Computer Networks
FACHHOCHSCHULE DORTMUND UNIVERSITY OF APPLIED SCIENCES	<ul style="list-style-type: none"> _ Dept. of Informatics _ Dept. of Information & Electrotechnology 	<ul style="list-style-type: none"> _ IT in the Health System (E-Health, Electronic Patient File) _ Medical Image & Signal Processing _ Mobile Computing _ Web-Engineering _ E-Business _ Operational Information Management _ Communication Technology _ Signal Processing _ Quality Assurance Systems
FOM – FACHHOCHSCHULE FÜR OEKONOMIE & MANAGEMENT UNIVERSITY OF APPLIED SCIENCES FOR ECONOMICS & MANAGEMENT	<ul style="list-style-type: none"> _ Dept. of Business Informatics 	<ul style="list-style-type: none"> _ IT Engineering _ Enterprise Resource Planning _ IT-Feasibility Studies _ E-Business Applications
TECHNISCHE FACHHOCHSCHULE GEORG AGRICOLA ZU BOCHUM UNIVERSITY OF APPLIED SCIENCES	<ul style="list-style-type: none"> _ Dept. of Electro & Information Technology _ Dept. of Mechanical & Process Technology 	<ul style="list-style-type: none"> _ Embedded Systems _ Electronic Teaching Aids _ Information Technology Systems _ Modeling & Simulation of Heterogeneous Systems
RUHR-UNIVERSITÄT BOCHUM	<ul style="list-style-type: none"> _ Faculty of Civil Engineering _ Faculty of Electro & Information Technology _ Faculty of Mathematics _ Faculty of Business Management 	<ul style="list-style-type: none"> _ Modeling & Simulation in Civil Engineering _ Software-Agents _ Networked Cooperative Planning Processes _ IT-Security _ Computer Networks _ Communications Security _ Network & Data Security _ IT-Security _ Electronic Business Transactions _ IT-Security
UNIVERSITÄT DORTMUND	<ul style="list-style-type: none"> _ Dept. of Bio- & Chemical Engineering _ Faculty for Electrotechnology & Information Technology _ Dept. of Informatics _ Faculty of Mechanical Engineering _ Business & Social Sciences Faculty _ Dept. of Statistics 	<ul style="list-style-type: none"> _ Systems Control Technology _ Embedded Systems _ Modeling & Simulation _ Computer & Network Structures _ Signal Processing _ Analysis & Modeling of Complex Systems _ Computational Intelligence _ Embedded Systems _ IT Security _ Artificial Intelligence _ Bio-Informatics _ Information Systems in Logistics _ Intermodal Communication _ Mobile Systems _ Communications Chain Modeling _ Data Modeling _ Operations Research _ Data Mining _ Surveys _ Design of Experiments _ Modelling Uncertainty _ Complexity Reduction _ Quality Control
UNIVERSITÄT DUISBURG-ESSEN	<ul style="list-style-type: none"> _ Mercator School of Management, _ Dept. of Business Studies _ Dept. of Social Sciences _ Faculty of Engineering Sciences 	<ul style="list-style-type: none"> _ Agent Systems _ Business Intelligence _ Cooperative Learning Systems _ Computer Scenarios as Training Tools _ Image Processing & Scientific Calculations _ Information Logistics _ Intelligent Systems _ Software Engineering

Table continued from page 30

UNIVERSITÄT DUISBURG-ESSEN	_Dept. of Art & Design _Dept. of Economic Science	_Communications Design _Information & Communication Systems _Applied Informatics _Systems Engineering _Business Informatics
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CENTRAL INSTITUTIONS AT THE UNIVERSITIES →

UNIVERSITY →	TYPE OF INSTITUTION →	FIELD OF RESEARCH →
FACHHOCHSCHULE DORTMUND UNIVERSITY OF APPLIED SCIENCES	_Central scientific institution	_Communications Technology
FOLKWANG HOCHSCHULE UNIVERSITY OF THE ARTS	_Central scientific institution	_Software Development
RUHR-UNIVERSITÄT BOCHUM	_Central scientific institution	_IT Security
UNIVERSITÄT DORTMUND	_DFG-Research Unit _Research Training Group _Collaborative Research Center _Central scientific institution (Research school)	_Simulation-Supported Offline-Process Planning & Optimization _IT Security, particularly Encryption Technologies _Complexity Reduction in Multivariate Data-Structures _Modeling of Large Logistics Networks _Computational Intelligence _Modeling/Simulation
UNIVERSITÄT DUISBURG-ESSEN	_Research Training Group	_IT Security

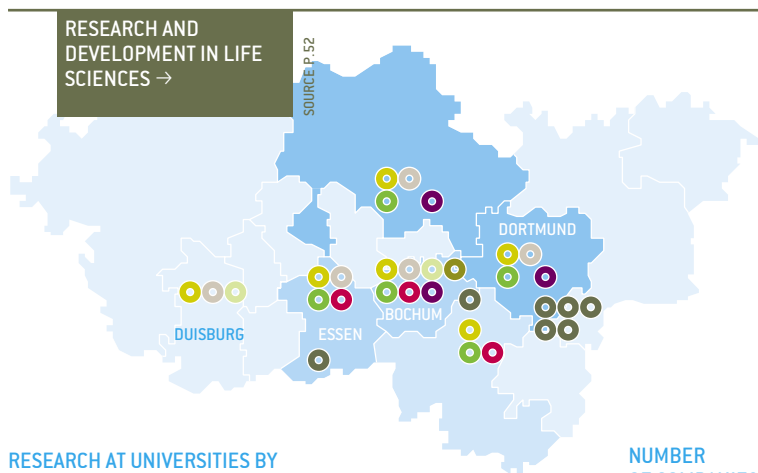
RESEARCH AND DEVELOPMENT AT NON-UNIVERSITY INSTITUTIONS →

INSTITUTION →	FIELD OF RESEARCH →
FRAUNHOFER-INSTITUTE OF MATERIALS FLOW & LOGISTICS (IML), DORTMUND	_eLogistics _Information Logistics
FRAUNHOFER-INSTITUTE OF MICROELECTRONIC CIRCUITS & SYSTEMS (IMS), DUISBURG	_Assistant Systems _Embedded Systems Hard-/Software _Mobile Systems
FRAUNHOFER-INSTITUTE OF SOFTWARE & SYSTEMS TECHNOLOGY (ISST), DORTMUND	_Continuous Software Engineering _eLearning _Information Logistics
INFORMATICS CENTRUM DORTMUND E.V. (ICD)	_Embedded Systems _Multimedia Systems _Software Technology
INSTITUT FÜR BETRIEBLICHE INFORMATIONS- & EXPERTENSYSTEME AN DER FACHHOCHSCHULE DORTMUND E.V. (IBIES) INSTITUTE FOR COMPANY INFORMATION & EXPERT SYSTEMS AT THE UNIVERSITY OF APPLIED SCIENCES	_Company Information Systems _Company Planning & Control Software _Information Management Systems
INSTITUT FÜR MOBILE SATELITENTECHNIK (IMST), KAMP-LINTFORT INSTITUTE FOR MOBILE SATELLITE TECHNOLOGY	_Mobile Communications Systems
MMB – INSTITUT FÜR MEDIEN- & KOMPETENZFORSCHUNG, ESSEN INSTITUTE FOR MEDIA & SKILLS RESEARCH	_Media Supported Learning

LIFE SCIENCES

Life sciences open new opportunities to understand and treat diseases. New methods such as genetic engineering, bio informatics, micro system technology and imaging techniques have led to advances in scientific knowledge which should continue to be developed and put to use through innovative applications.

Science and research play the central role in the still relatively new life sciences market. Few economic fields are so closely linked with scientific research and the resulting innovations. The three universities of Bochum, Dortmund and Duisburg-Essen with two medical and several natural science and engineering faculties, not to mention the Max Planck Institute of Molecular Physiology, are key points in the network. Almost 100 companies in the Ruhr Metropolis are now closely linked with the research institutes, conducting research and development in the field of life sciences or supplying specialized products and services.



FOCUS →

Absorbable Magnesium Stents: Innovation in Heart Research

Heart attacks remain one of the most common causes of death in the industrialized nations. They are caused by an acute closure of one of the coronary vessels that supply the myocardial muscle with blood – and oxygen.

Stents are used to hold open blocked, previously widened coronary vessels. Due to problems with metal stents that become re-blocked or medical stent coatings that cause allergic reactions, however, the search for alternatives has begun. Prof. Dr. Raimund Erbel, Director of the Cardiology Clinic at the University Hospital of Essen, is a cardiology specialist and a pioneer in this field: the use of self-dissolving magnesium stents has received worldwide recognition. Initial studies show that the tiny high-tech products produce no side-effects, even in problem patients.

CONTACT →

Prof. Dr. Raimund Erbel
erbel@uni-essen.de

FOCUS →

International Max Planck Research School in Chemical Biology

The International Max Planck Research School in Chemical Biology is a collaboration between the Max Planck Institute of Molecular Physiology, the Universität Dortmund and the Ruhr-Universität Bochum.

Its purpose is to train experts for the interdisciplinary resolving of biological problems using chemical tools. Knowledge and methodological skills gained in the lectures are applied by the PhD students in research-oriented internships on illustrative biological and chemical problems.

The contents of the course reflect the focus of research in the Ruhr Metropolis: namely the modelling and simulation of molecular interaction, spectroscopic methods of analyzing the structure and function of biological molecules, or methods of examining the interaction of chemical substances with their biological target molecules.

CONTACT →

Prof. Dr. Martin Engelhard
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The hospitals, university clinics and medical faculties at the universities conduct research in a broad spectrum of themes with international renown. This research profile can be categorized into four domains:

→ Biochemical technologies analyze the structure and function of molecules, proteins and cells in order to improve understanding of and influence interactions within the organism. Main areas of research are, in particular, molecular biology, protein research and system biology.

→ High-tech medical research in the field of genetic medicine builds on these insights by developing cutting edge treatment and examination methods. Medics in the Ruhr Metropolis are devoting particular attention to oncology, transplantation, research into cardiology and tumors.

→ Neurosciences look at the structure and function of the biological nerve system and brain. Between fundamental research and the exploration of clinical disease patterns, a multitude of specialist areas, such as developmental genetics, neuropsychology or neuroinformatics, has emerged.

→ To put new diagnosis and treatment methods into practice, cutting-edge instruments, apparatus and systems are essential. Medical technology develops and improves this often highly complex equipment.

OPINION →

Jun. Prof. Dr. Carola Meier (35)
Ruhr-Universität Bochum

KEY ACTIVITIES →

Experimental neurobiology in the project “Stem cells obtained from umbilical cord blood when nerve tissue is damaged at birth”. In the future, it should be possible to help more children who have suffered damage during birth.

HONORS →

2000 Novartis Prize 2002 Research prize to set up a rising generation of researchers as part of the expertise network “Stem Cell Research” funded by the state of North Rhine Westphalia 2004 Pfizer Research Prize

THE RUHR METROPOLIS →

Neurobiology takes on a central role, in particular through the postgraduate programme “Development and Plasticity of the Nervous System” and the International Graduate School of Neurosciences at the Ruhr University of Bochum. As a result, many young scientists from a range of specialist areas work here, contributing to an innovative research environment and boosting new collaborations.

OPINION →

PD Dr.-Ing. Harald H. Quick (36)
Universität Duisburg-Essen

KEY ACTIVITIES →

Development and research in the field of magnetic-resonance-tomography (MRT)

HONORS →

2002 Young Investigator Award Finalist at the International Society for Magnetic Resonance in Medicine (ISMRM) 2003 Science Prize for Medicine awarded by Sparkasse Essen 2005 North Rhine Westphalia Science Prize, Industry-Club Düsseldorf e.V. and the North Rhine Westphalia Science Centre (Wissenschaftszentrum NRW)

THE RUHR METROPOLIS →

We moved from Switzerland to the Ruhr Metropolis six years ago to set up a research unit at the University Clinic of Essen in the field of Magnetic Resonance Imaging. Our research into MRI soon became established, gaining world-wide acclaim. The research-friendly environment along the Ruhr was very helpful. With so many renowned institutes based locally, productive collaborations have been developed. Zeche Zollverein has offered us the unique opportunity to install a pioneering project with a 7-Tesla high-field tomograph.

RESEARCH FOCUSES AT THE UNIVERSITIES →		
UNIVERSITY →	DEPT./FACULTY →	FIELD OF RESEARCH →
FACHHOCHSCHULE BOCHUM UNIVERSITY OF APPLIED SCIENCES	_Dept. of Electrotechnology & Informatics	_Medical Technology
FACHHOCHSCHULE DORTMUND UNIVERSITY OF APPLIED SCIENCES	_Dept. of Informatics	_Medical Informatics _Image Processing: Cell and Tissue Processing
RUHR-UNIVERSITÄT BOCHUM	_Faculty of Biology _Faculty of Chemistry _Faculty of Electro & Information Technology _Faculty of Mechanical Engineering _Faculty of Physics & Astronomy _Faculty of Psychology _Medical Faculty/University Clinic	_BioPhysics _Developmental Biology _Genetics _Micro-Biology _Neuro- biology & Behavioral Research _Cell & Molecular Biology _BioChemistry _Biosensors _Genetics _Imaging Processes _Medical Technology _Plasma Technology _Medical Technology _BioPhysics _Neuroinformatics _Plasma-Physics _Biopsychology _Clinical Psychology _Neuropsychology _Imaging Processes _Cardiovascular Medicine _Medical Technology _ Molecular Medicine _Neuro-Sciences _Oncology & Hepato-/ Gastroenterology _Protein Research
UNIVERSITÄT DORTMUND	_Dept. of Bio- & Chemical Engineering _Dept. of Chemistry _Dept. of Physics	_Biotechnology _Bio-Process Engineering _Chemical Biotechnology _ Technical Micro-Biology _Bioinorganic Chemistry _Biochemistry _Biochemical Microstructure Technology _Physical Biology _Biomaterials _Nanobiotechnology
UNIVERSITÄT DUISBURG-ESSEN	_Dept. of Biology & Geography _Dept. of Chemistry _Dept. of Physics _Faculty of Engineering Science _Dept. of Art & Design _Medical Faculty/University Clinic	_Developmental Biology _Genetics _Micro-Biology _Biofilms _Bio-Materials _Bio-Sensors _Micro-Biology _BioPhysics _Digital Image Processing _Nanostructures _Plasma Physics _Biomechanics _New Medical Technical Products _Gastroenterology _Cardio-vascular _Human Genetics _Oncology _ Trans- plantation _Tumor Research
RESEARCH FOCUSES AT THE NON-UNIVERSITY INSTITUTIONS →		
INSTITUTION →	FIELD OF RESEARCH →	
INSTITUT FÜR UMWELTHYGIENE UND UMWELTMEDIZIN DES HYGIENE-INSTITUTS DES RUHRGEBIETS, GELSENKIRCHEN INSTITUTE FOR ENVIRONMENTAL HYGIENE & MEDICINE	_Environmental-Micro-Biology _Environmental Medicine _Environmental Toxicology	

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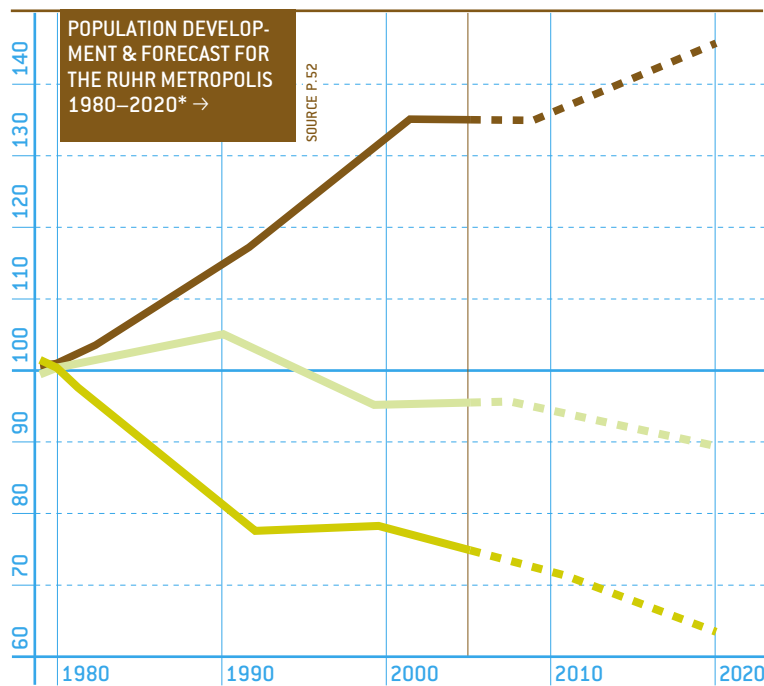
INSTITUT FÜR ARBEITSPHYSIOLOGIE AN DER UNIVERSITÄT DORTMUND (IfaDo) LEIBNIZ-INSTITUTE FOR WORKING ENVIRONMENT AND HUMAN FACTORS	_Occupational Medicine _Occupational Physiology _Neurophysiology _ Toxicology
INSTITUTE FOR GERONTOLOGY AT THE UNIVERSITÄT DORTMUND	_Demographic Change & Employment _Health & Health Services Supply Research _Life Circumstances Research & Social Gerontology Policy
INSTITUTE OF ENVIRONMENTAL RESEARCH (INFU), DORTMUND	_Molecular Imprinting Polymers _Xenobiotics in the Environment
INSTITUTE FOR ANALYTICAL SCIENCES (ISAS), DORTMUND	_Metabolomics _Miniaturisation _Proteomics & Functional Genomics _ Spectroscopy
INTERNATIONAL MAX PLANCK RESEARCH SCHOOL IN CHEMICAL BIOLOGY, DORTMUND	_BioChemistry _BioPhysics _Molecular Biology _Physical Chemistry _ Structural Biology
IWW – RHEINISCH-WESTFÄLISCHES INSTITUT FÜR WASSERFORSCHUNG GMBH, ESSEN IWW – RHENISH-WESTPHALIAN INSTITUTE FOR WATER RESEARCH	_Applied Micro-Biology _Biofilms _Microbiological Analytics
MAX-PLANCK-INSTITUTE FOR BIOINORGANIC CHEMISTRY, MÜLHEIM AN DER RUHR	_Bioinorganic Chemistry _Biophysical Chemistry _Protein Research
MAX-PLANCK-INSTITUTE OF MOLECULAR PYHSIOLOGY, DORTMUND	_Chemical Biology _Systems Biology _Physical-Biochemistry _ Structural Biology
WESTDEUTSCHES TUMORZENTRUM ESSEN (WTZE) WEST GERMAN TUMOR CENTER	_Tumor Research

CENTRAL INSTITUTIONS AT THE UNIVERSITIES →

UNIVERSITY →	TYPE OF INSTITUTION →	FIELD OF RESEARCH →
RUHR-UNIVERSITÄT BOCHUM	_Graduate School _Research Training Group _Center of Excellence _Collaborative Research Center _Central scientific institution	_Neurosciences _Chemistry and BioChemistry _Biology _Neurosciences _Medical Technology _Traumatology _Molecularbiology _Neurosciences _Proteomics _Medical Technology _Neuroinformatics
UNIVERSITÄT DORTMUND	_DFG-Research Unit _Central scientific institution (Research school)	_Molecular Biology _Biosciences/Biological-Chemical Microstructure Technology
UNIVERSITÄT DUISBURG-ESSEN	_DFG Research Unit _DFG Priority Program _Research Training Group _Central scientific institution	_Analytics _Oncology/Genetics _Transplantation _Epigenetics _Immune & Metabolism Modulation _Infection/Immunology _Medical Biotechnology _Microscaled Environmental Systems

ECONOMIC AND SOCIAL CHANGE

Economic, social and technological progress, and the growth of global networks of national societies and markets, have led to restructuring processes, social differentiations, to the breakdown of traditional values and behavioral patterns, and to the pluralization of lifestyles. Demographic developments accentuate these trends. As one of the largest conurbations in Europe, for the Ruhr Metropolis, this process is particularly relevant in view of the transformations to economic structures that have taken place in recent decades. Besides numerous faculties in economics, social sciences and humanities, almost 20 non-university research institutes address these issues.



*Development in the main age groups (1980 = 100)

OPINION →

Prof. Dr. Bernd Kriegesmann (42)
Institute for Applied Innovation Research (IAI) in Bochum e.V.
Fachhochschule Gelsenkirchen,
University of Applied Sciences

KEY ACTIVITIES →

Exploration of the conditions and forming of company innovation processes. The institute is currently involved in research on the early phases of company innovation processes and the development of application and realization skills to use newly gained technical-scientific knowledge in new products, services and processes.

THE RUHR METROPOLIS →

The Ruhr Metropolis could build on its traditional profile of skilled labor to contribute toward developing marketable products and services from newly acquired knowledge. After all, excellent research results alone do not create jobs. For this, a suitable implementation elite is required.

- Persons of pensionable age (>60 years)
- Persons of employable age (19-59 years)
- Children and youths (<19 years)

FOCUS →

Humanism in the Era of Globalization

Since autumn 2005, the Mercator Foundation in Essen has been funding a project platform throughout the Ruhr entitled "Humanism in the Era of Globalization" in the humanities and the arts.

The project's objective is to build research networks in the arts in the Ruhr Metropolis. It aims to promote intercultural dialog about cultural identity and difference in the age of globalization.

The basics relate to the intercultural perspectives of a new humanism and the potentials of mutual recognition in the discussion of cultures.

With an international Research Training Group at the participating universities of Bochum, Dortmund, Duisburg-Essen and Witten/Herdecke and an international exchange programme for guest academics, the project is about to begin; an international event and lecture programme is to follow.

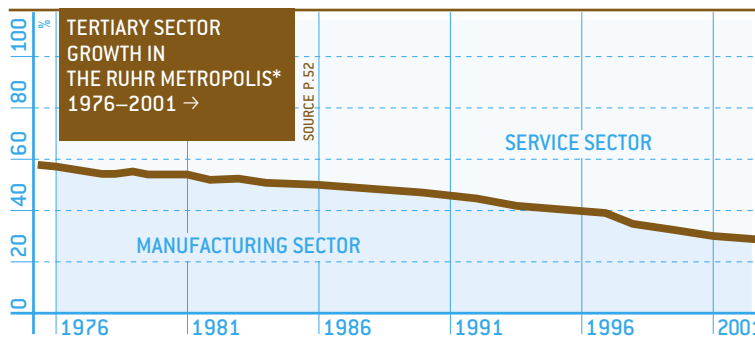
The project is hosted by the Institute for Cultural Affairs in Essen.

CONTACT PARTNER →

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In the search for concrete solutions, research activities in the Ruhr Metropolis can be classified into four categories:

- New working patterns, shifting lifestyles and new demands on living space have a direct impact on the towns and regions. Demographic change and the trend towards economic concentration are further subjects of research in the interplay of town and space.
- The economic upheaval of recent decades has opened up new opportunities, but that is not all: for companies and workers alike, the fast-moving economic changes are linked with socio-economic risks. Processes of change within the economy, their effects and possible solutions, are therefore a central theme of research of many economists and sociologists.
- Restructuring in the market, changes in production processes and even the rise in employment in the services sector have contributed to transformations in the world of work. Research in the field of labor addresses these changes.
- The Ruhr Metropolis is a prototypical immigration society, characterized by the dynamics of immigration and integration. Research into culture in society has its roots in the tradition of successfully dealing with the socio-economic demands of social change. In this way the region has, for example, expertise in working out and putting into practice new concepts of an intercultural urban development.



*Proportion of employees subject to social security contributions

FOCUS →

Ruhr Graduate School in Economics (RGS Econ)

The RGS Econ is a network initiative by the Ruhr-Universität Bochum, the Universities of Dortmund and Duisburg-Essen and the Rheinisch Westphalian Institute for Economic Research in Essen. As one of seven Graduate Schools in North Rhine Westphalia, this international research and training establishment supports and accompanies PhD students in their economic research projects. The principle of the RGS Econ is based on cooperation and networking to boost elite research and the international competitiveness of North Rhine Westphalia. As a joint establishment of research and teaching of economics, it combines empirical and theoretical problems with an international orientation. Theoretical modelling and econometric processes are special areas of interest. At the core of the research for the coming years are the impact and concomitant phenomena of demographic change.

CONTACT →

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OPINION →

Dr. John P. Haisken-DeNew (40)
Rhenish-Westphalian Institute for Economic Research (RWI Essen)

KEY ACTIVITIES →

Migration, applied economics, life satisfaction. Investigations, for example into the link between a rise in real income and life satisfaction in eastern Germany since reunification.

HONORS →

2005 Newcomer Award of the German Socio-Economic Panel Study sponsored by the Society of Friends of the German Institute for Economic Research in Berlin for a study of the defining factors of life satisfaction in Germany since reunification.

THE RUHR METROPOLIS →

The economic region of the Ruhr offers a multitude of opportunities for networking, one example being the Ruhr Graduate School of Economics (RGS Econ), set up by RWI Essen together with the Universities of Bochum, Dortmund and Duisburg-Essen. It enables PhD studies at an international level, combines the knowledge resources of all participating institutions and documents the intellectual capability of the Ruhr region as an economic region. Everyone involved enjoys the benefits: the young scientists, RWI Essen and the Universities.

RESEARCH FOCUSES AT THE UNIVERSITIES →		
UNIVERSITY →	DEPT./FACULTY →	FIELD OF RESEARCH →
EVANG. FACHHOCHSCHULE RHEINLAND-WESTFALEN-LIPPE, BOCHUM PROTESTANT UNIVERSITY OF APPLIED SCIENCES	<ul style="list-style-type: none"> _Dept. of Social Work _Dept. of Special Education/Nursing _Dept. of Religious and Church Pedagogy 	<ul style="list-style-type: none"> _Family & Youth Research _Migration & Interculturism _Public Health _Law for Social Services _Social Ethics _Networks Research _Schools Social Work _Promoting Development & Health _Learning & Behavioral Problems _Inclusion Research _Care in the Nursing Care & Health Systems _Development & Evaluation of Training Measured in Healthcare/Nursing Systems _Community Development _History of the Diakonie _Organisational Development of the Diakonie
FACHHOCHSCHULE DORTMUND UNIVERSITY OF APPLIED SCIENCES	<ul style="list-style-type: none"> _Dept. of Architecture _Dept. of Applied Social Sciences _Dept. of Economics _Dept. of Design 	<ul style="list-style-type: none"> _Urban Planning & Urban Development _Construction Labor Research/ Employment in the Constuction Sector _Culture-, Construction- & Urban Development History in the Ruhr Region _Integration & Migration Research _Auditive Culture Techniques _Global Markets: Projects, Risk & Finance _Art in public space (graphics, photography & film projects)
FOM – FACHHOCHSCHULE FÜR OEKONOMIE & MANAGEMENT UNIVERSITY OF APPLIED SCIENCES FOR ECONOMICS & MANAGEMENT	<ul style="list-style-type: none"> _Dept. of Economic Science 	<ul style="list-style-type: none"> _International Accounting _Outsourcing _Innovative Financing Intruments _Developing Skills in Small and Medium-Sized Companies _Marketing & Sales Analyses of SMEs
RUHR-UNIVERSITÄT BOCHUM	<ul style="list-style-type: none"> _Faculty of GeoSciences _Faculty of Social Sciences _Faculty of Economic Sciences _Law Faculty 	<ul style="list-style-type: none"> _City & Regional Planning Management _Economic & Social Geography _Work Organisation & Planning _Work & Economic Sociology _Developing Countries _International Politics _Political Systems _City & Regional Research _Impact & Implications of Economic Globalization _Demographic Change _Deregulation _Development Research _Development Policy _Regional Policy _Welfare Economics _Work & Social Policies _The International & European Economy
UNIVERSITÄT DORTMUND	<ul style="list-style-type: none"> _Faculty of Civil Engineering _Faculty of Humanities & Theology _Faculty of Cultural Sciences _Faculty Urban & Regional Planning _Economics & Social Sciences Faculty 	<ul style="list-style-type: none"> _Urban Development _Intercultural Communication _Media & Politics _Party Research _Political Systems _Cultural Sciences _Semiotics _Scientific Communication _Political Economics _Urban and Regional Planning in Europe & in Developing Countries _Spatial Economics _Urban-, Regional- & State Planning _Employment & Technology Sociology _Employment Market Economics _Industrial Economics _Monetary Foreign Policy _Growth & Distribution Theory _Economic & Industrial Sociology
ZOLLVEREIN SCHOOL OF MANAGEMENT & DESIGN	<ul style="list-style-type: none"> _Dept. of Economic Science _Dept. of Design 	<ul style="list-style-type: none"> _International Accounting _Design _Innovation

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UNIVERSITÄT DUISBURG-ESSEN	Dept. of Building Science Dept. of Educational Science Dept. of Social Sciences Dept. of Art & Design Dept. of Economic Science Mercator School of Management, Dept. of Business Studies	Urban Development Migration Research Development Policy _Global, Regional and Modern Democratic Governance _Culture & Communication _Changing Organisational Society _Political Management _Security/Peace Policy Ergonomic Design Solutions _Industrial Design Labor Market Policy _Industrial Economics _Innovation Economics _International Relations _Economic Policy Labor Market Policy _Deregulation _Innovation Management _International Economic Relations _Regulatory Policy _Economic Policy
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CENTRAL INSTITUTIONS AT THE UNIVERSITIES →

UNIVERSITY →	TYPE OF INSTITUTION →	RESEARCH SUBJECTS →
FACHHOCHSCHULE BOCHUM UNIVERSITY OF APPLIED SCIENCES	_Central scientific institution	_Soft-Skills-Training
FACHHOCHSCHULE DORTMUND UNIVERSITY OF APPLIED SCIENCES	_Central scientific institution	_Auditive Cultural Techniques
FOLKWANG HOCHSCHULE UNIVERSITY OF THE ARTS	_Central scientific institution	_Musical Exile Research
RUHR-UNIVERSITÄT BOCHUM	Research Training Group _Central scientific institution	Industrial Agglomerations _Migration Employment Science _Development Policy _Peace Studies _Migration _Ruhr Region Research _Social Movements
UNIVERSITÄT DORTMUND	_Central scientific institution	_Urban and Regional Planning _Knowledge & Service Work
UNIVERSITÄT DUISBURG-ESSEN	_Central scientific institution	_Cultural Science _Civilisation & Gender _Cultural History/Regional Development _Gender Research

RESEARCH AND DEVELOPMENT AT NON-UNIVERSITY INSTITUTIONS →

INSTITUTION →	FIELD OF RESEARCH →
AIQ – ARBEIT INNOVATION QUALIFIKATION E.V., DORTMUND RESEARCH, TRAINING & CONSULTING INSTITUTE	_Impact of Technical & Organisational Change on the Employment World
BUNDESANSTALT FÜR ARBEITSSCHUTZ & ARBEITSMEDIZIN (BAuA), DORTMUND FEDERAL INSTITUTE FOR OCCUPATIONAL SAFETY & HEALTH	_Health & Safety at Work
DEUTSCHE ARBEITSSCHUTZAUSSTELLUNG (DASA), DORTMUND GERMAN OCCUPATIONAL SAFETY & HEALTH EXHIBITION	_Health & Safety at Work _Changing World of Employment
DEUTSCHES BERGBAU-MUSEUM (DBM), BOCHUM GERMAN MINING MUSEUM	_Protection and Preservation of Cultural Heritage particularly the Steel & Coal Industry

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FORSCHUNGSGESELLSCHAFT FÜR GERONTOLOGIE E.V. AN DER UNIVERSITÄT DORTMUND RESEARCH SOCIETY FOR GERONTOLOGY	_Social Gerontology Policy _Demographic Change & the Working World_ _Care Provisions Research
FORSCHUNGSINSTITUT ARBEIT BILDUNG PARTIZIPATION E.V. (FIAB), RECKLINGHAUSEN LABOR, EDUCATION, PARTICIPATION RESEARCH INSTITUTE	_Globalisation _Participation & Integration _Political Education _Future of Work
FORSCHUNGSINSTITUT FÜR WIRTSCHAFTLICHE ENTWICKLUNG IM PAZIFIKRAUM E.V. (FIP), DUISBURG RESEARCH INSTITUTE FOR ECONOMIC DEVELOPMENT IN THE PACIFIC	_Economic Development & Governance in Asia
FRIEDRIKE-FLIEDNER-INSTITUT FÜR PRAXISFORSCHUNG IM GESUNDHEITS- & SOZIALWESEN, DÜSSELDORF INSTITUTE FOR PRACTICAL RESEARCH IN HEALTH & SOCIAL SYSTEMS	_Care _Care Process Planning _Training Concepts in the Health & Social Services Systems
GESELLSCHAFT FÜR ARBEITSSCHUTZ & HUMANISIERUNGSFORSCHUNG MBH, DORTMUND (GFAH) SOCIETY FOR OCCUPATIONAL SAFETY & HUMANIZATION RESEARCH	_Demographics & Diversity _Structural Change in the Future
INSTITUT FÜR ANGEWANDTE INNOVATIONSFORSCHUNG E.V. (IAI), BOCHUM INSTITUTE FOR APPLIED INNOVATION RESEARCH	_Innovation Management _Innovation Policy _Skills Development _ Lifestyle-Management _Small & Medium-Sized Companies in Structural Change
INSTITUT FÜR DIASPORA- & GENOZIDFORSCHUNG (IDG) INSTITUTE FOR DIASPORA & GENOCIDE RESEARCH	_Peace Research _Human Rights Violations _Migration _Modern Lifestyles _Genocide
INSTITUT FÜR LANDES- & STADTENTWICKLUNGSFORSCHUNG & BAUWESEN DES LANDES NRW (ILS NRW), DORTMUND INSTITUTE FOR REGIONAL & URBAN DEVELOPMENT & CIVIL ENGINEERING STATE NRW	_Demographic Change _Development of City & Metropolitan Regions _ Social & Integrative Urban Development
INSTITUT FÜR WOHNUNGSWESEN, IMMOBILIENWIRTSCHAFT, STADT- & REGIONALENTWICKLUNG GMBH (InWIS) INSTITUTE FOR HOUSING, REAL ESTATE, URBAN & REGIONAL DEVELOPMENT	_Demographic Change _Social- & Labor Market Policy _Urban & Regional Development
KULTURWISSENSCHAFTLICHES INSTITUT (KWI), ESSEN INSTITUTE OF CULTURAL STUDIES	_Intercultural Communication _Culture of Responsibility in Civil Society
LANDESINSTITUT SOZIALFORSCHUNGSSTELLE DORTMUND (sfs) STATE INSTITUTE FOR LABOR RESEARCH	_Service Work in a Changing Society _European Employment Policy _The Future of Work
NEUKIRCHENER JUGENDHILFEINSTITUT FÜR PRAXISFORSCHUNG IN DER KINDER-, JUGEND-, FAMILIEN- & BEHINDERTENHILFE, NEUKIRCHEN-VLUYN YOUTH AID INSTITUTE FOR PRACTICAL RESEARCH IN CHILDREN, YOUTH, FAMILY & DISABLED	_Youth & Family Support _Disabled Support _Health & Social Services
RHEINISCH-WESTFÄLISCHES INSTITUT FÜR WIRTSCHAFTSFORSCHUNG E.V. (RWI), ESSEN RHENISH-WESTPHALIAN INSTITUTE FOR ECONOMICS RESEARCH	_Employment Market _Demographic Change _Migration _Integration & Education _Social Safeguards
RHEIN-RUHR-INSTITUT FÜR SOZIALFORSCHUNG & POLITIKBERATUNG E.V. (RISP), DUISBURG SOCIAL RESEARCH & POLICY CONSULTING INSTITUTE	_Employment _Education & Social Change _Migration & Intercultural Communication
RUHR GRADUATE SCHOOL IN ECONOMICS (RGS Econ), VERBUND UNIVERSITÄTEN BOCHUM, DORTMUND, DUISBURG-ESSEN; RWI, ESSEN	_Demographic Change, particularly Employment & Population Economics _ Industrial Economics
STIFTUNG ZENTRUM OF TÜRKEISTUDIEN, ESSEN FOUNDATION CENTER FOR STUDIES ON TURKEY	_Migration & Integration

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 44227 Dortmund
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 Universitätsstraße 150
 44801 Bochum
www.hgi.ruhr-uni-bochum.de
hgi-office@ruhr-uni-bochum.de

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idf@ruhr-uni-bochum.de

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www.ruhr-uni-bochum.de/iee
ieeoffice@ruhr-uni-bochum.de

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 Ellernstraße 29
 45326 Essen
www.exp-math.uni-essen.de
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INSTITUTE FOR NEUROCOMPUTING →
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INSTITUTE OF LOWER-RHINE CULTURAL HISTORY & REGIONAL DEVELOPMENT →
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zefir@ruhr-uni-bochum.de

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zlv.uni-duisburg.de/fs.htm
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 44339 Dortmund
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